

SKELETAL SYSTEM–



DEFINITION–

The skeletal system is the structural framework that supports a body. It also provides protection for a soft tissues and internal organs and serves as an attachment for the body's muscles that push against it and apply force, resulting in movement.

FUNCTIONS–

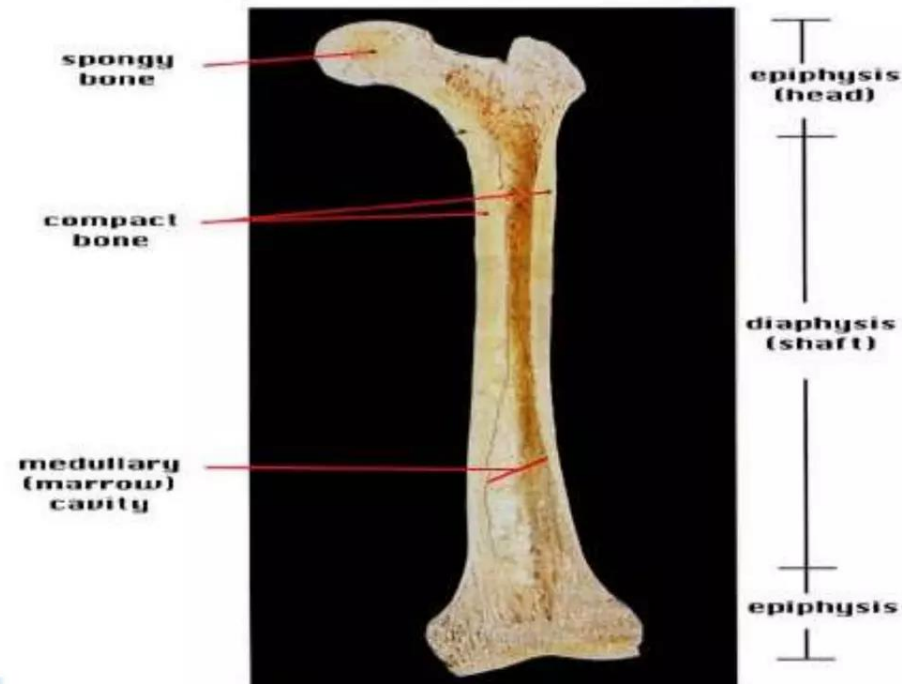
- ▶ Support and protects of soft tissues and vital organs.
- ▶ To give attachment to muscles.
- ▶ Formation of red blood corpuscles in the bone marrow.
- ▶ Storage of mineral salts like phosphorus and calcium.

CLASSIFICATION OF BONE-

1. Long bone-

They found in the limbs. A long bone contains shaft and two extremities.

e.g. Humerus, femur



2. SHORT BONE-

These have no shaft, but they contain a spongy substance covered by a shell of compact bone.

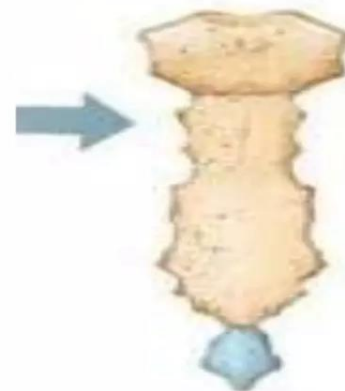
e.g. Wrist, ankle.



3. Flat bone–

Flat bones are as they sound, strong, flat plates of bone with the main function of providing protection to the bodies vital organs and being a base for muscular attachment.

E.g. Scapula (shoulder blade), Sternum (breast bone).



(c) Flat bone (sternum)

4. Irregular bone-

These are bones in the body which do not fall into any other category, due to their non-uniform shape. They primarily consist of cancellous bone, with a thin outer layer of compact bone.

E.g. Vertebrae, Mandible etc.



5.Sesasmoid bone-

Sesasmoid bones are usually short or irregular bones, embedded in a tendon. The most obvious example of this is the Patella.



