

The background of the image is a light gray gradient with several realistic water droplets of various sizes scattered across it. The droplets have highlights and shadows, giving them a three-dimensional appearance. The word "BONES" is centered in the middle of the image in a bold, black, serif font.

BONES

DEFINITION

- **BONE IS MINERALIZED DENSE CONNECTIVE TISSUE**
- **MADE UP OF FEW CELLS IN MINERALIZED MATRIX**
- **CONSISTS OF 30-40 % OF OUR BODY WEIGHT.**
- **DYNAMIC IN NATURE**
- **OSTEOLOGY: THE SCIENTIFIC STUDY OF BONES IS KNOWN AS OSTEOLOGY**

FUNCTION

Framework of the body.

Attachment of muscle and tendon.

Permit the movements in body parts.

Protection of organs.

Haematopoiesis

Reservoir of minerals and fat.



A. SUPPORT, PROTECTION & MOVEMENT:

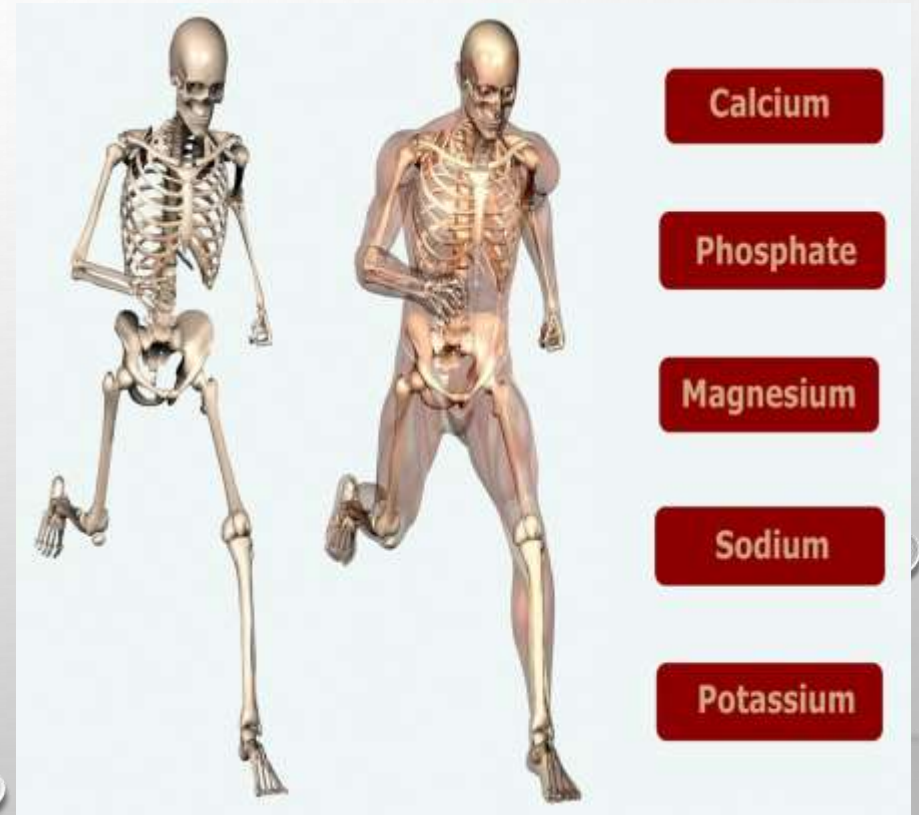
- 1. GIVES SHAPE TO THE BODY.
- 2. SUPPORTS BODY WEIGHT.
- 3. PROTECTS SENSITIVE PARTS OF THE BODY.

B. BLOOD CELL FORMATION:

- THE RED BONE MARROW FOUND IN THE CONNECTIVE TISSUE OF CERTAIN BONES IS THE SITE OF BLOOD CELL PRODUCTION.
- 

C. IN-ORGANIC SALT STORAGE:

- **FUNCTIONS AS A STORAGE DEPOT FOR MANY OF THE BODY NEEDS.**
FOR EXAMPLE: (CALCIUM, POTASSIUM, SODIUM ETC).



CLASSIFICATION OF BONES

REGION- AXIAL, APPENDICULAR

SHAPE - LONG BONES, SHORT BONES, IRREGULAR, PNEUMATIC, SESAMOID, ACCESSORY

DEVELOPMENT – MEMBRANOUS

- CARTILAGINOUS
- MEMBRANO-CARTILAGINOUS

**STRUCTURE MACROSCOPIC – COMPACT
SPONGY**

MICROSCOPIC APPROACH:

A. FIBROUS BONE.

B. LAMELLAR BONE.

C. WOVEN BONE.

D. DENTINE AND CEMENT.

BIOCHEMISTRY

1. INORGANIC 65 -70%

2. ORGANIC 30-35%

ORGANIC:

A. COLLAGEN 90-95%

B. PPS 4-5%

C. LIPIDS 0.1%

INORGANIC 90% CALCIUM AND PHOSPHATE

- **INORGANIC CONTENT GIVE RIGIDITY TO THE BONE**
- **ORGANIC CONTENT GIVE THE ELASTICITY TO THE BONE.**
- **LACK OF INORGANIC CONTENT- SOFT BONE**
- **LACK OF ORGANIC CONTENT- BRITTLE BONE**