Composition of bone–

Extracellular matter

Cellular component

Organic matrix
(osteoid tissue)
Collagen fibers

Inorganic
matrix (bone
mineral) calcium
phosphate


*OSTEOBLASTS

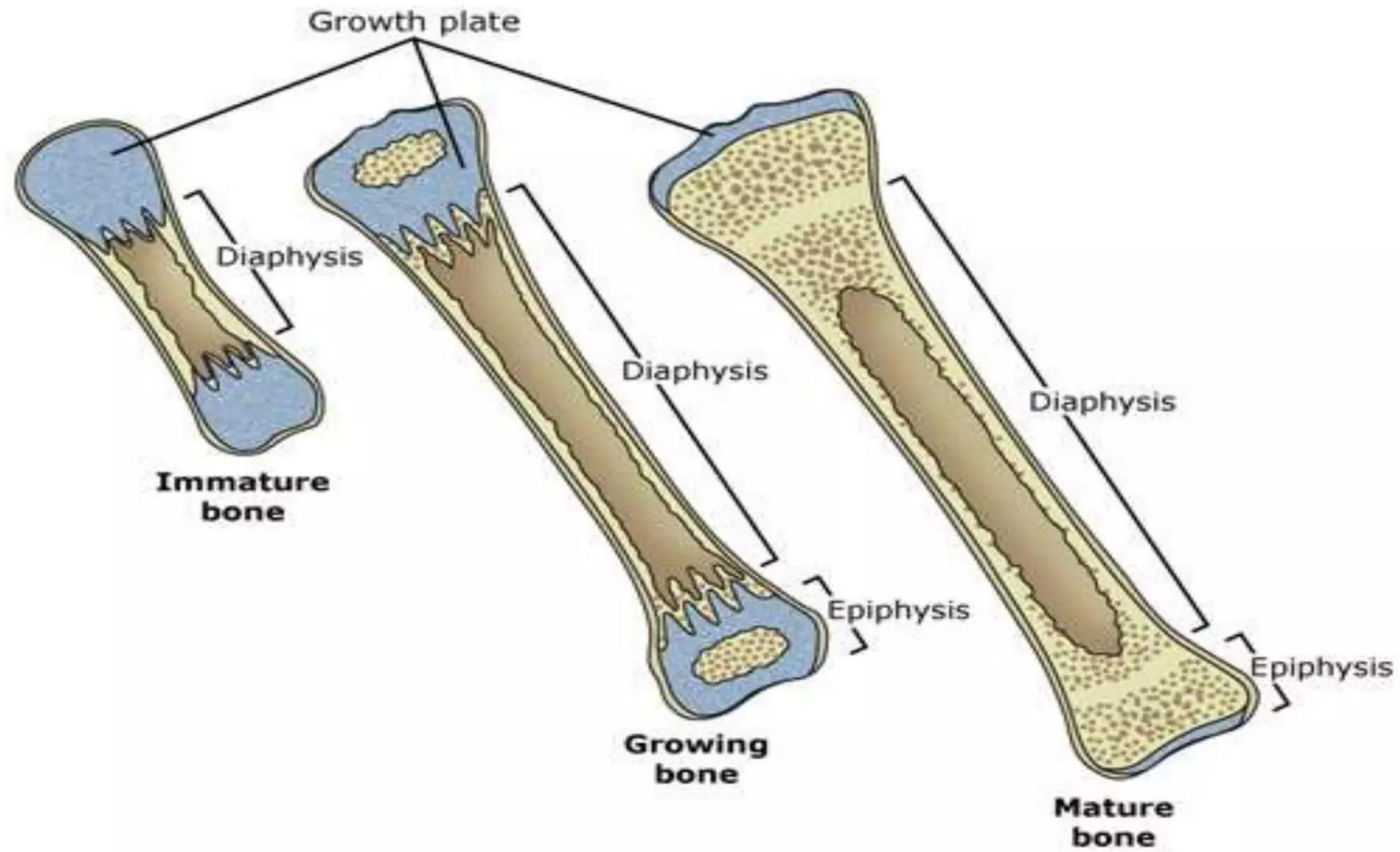
*OSTEOCLASTS

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Development of bone-

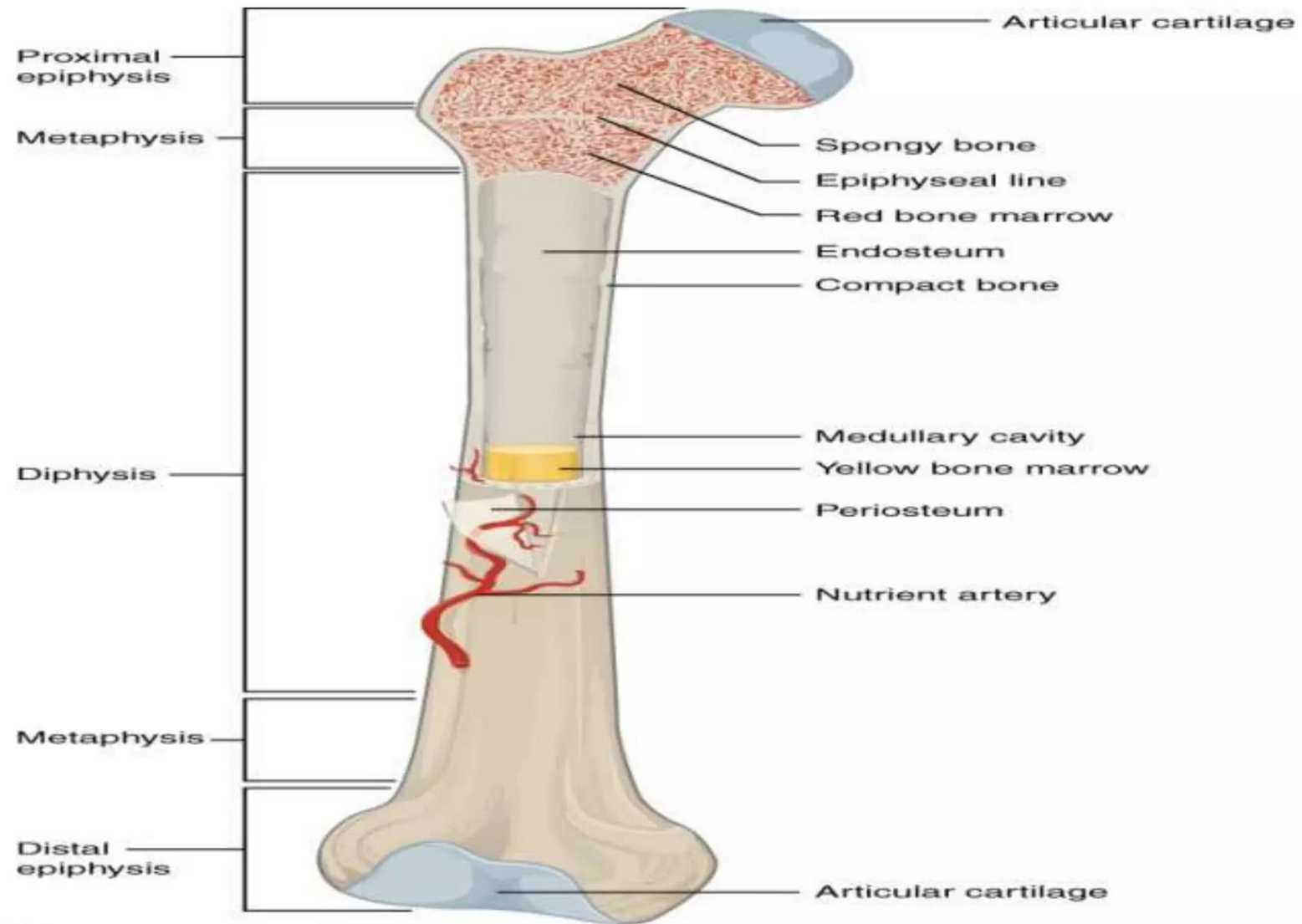
- ▶ Ossification, or osteogenesis, is the process of bone formation by osteoblasts.
- ▶ Ossification is distinct from the process of calcification; whereas calcification takes place during the ossification of bones, it can also occur in other tissues.

- ▶ Ossification begins approximately six weeks after fertilization in an embryo. Bone growth continues until approximately age 25.
 - ▶ Bones can grow in thickness throughout life, but after age 25, ossification functions primarily in bone remodeling and repair
 - ▶ Long bones continue to lengthen (potentially throughout adolescence) through the addition of bone tissue at the epiphyseal plate.
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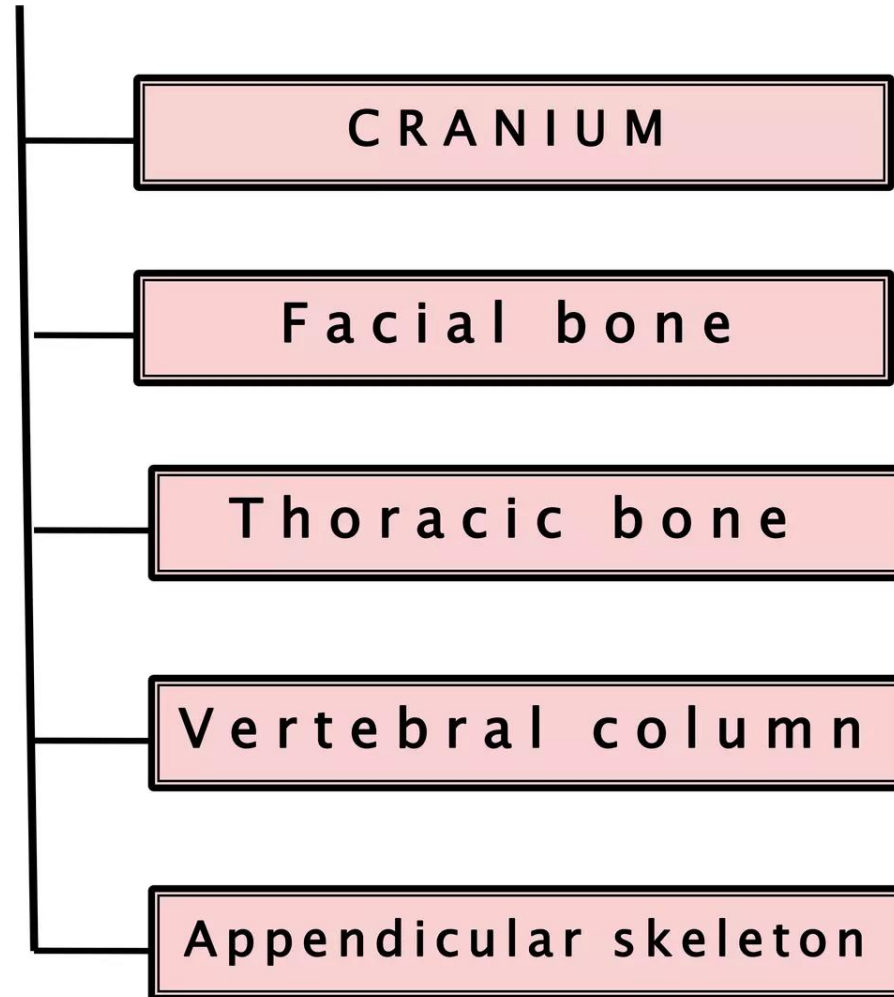


LONG BONE–

- ▶ Each long bone has an elongated shaft or diaphysis and two expanded ends (epiphyses) which are smooth and articular.
- ▶ The shaft typically has 3 surfaces separated by 3 borders, a central medullary cavity, a nutrient foramen and periostium directed away from the growing end.
- ▶ Limb bones are typical long bones.

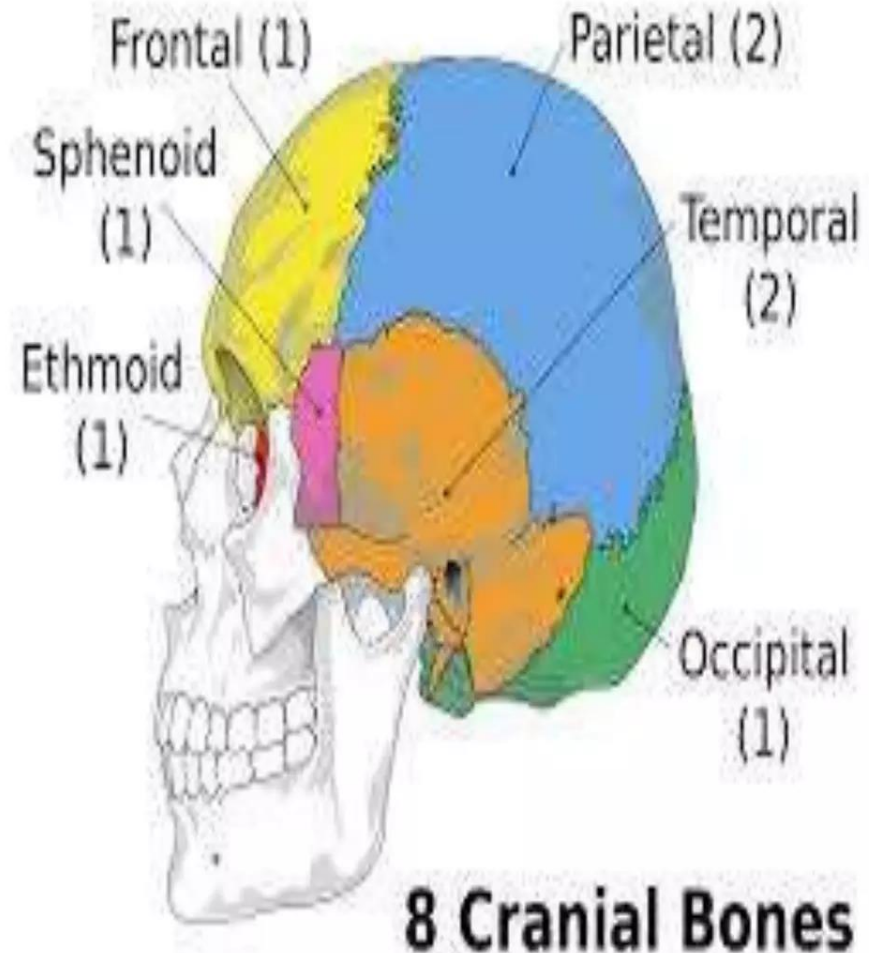


SKELETAL SYSTEM–



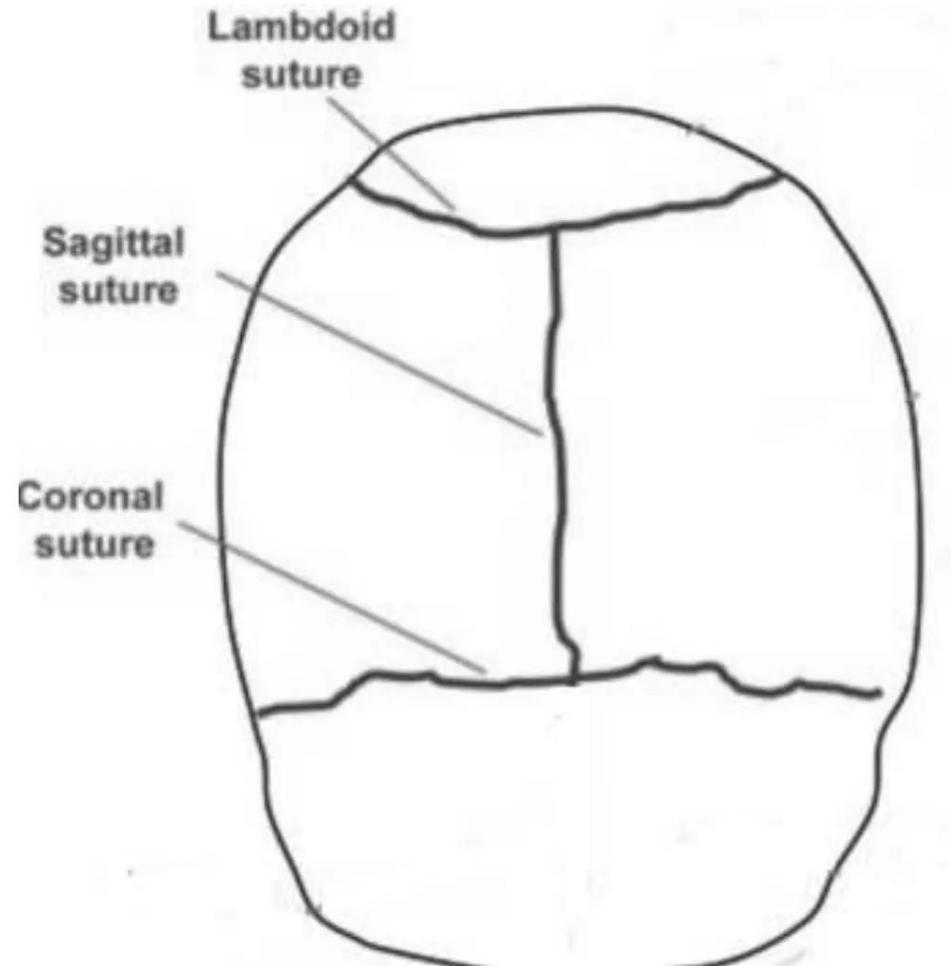
CRANIUM–

- ▶ It consist of 8 bones:
 - a. One **frontal** bone
 - b. Two **parietal** bone
 - c. Two **temporal** bone
 - d. One **occipital** bone
 - e. One **sphenoid** bone
 - f. One **ethmoid** bone



Sutures of cranium–

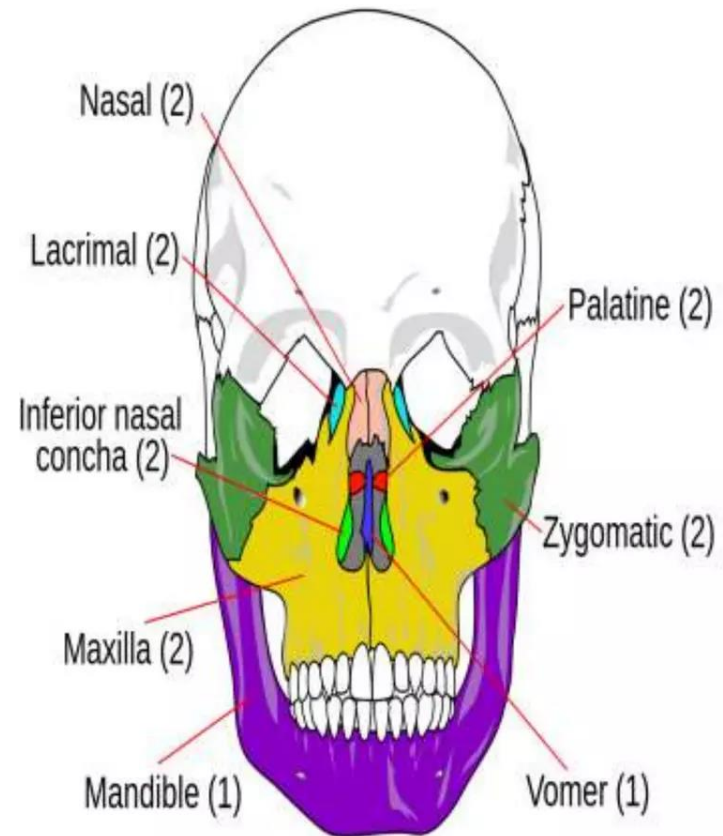
1. Coronal suture
2. Saggittal suture
3. Lambdoid suture



BONES OF THE FACE-

The bones which make the face are 14 in number.
These are–

1. Two maxillae (upper jaw)
2. One mandible (lower jaw)
3. Two palate bones
4. Two zygomatic bones
5. Two lacrimal bones
6. Two nasal bones
7. Two inferior conchae bones
8. One vomer

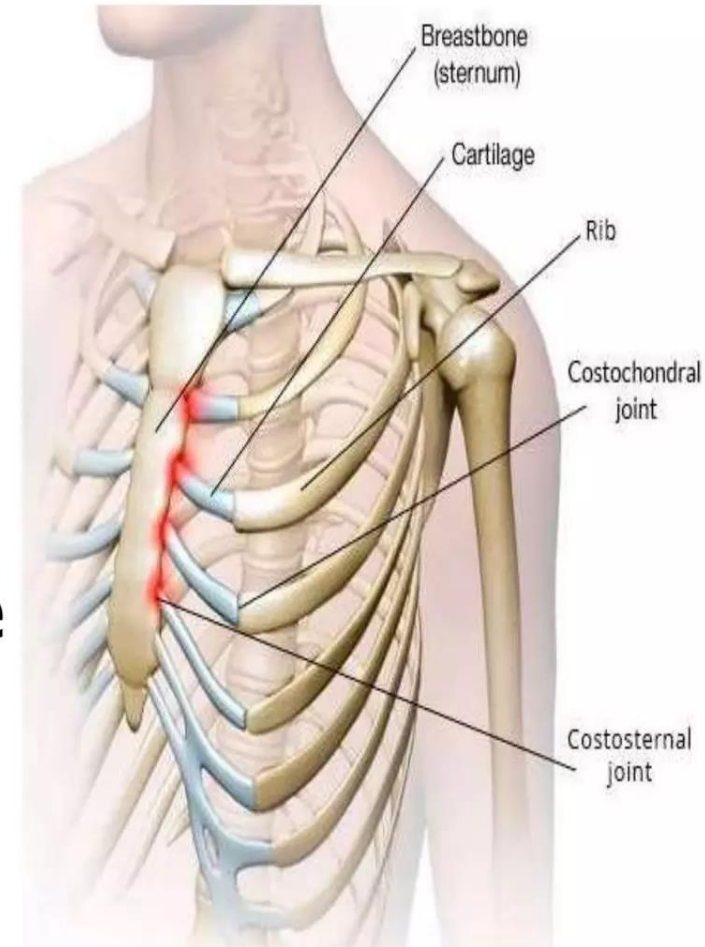


14 Facial Bones

BONE OF THORAX–

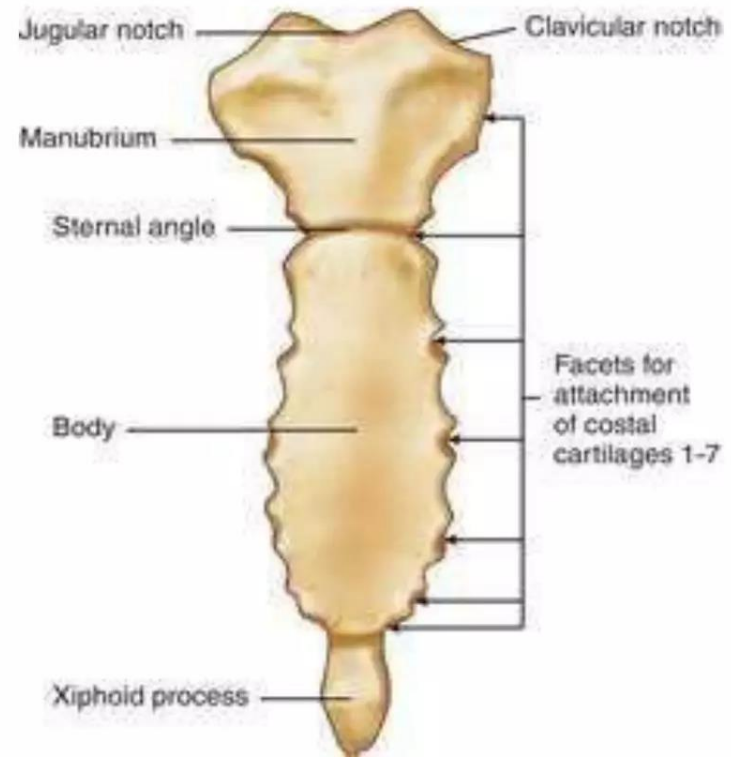
The skeleton of thorax is made up of the following bone–

1. **Sternum** in the front
2. **Twelve pairs of ribs**
3. **Twelve thoracic vertebrae**



- ▶ **Sternum:** It is also called Breast bone. It is a flat bone which is divided into three parts namely–