CARTILAGE

- **CARTILAGE IS A CONNECTIVE TISSUE ,COMPOSED OF CELLS & FIBERS EMBEDDED IN NUCLEOPOLYSACHHARIDE.**

THERE ARE THREE MAIN TYPES OF CARTILAGES

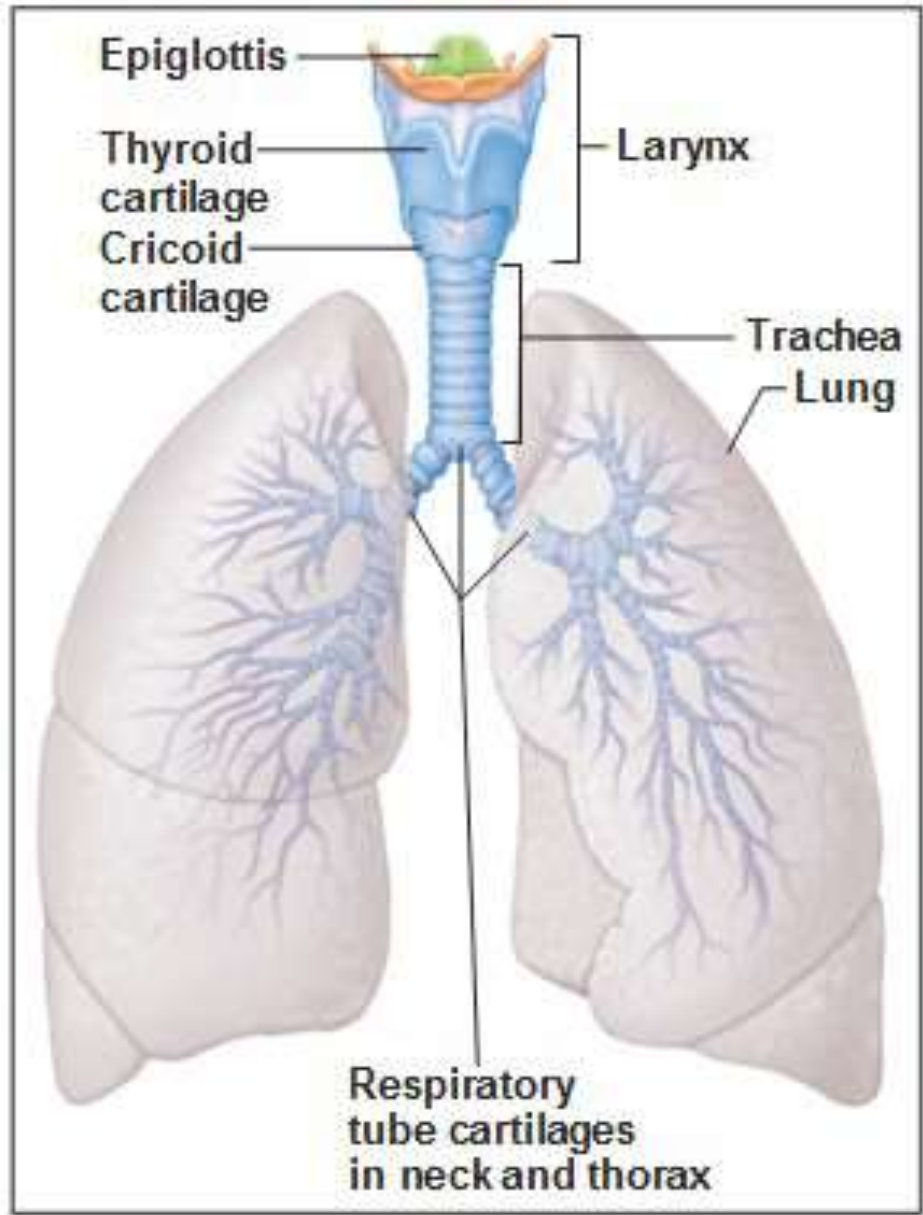
- **WHICH ARE MENTIONED BELOW:**