- a. Manubrium sterni
- b. Body of sternum
- c. Xiphoid bone

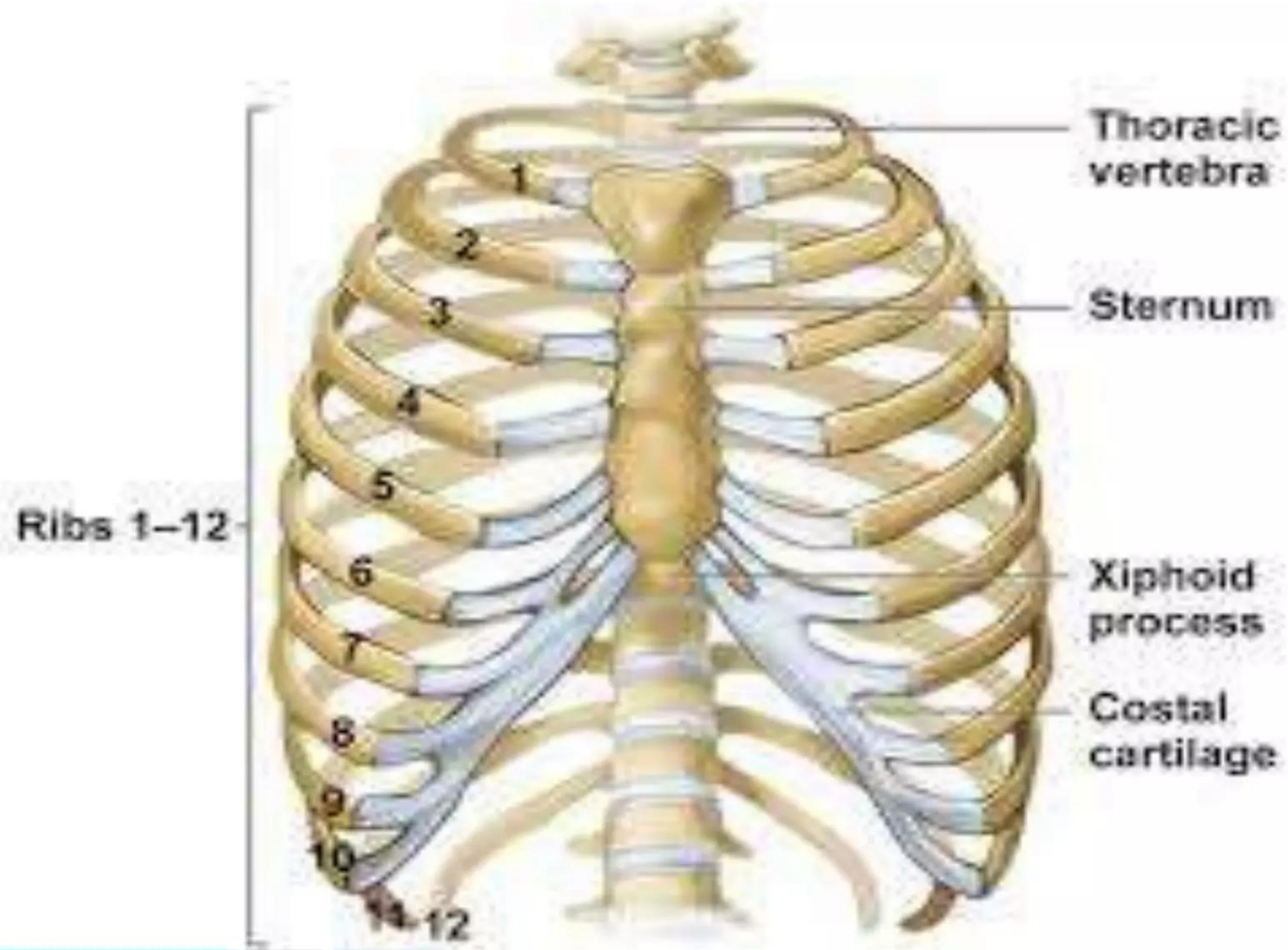


► **RIBS-** They are arranged in **12** pairs, on the back side, all of them are attached to thoracic vertebrae. Depending on their attachment in the front, they are classified as:

a. True ribs- They are upper five pairs, and are attached to sternum directly.

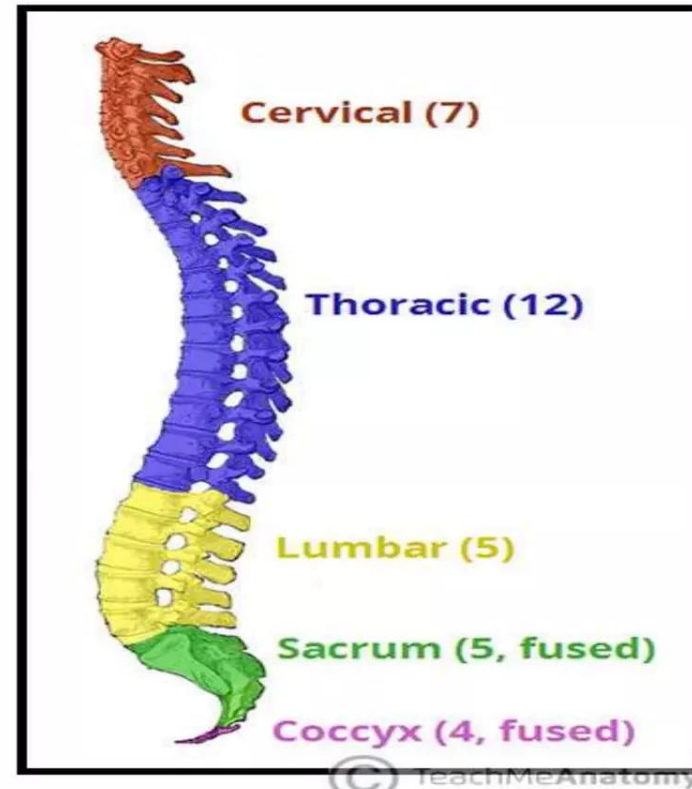
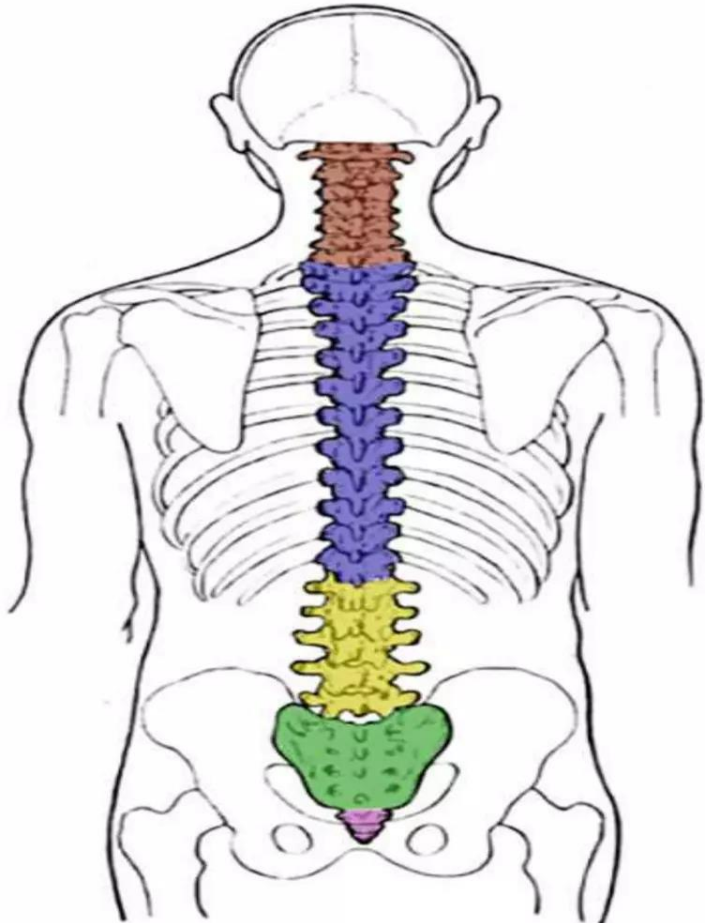
b. False ribs- They are lower five pairs, and are attached to the sternum indirectly. (through costal cartilages).

c. Floating ribs- Lowest two pairs. They are not attached in front.



Vertebral column:

- ▶ The vertebral column is made up of number of bones. These bones are called vertebrae. These are **33** in no.

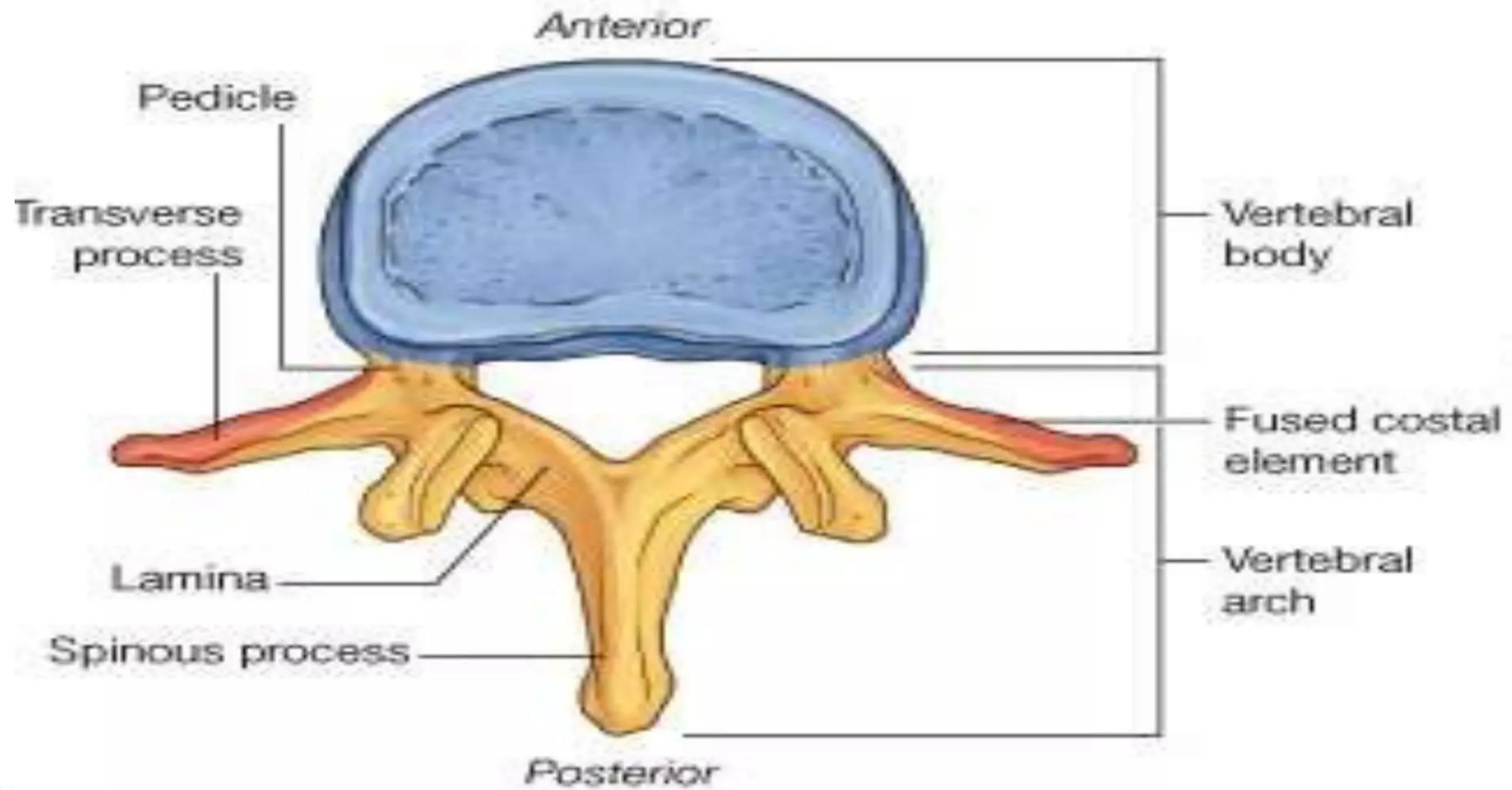


► **Classification of vertebrae**– According to the region they occupy:

1. **Cervical vertebrae**- 7 in no. They form the neck.
2. **Thoracic vertebrae**- 12 in no. they form back of thorax.
3. **Lumbar vertebrae**- 5 in no. they form lumbar region.
4. **Sacral vertebrae**- 5 in no. they form sacrum.
5. **Coccygeal vertebrae**- 4 in no. they form coccyx.