1. HYALINE CARTILAGE: COVERS THE ATRICULAR

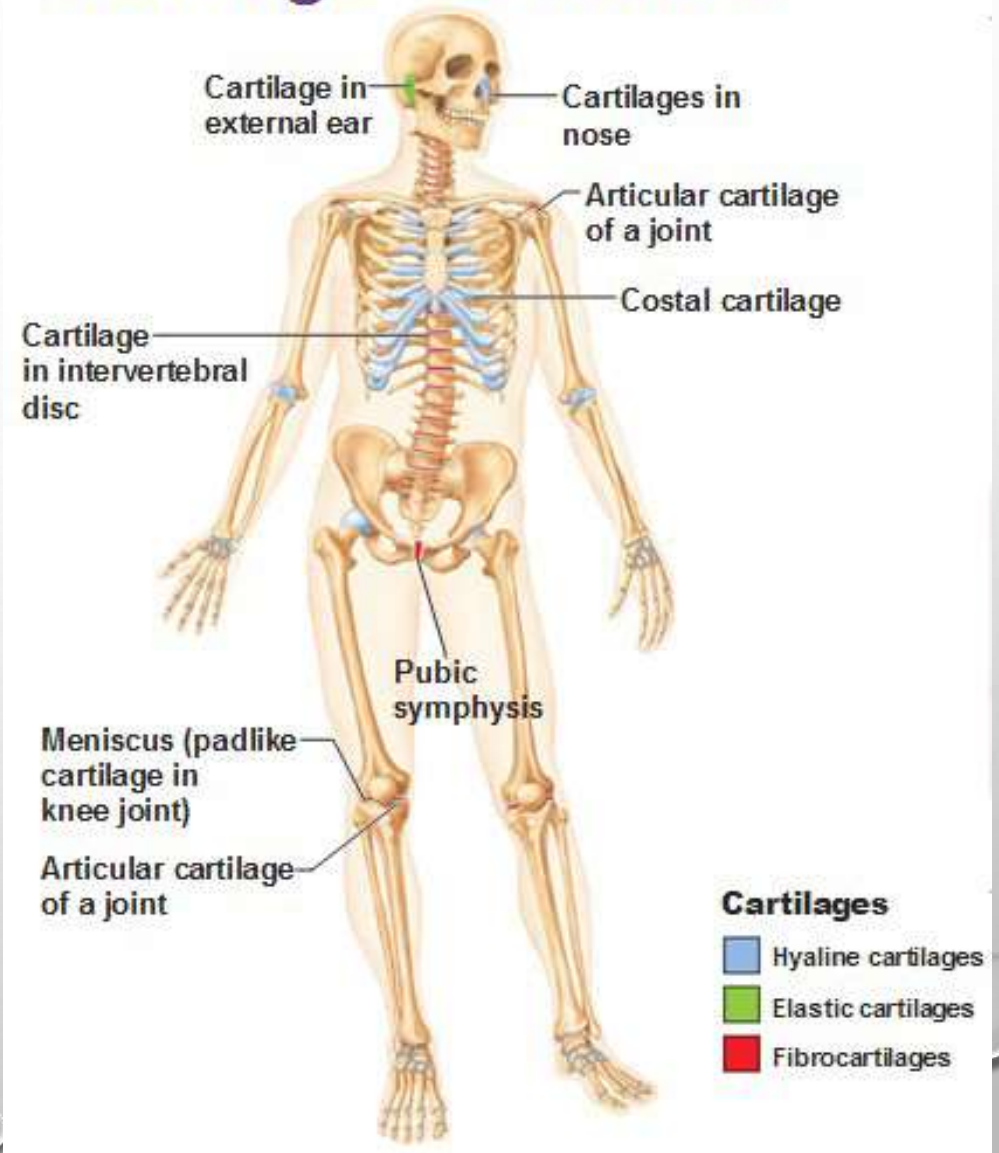
- **SURFACE OF SYNOVIAL MEMBRANE.**

2. FIBRO-CARTILAGE: PRESENT IN THE EPIGLOTTIS ETC.

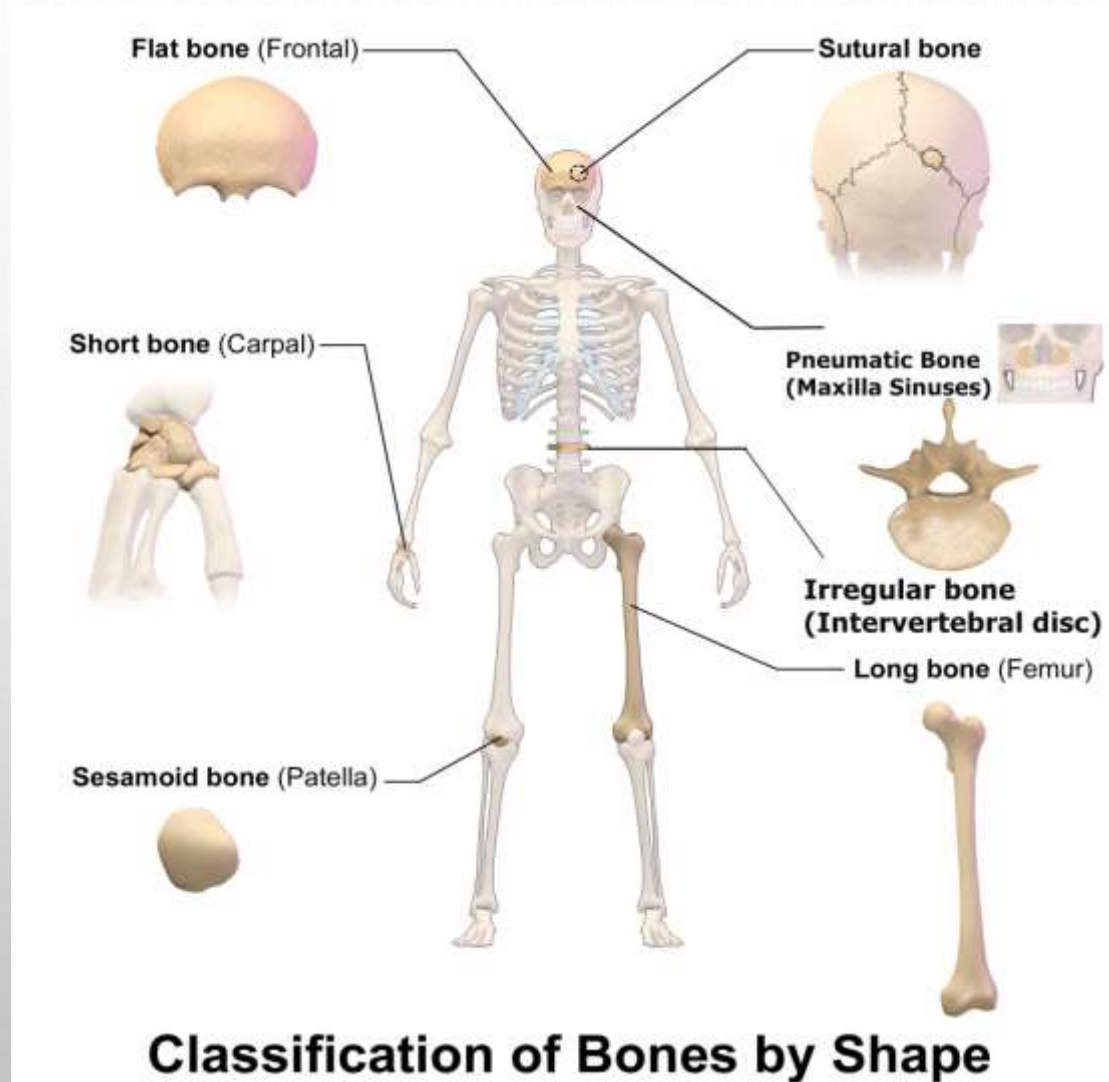
3. ELASTIC CARTILAGE: PRESENT IN THE EAR PINNA ETC.