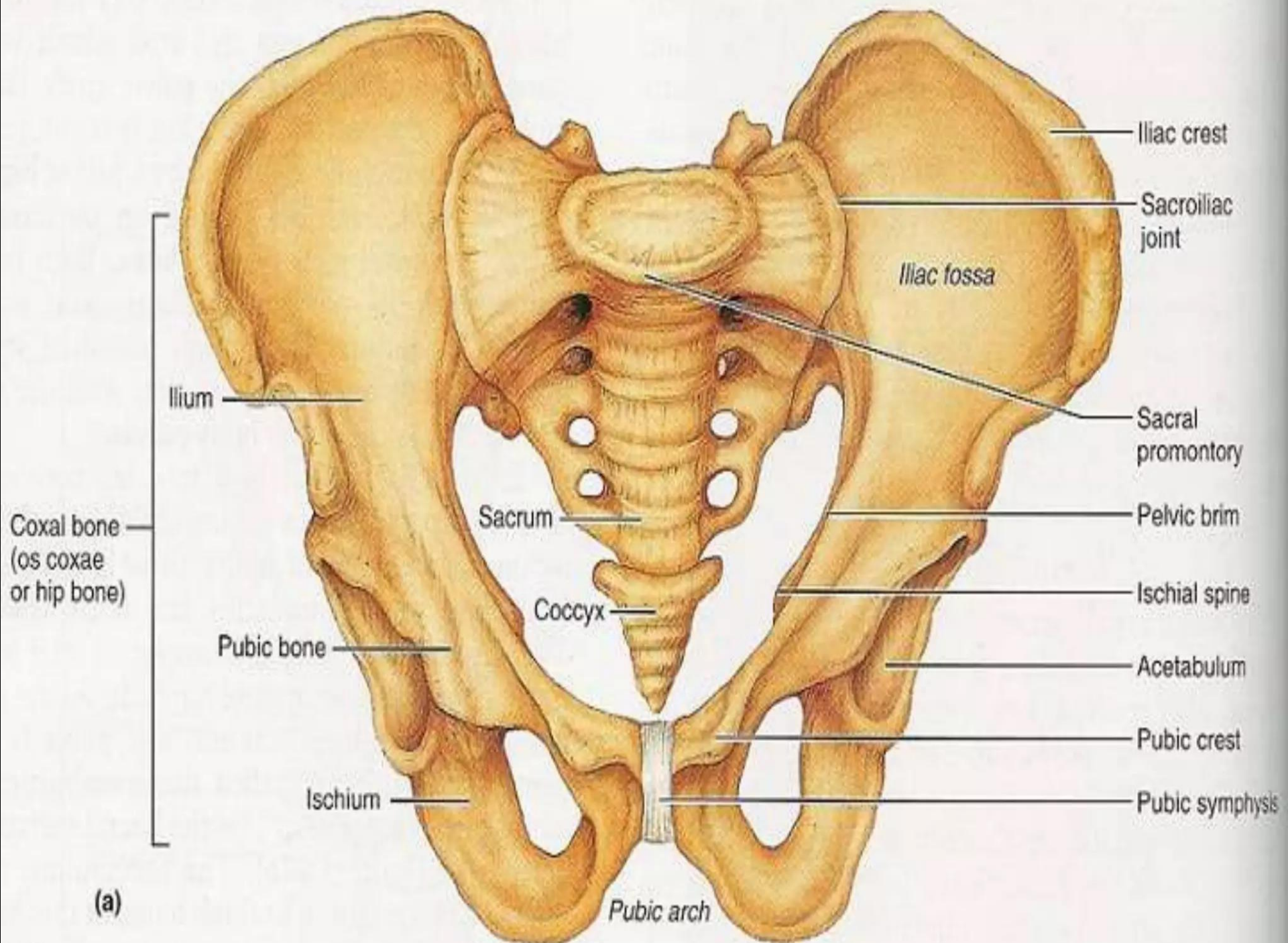
Structure of typical vertebrae-

- ▶ A **body** which is a box shaped anterior part. It is slightly concave in the upper and lower surface.
- ▶ **Neural arch** which is the posterior part.
- ▶ Two **transverse processes**, one on each side. They lie in the junction between pedicle and lamina.
- ▶ One spinous process which is a backward projection.
- ▶ Neural canal which is a circular opening. The spinal cord is passing through this.