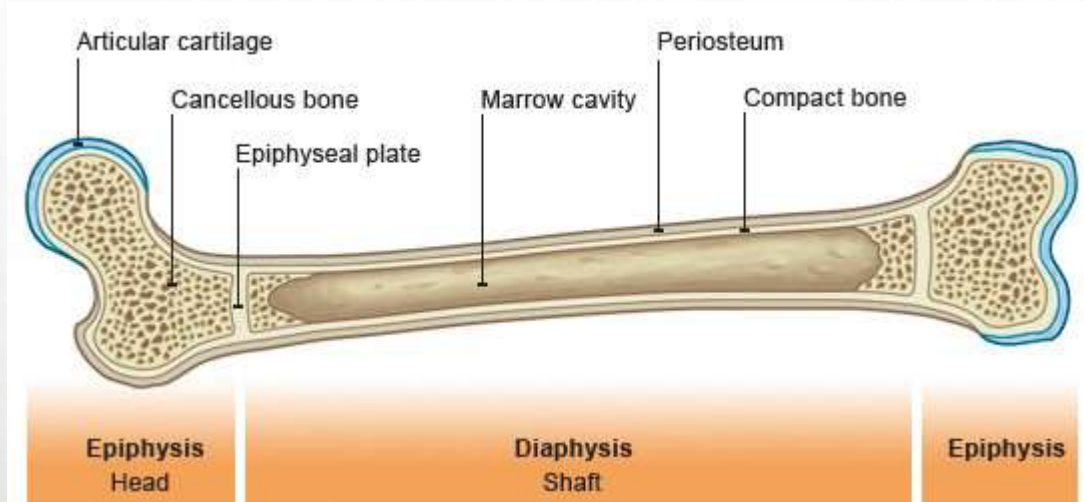
Cartilage - Locations



TYPES OF BONES



LONG BONE

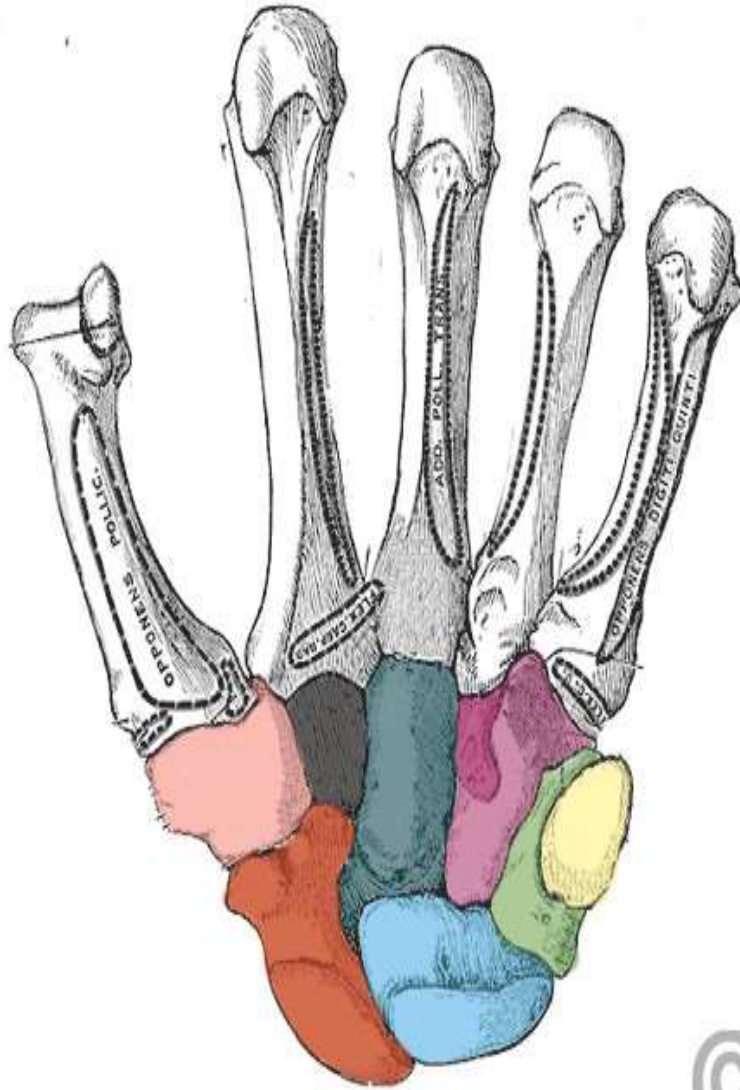


These bones typically have an elongated shaft and two expanded ends one on either side of the shaft. The shaft is known as diaphysis and the ends are called epiphyses.

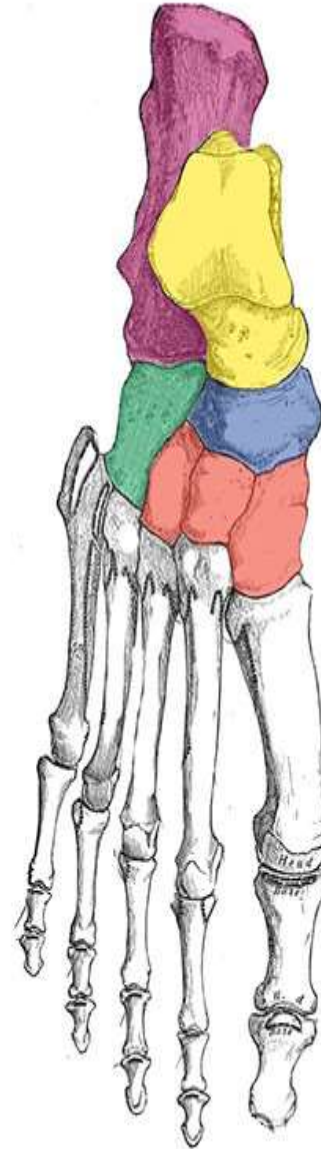
Examples: Humerus, femur etc.

2. SHORT BONES:

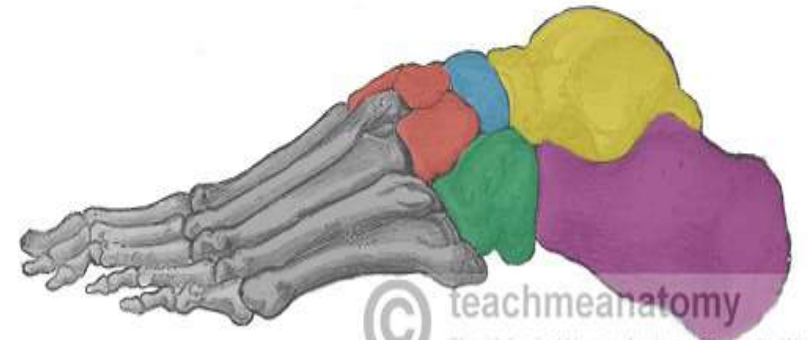
- **THESE BONES ARE SHORT IN POSTURE AND CAN BE OF ANY SHAPE.**
- **EXAMPLES: THE CARPAL AND TARSAL BONES.**



- Scaphoid
- Lunate
- Triquetrum
- Pisiform
- Trapezium
- Trapezoid
- Capitate
- Hamate