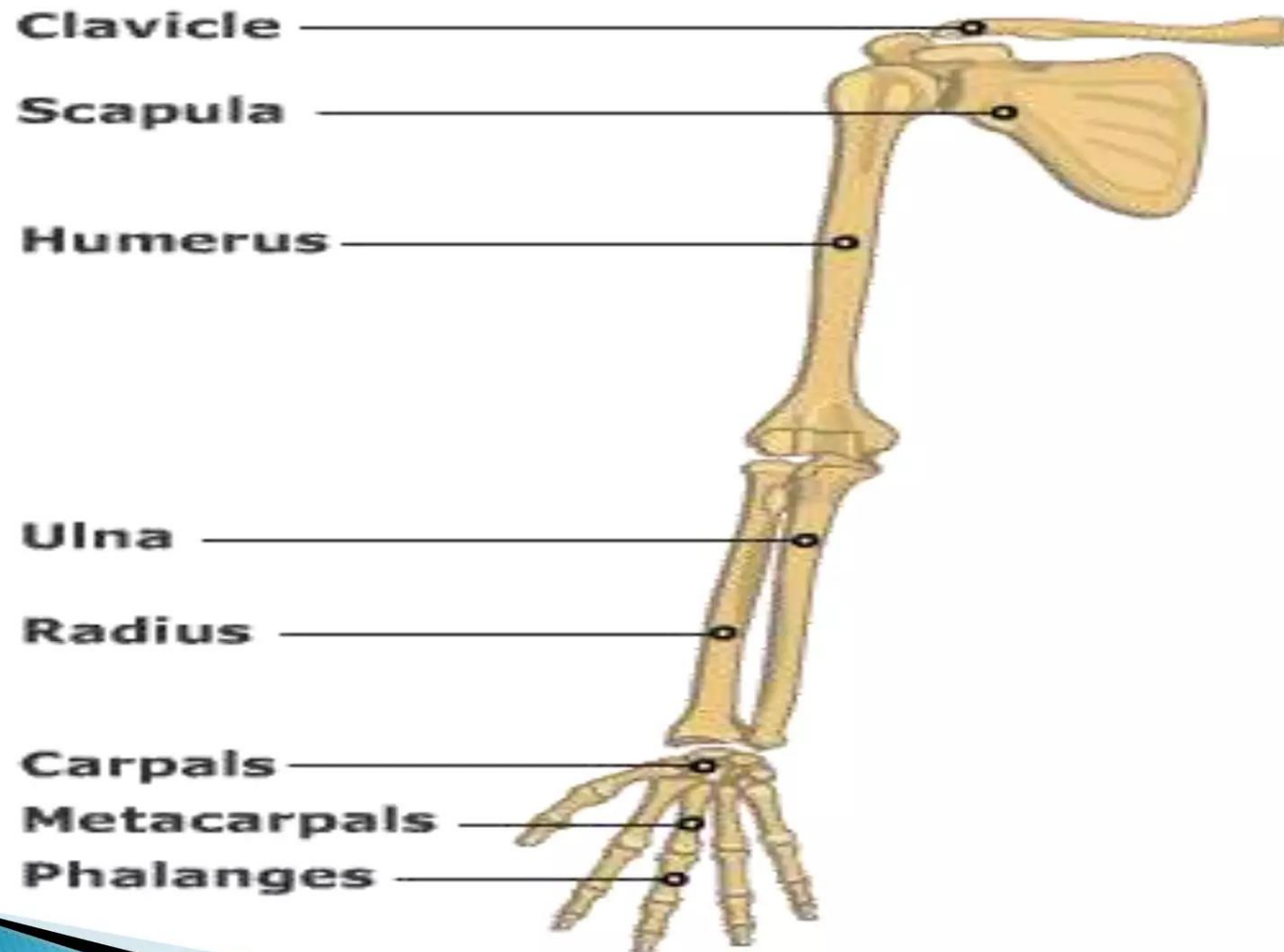


Bones of pelvic girdle–

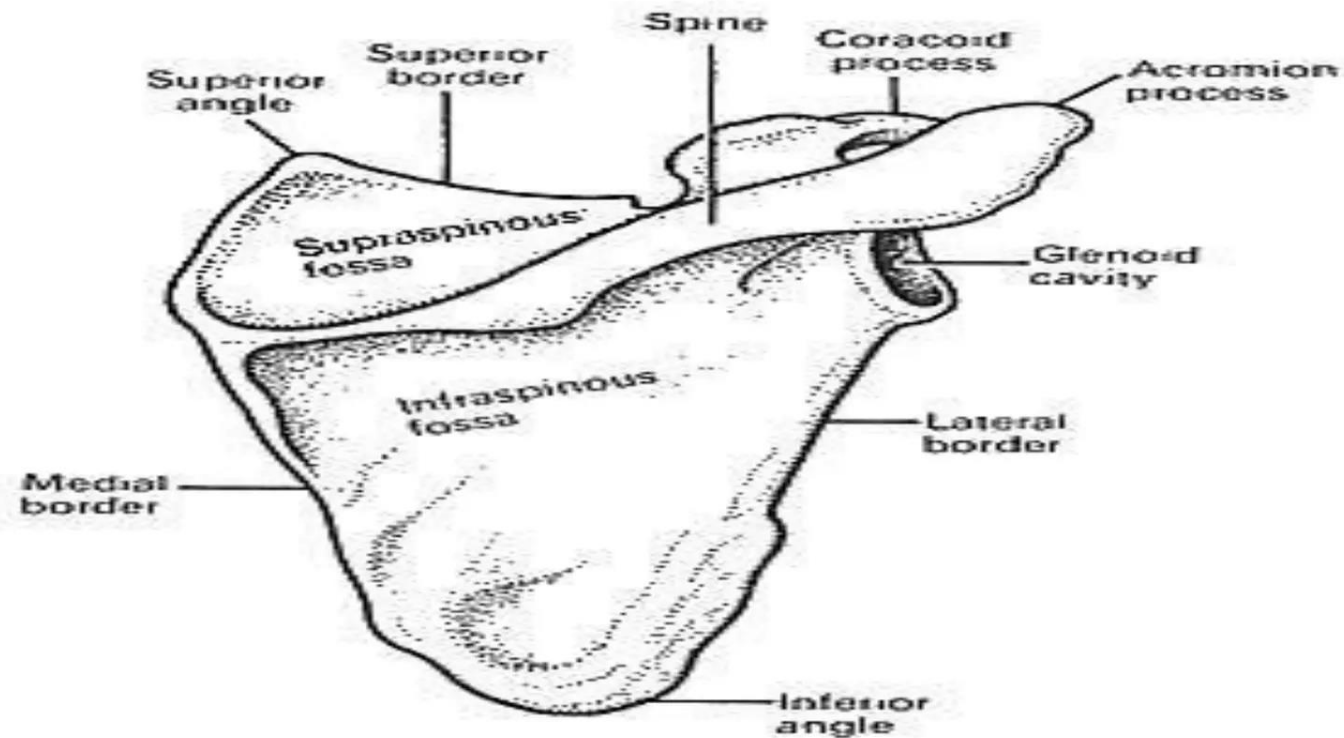
- ▶ The pelvic girdle is the connection between the trunk and lower extremities. It is formed by 4 bones–
 - a. **Two innominate bones**, one on each side
 - b. **Sacrum**
 - c. **Coccyx**



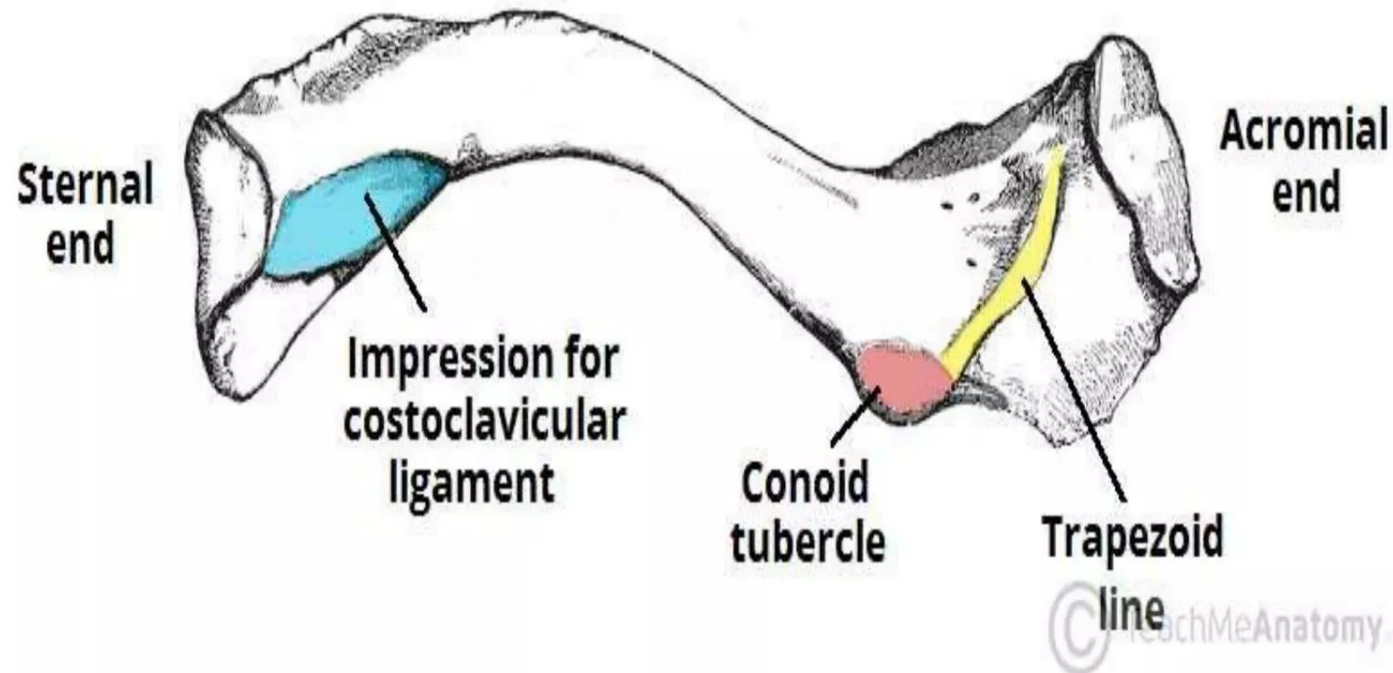
BONES OF UPPER LIMB



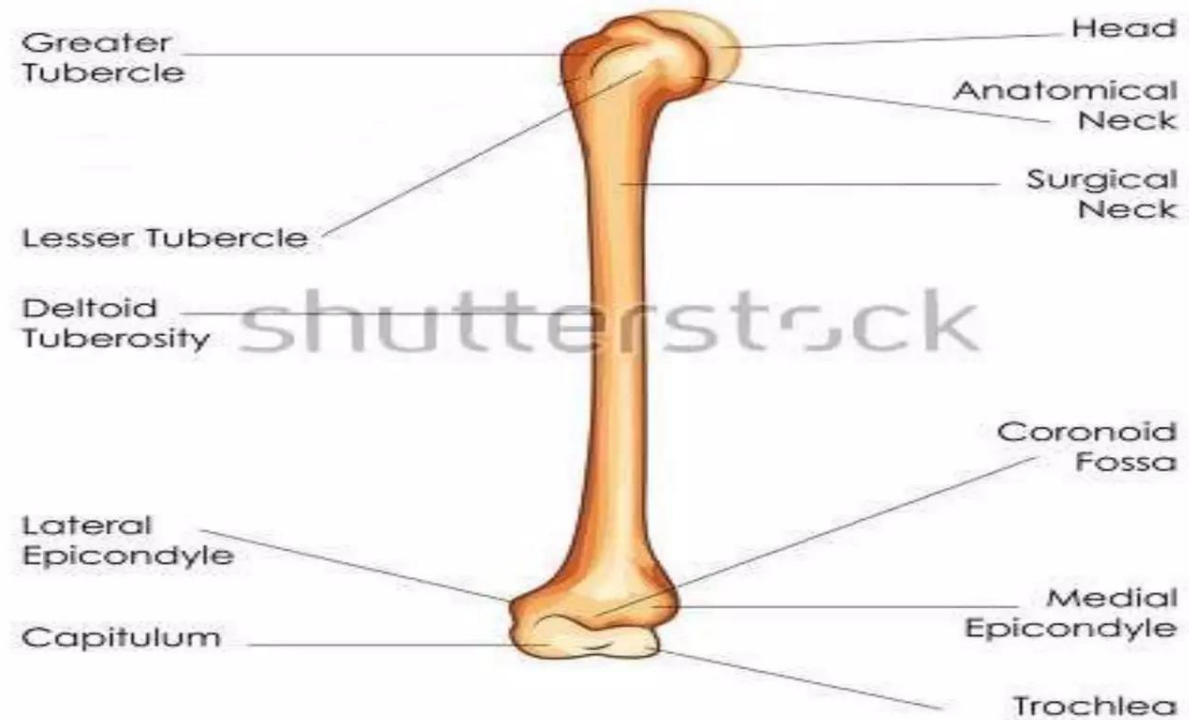
SCAPULA– It lie at the back of thorax. It forms the posterior part of shoulder girdle.



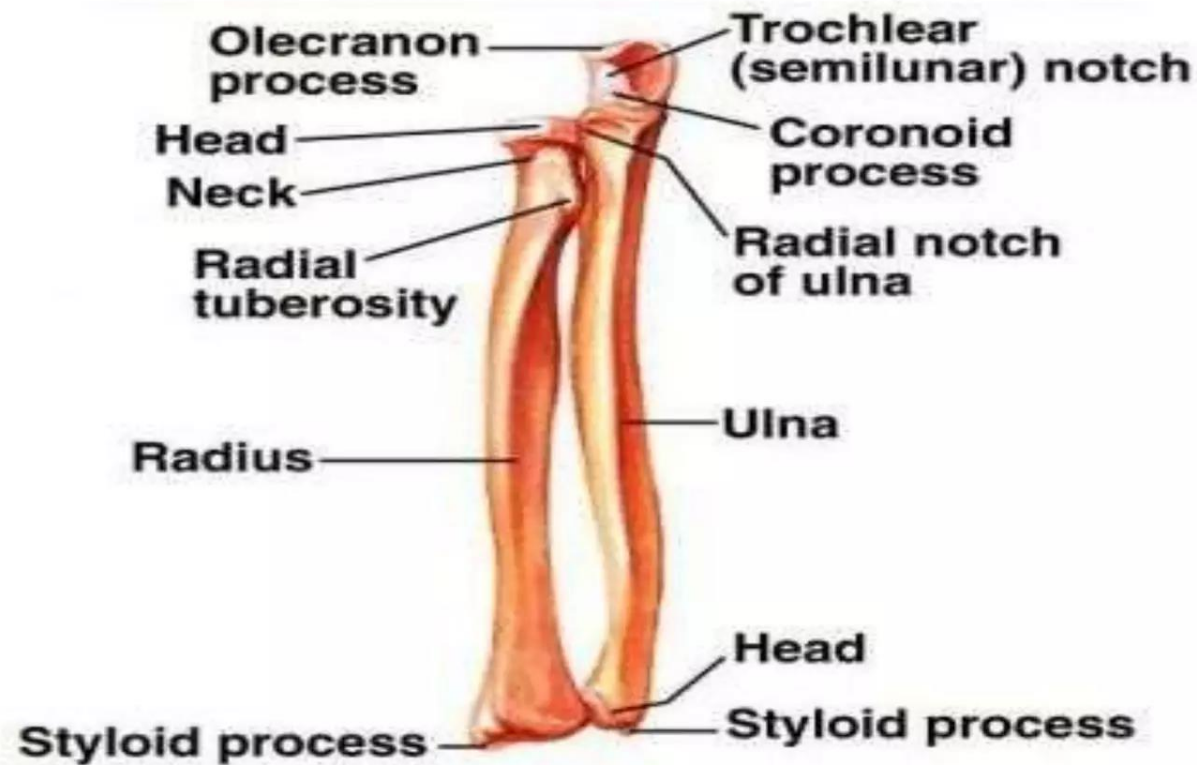
- **Clavicle**– It is also called as collar bone. It is long and curved bone. It form the anterior part of shoulder girdle.



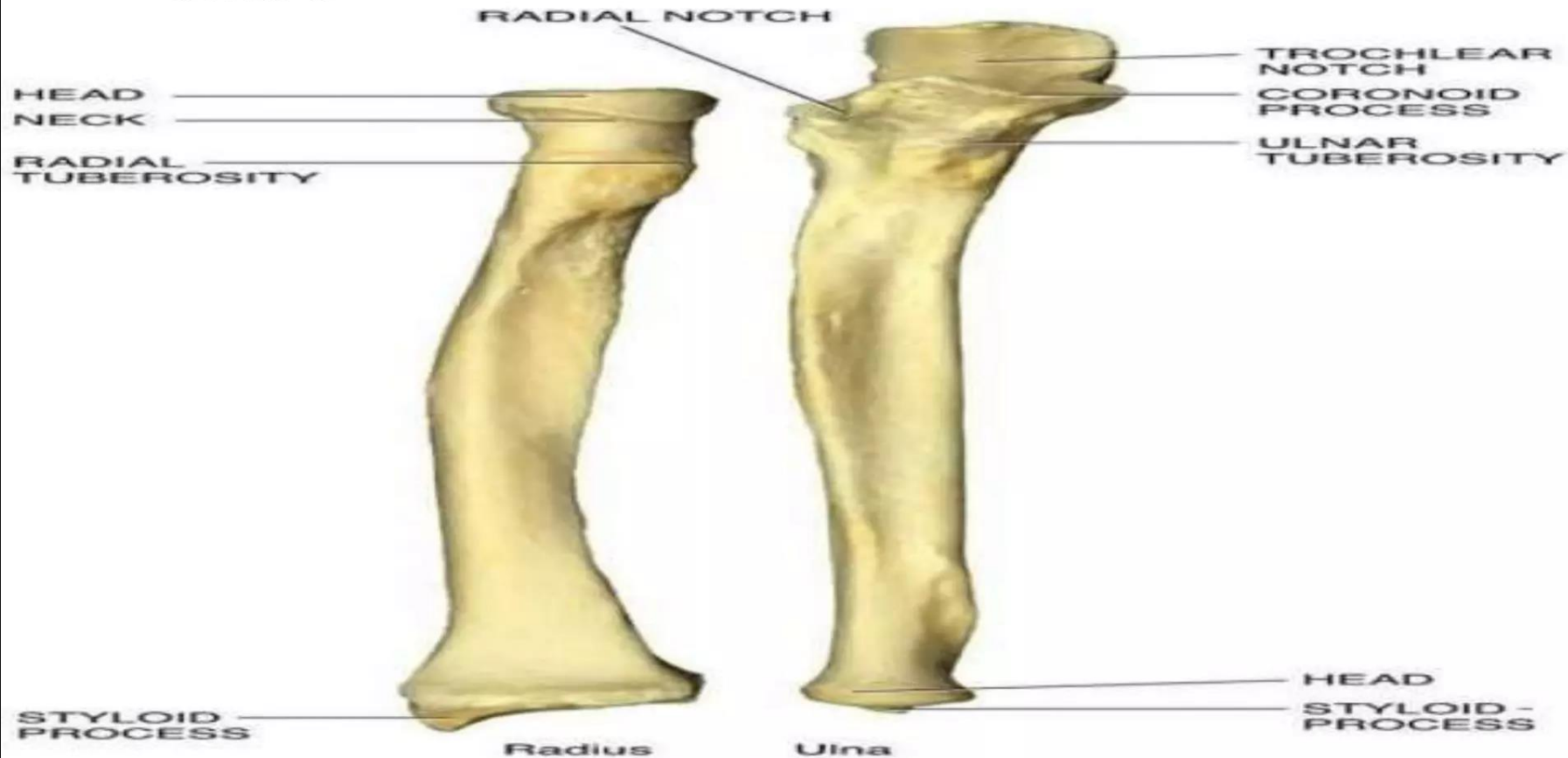
- ▶ **Humerus**– It is the longest bone of upper limb. It contains shaft and two extremities.



- ▶ **Ulna**– it is the inner most bone of forearm. It contains two extremities and a shaft



- ▶ **Radius**–It is the lateral or outer most bone of forearm. It contains two extremities and a shaft.



Bones of hand and wrist–

Bones of wrist/ carple are arranged in two row.

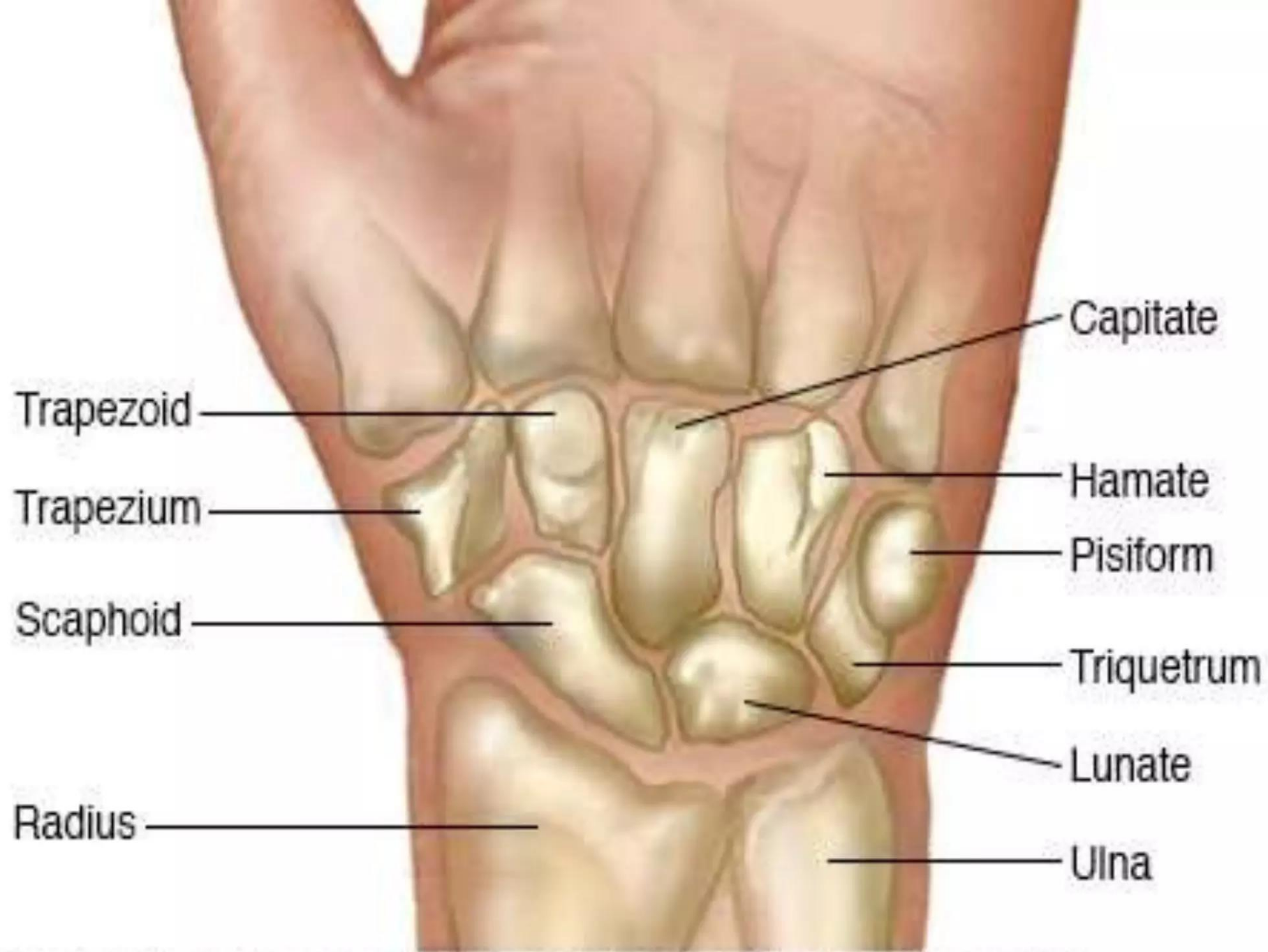
They are–

1. Proximal row– It is made of :

- a. Scaphoid
- b. Lunate
- c. Triquetral
- d.pisiform bones

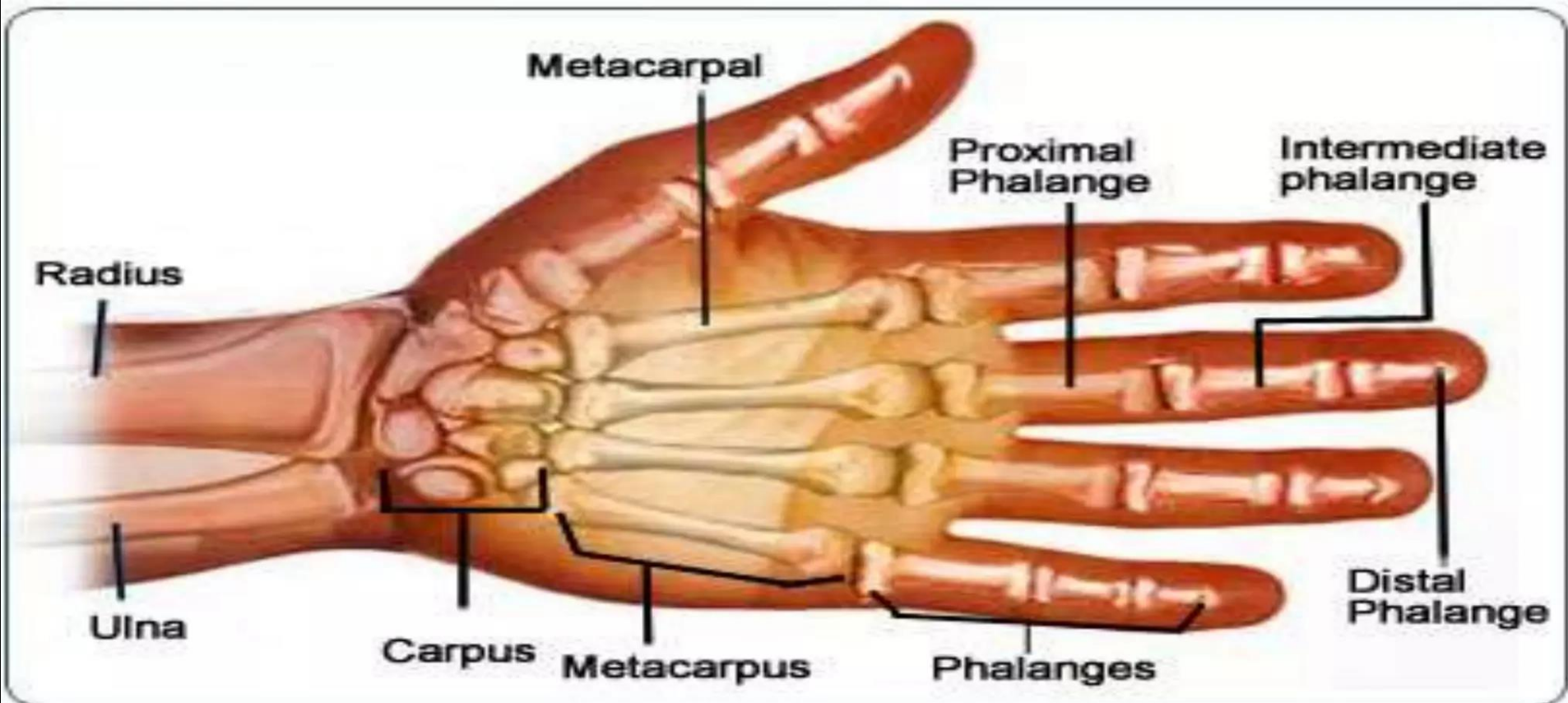
2. Distal row– It is made up of–

- a.trapezium
- b.trapezoid,
- c.capitate
- d.hamate bone.



► Bones of palm–

They are made of metacarpal bones. They are long bones which contain a head, a shaft and a base. The base is articulate with the distal row of carpal bone.

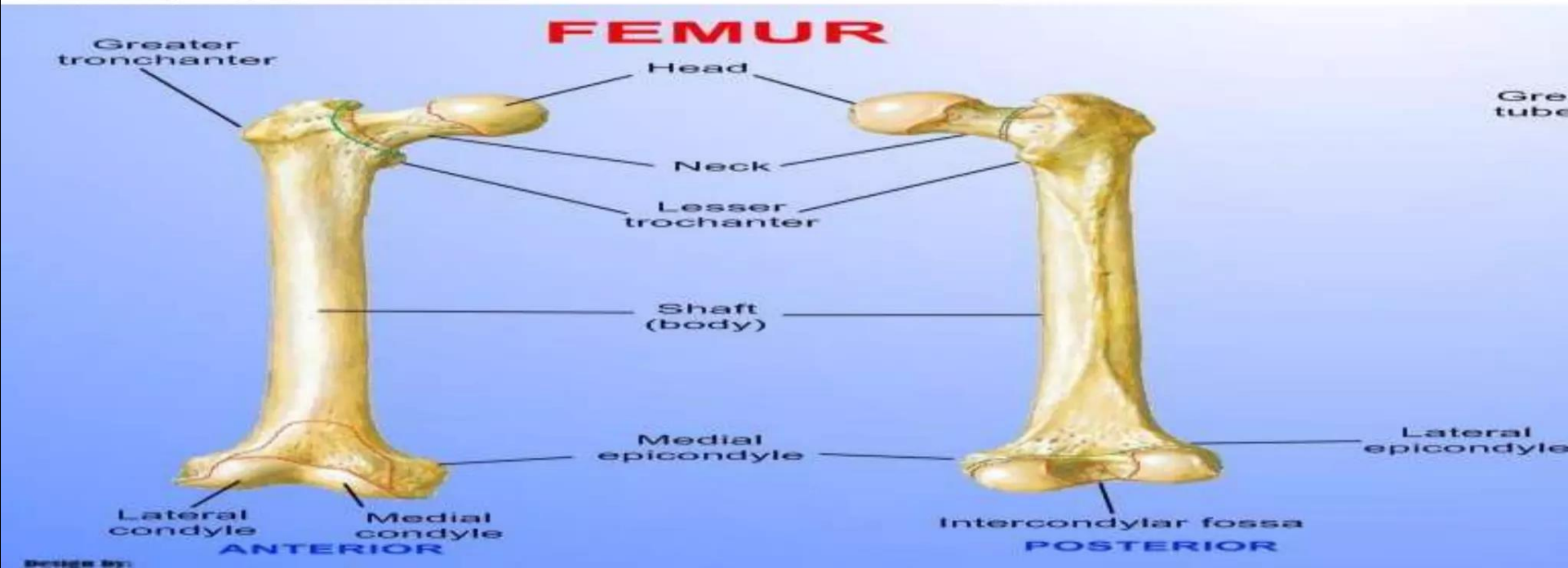


- ▶ **Bones of finger**– They are made up of phalangeal bones. The thumb has two phalanges. Other finger has three phalanges. They are proximal, middle, and distal.



► Bones of lower limb:

1. Femure– It is also called as **thigh bone**. It is the longest and strongest bone of the skeleton. It contains two extremities and a shaft.

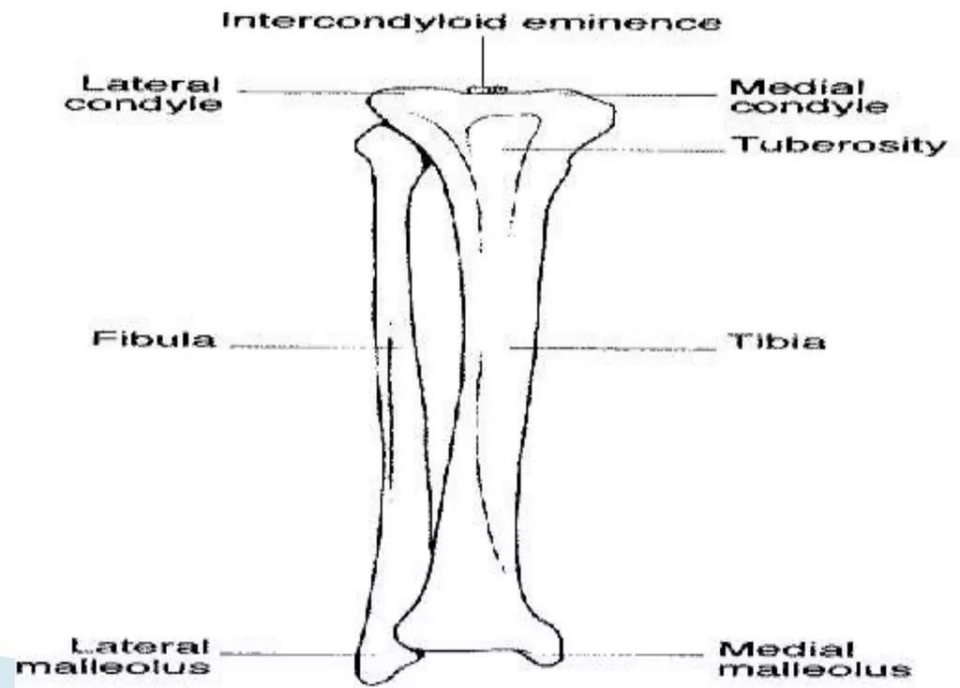


2. Patella– It is sesamoid bone. Developed in the tendons of quadriceps femoris muscle.



3. Tibia– It is the innermost bone of the leg. It is long bone containing two extremities and a shaft.

4. Fibula– It is the lateral and outermost bone of the leg. It also contain two extremities and a shaft.



Bones of foot–

Bones of foot can be classified as:

1. Tarsal bones (7 bones)
2. Metatarsal bones (5 bones)
3. Phalangeal bones (14 bones)