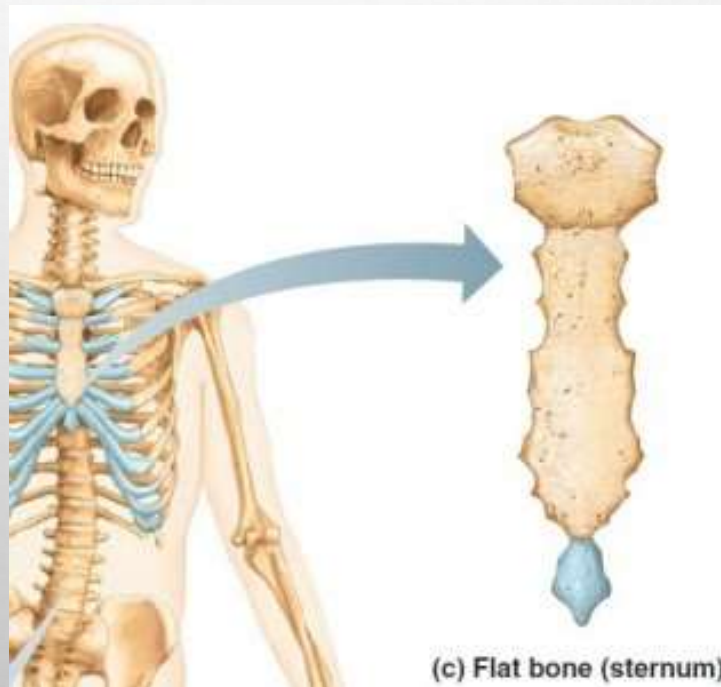
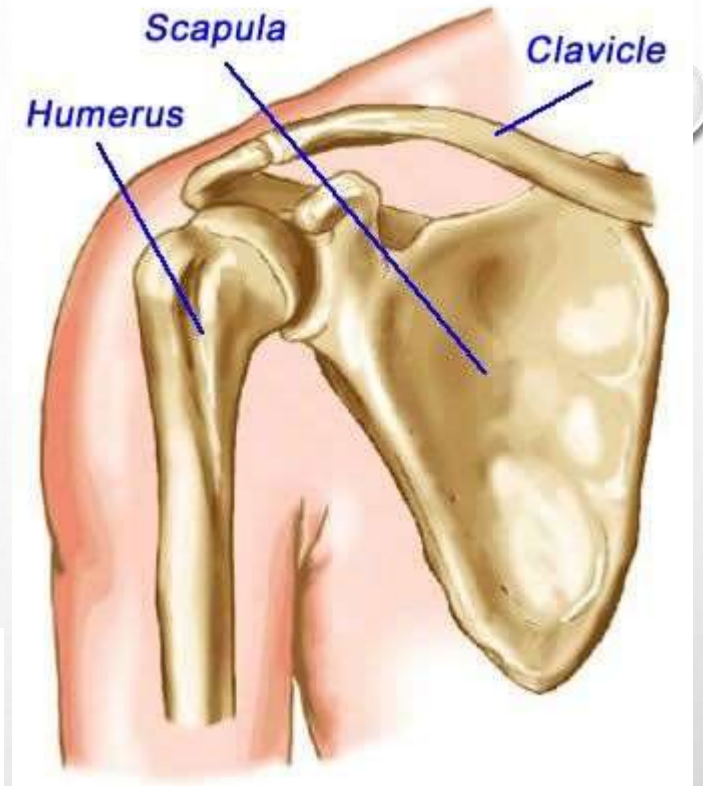


- Calcaneus
- Talus
- Navicular
- Cuboid
- Cuneiforms



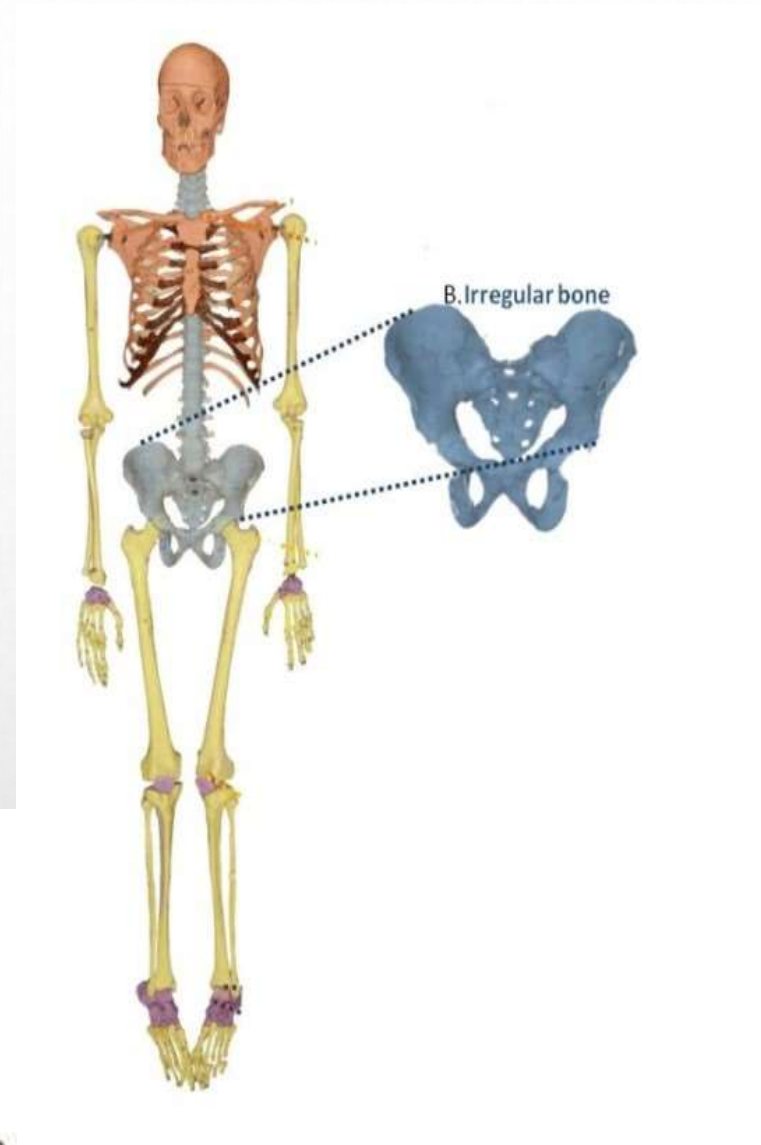
3. FLAT BONES:

- **THESE BONES ARE FLAT IN APPEARANCE.**
- **EXAMPLES: SCAPULA, RIBS, STERNUM ETC.**



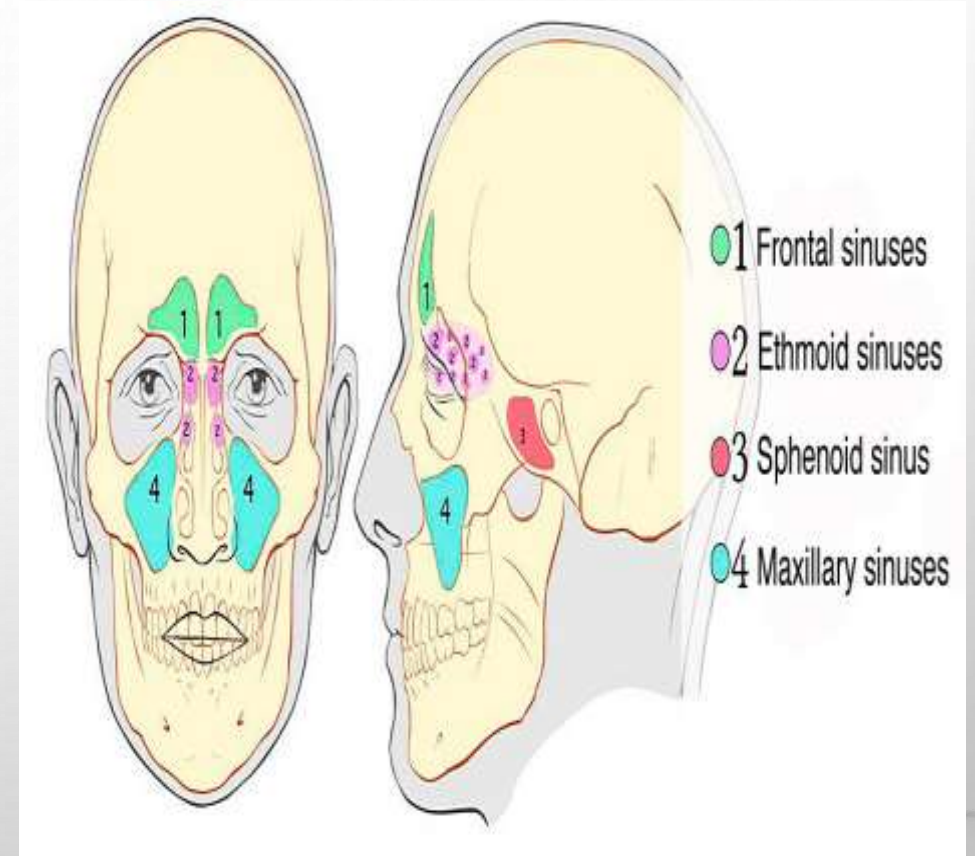
4. IRREGULAR BONES:

- **THESE BONES ARE COMPLETELY IRREGULAR IN SHAPE.**
- **EXAMPLES: VERTEBRAE, HIP BONE AND BONES IN THE BASE OF SKULL.**



5.PNEUMATIC BONES:

- PNEUMATIC BONES CAN ALSO BE CATEGORIZED UNDER THE IRREGULAR BONES.
- THE CHARACTERISTIC DIFFERENCE IS THE PRESENCE OF LARGE AIR SPACES IN THESE BONES WHICH MAKE THEM LIGHT IN WEIGHT AND THUS THEY FORM THE MAJOR PORTION OF SKULL
- **EXAMPLES: SPHENOID, ETHMOID, MAXILA ETC.**



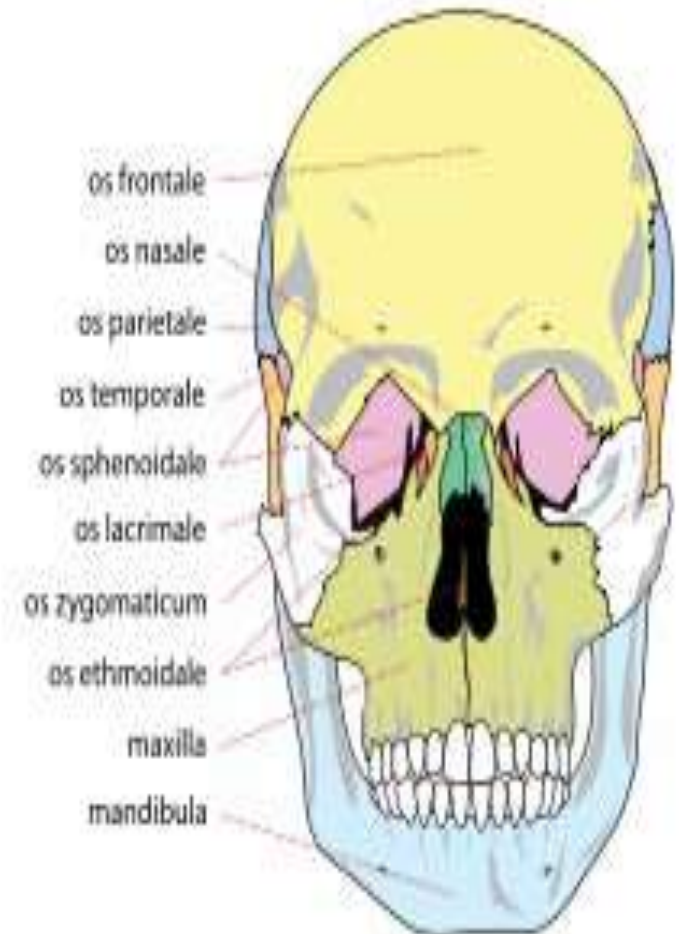
6.SESAMOID BONES:

- **THESE ARE IN THE FORM OF NODULES EMBEDDED IN TENDONS AND JOINT CAPSULES.**
- **EXAMPLES: PATELLA, PISIFORM, FABELLA ETC.**



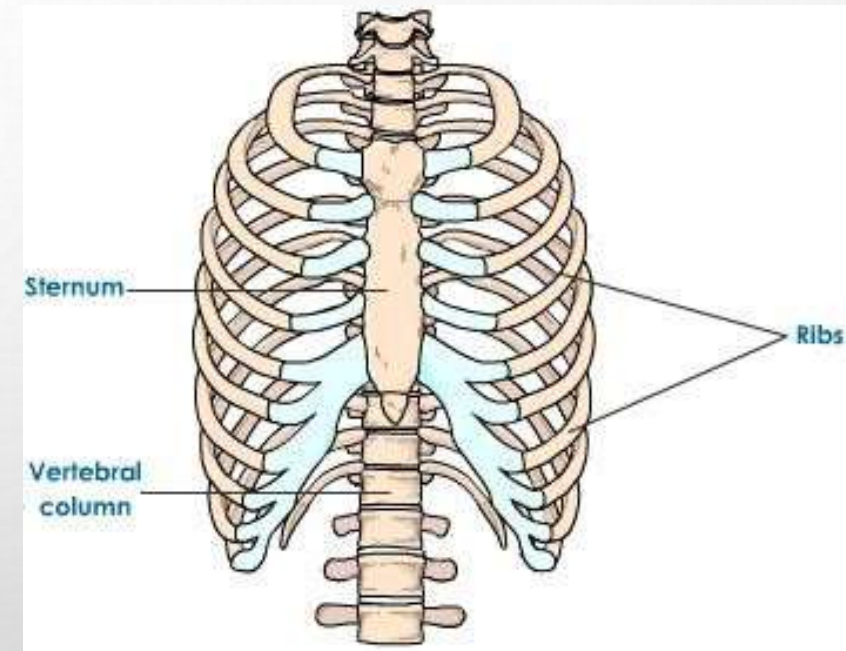
1.MEMBRANOUS BONES:

- **THESE BONES OSSIFY IN MEMBRANE FROM MESENCHYMAL CONDENSATIONS.**
- **EXAMPLES: BONES OF THE VAULT OF SKULL AND FACIAL BONES.**



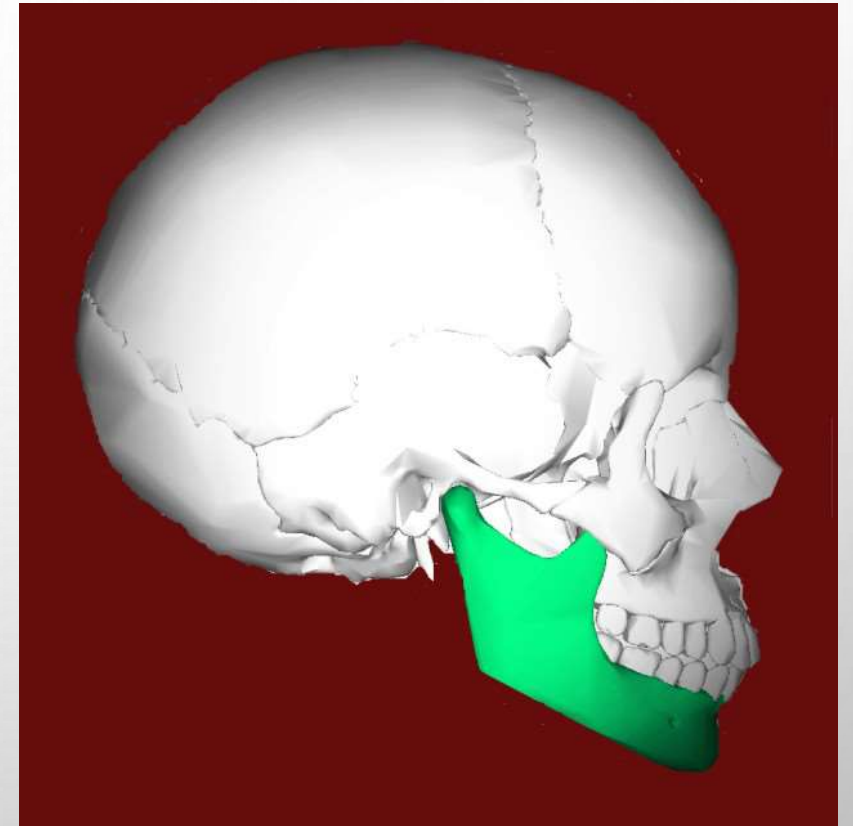
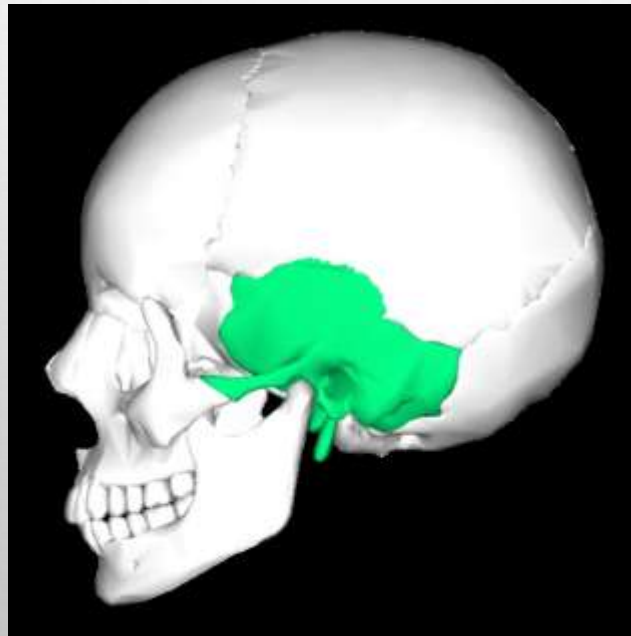
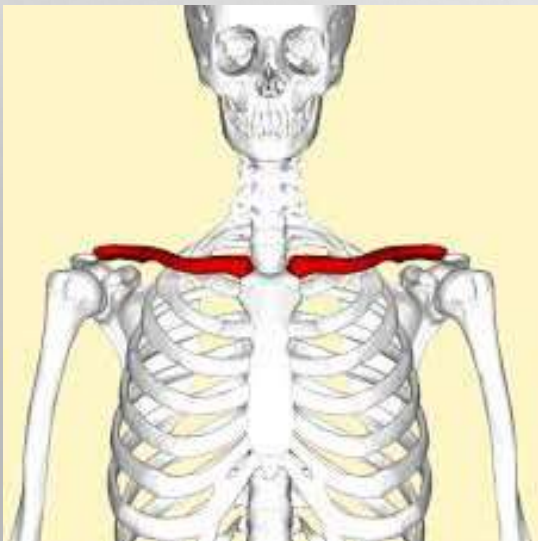
2. CARTILAGINOUS BONES:

- **THEY OSSIFY IN CARTILAGE AND THUS DERIVED FROM PERFORMED CARTILAGINOUS MODELS.**
- **EXAMPLES: THORACIC CAGE ETC.**



3. MEMBRANO-CARTILAGINOUS BONES:

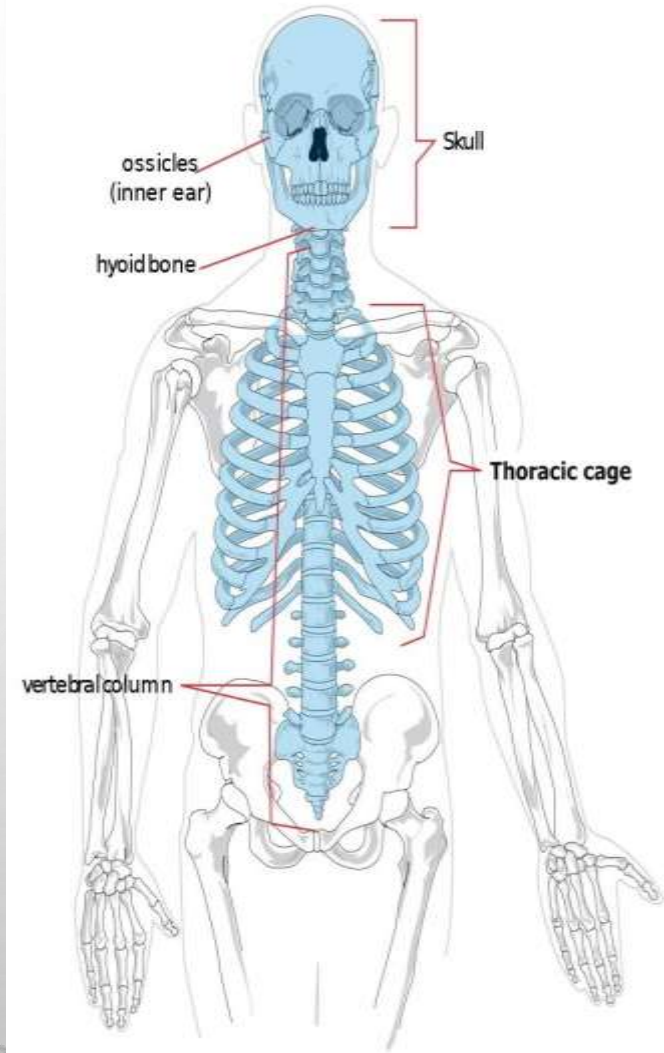
- **THEY OSSIFY PARTLY IN MEMBRANE AND PARTLY IN CARTILAGE.**
- **EXAMPLES: CLAVICLE, MANDIBLE, TEMPORAL ETC**



ON THE BASIS OF REGION:

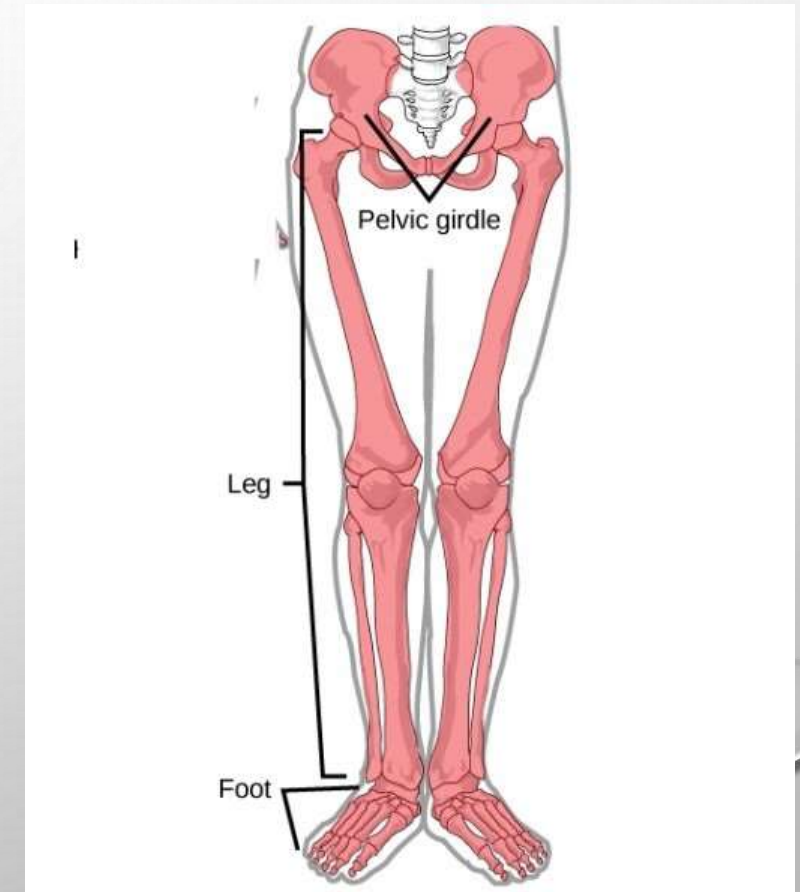
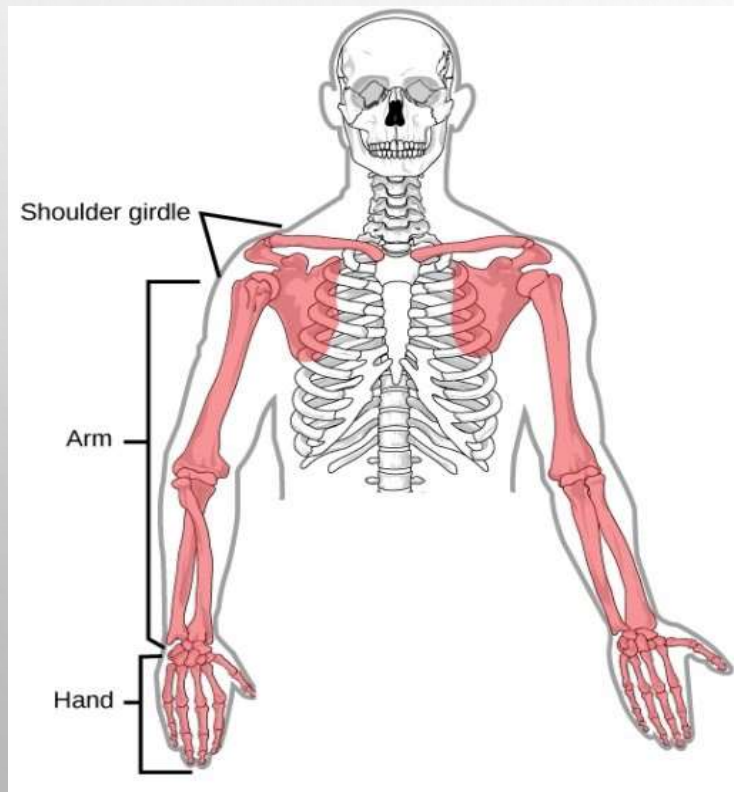
1. BONES OF **AXIAL SKELETON**:

- **THESE BONES FORMS THE AXIAL SKELETON OF THE HUMAN BODY.**
- **EXAMPLES: BONES OF SKULL, THORACIC CAGE & VERTEBRAL COLUMN**



2. BONES OF APPENDICULAR SKELETON:

- THESE BONES FORMS THE APPENDICULAR SKELETON OF THE HUMAN BODY.
- **EXAMPLES: BONES OF THE LIMBS AND GIRDLES OF**



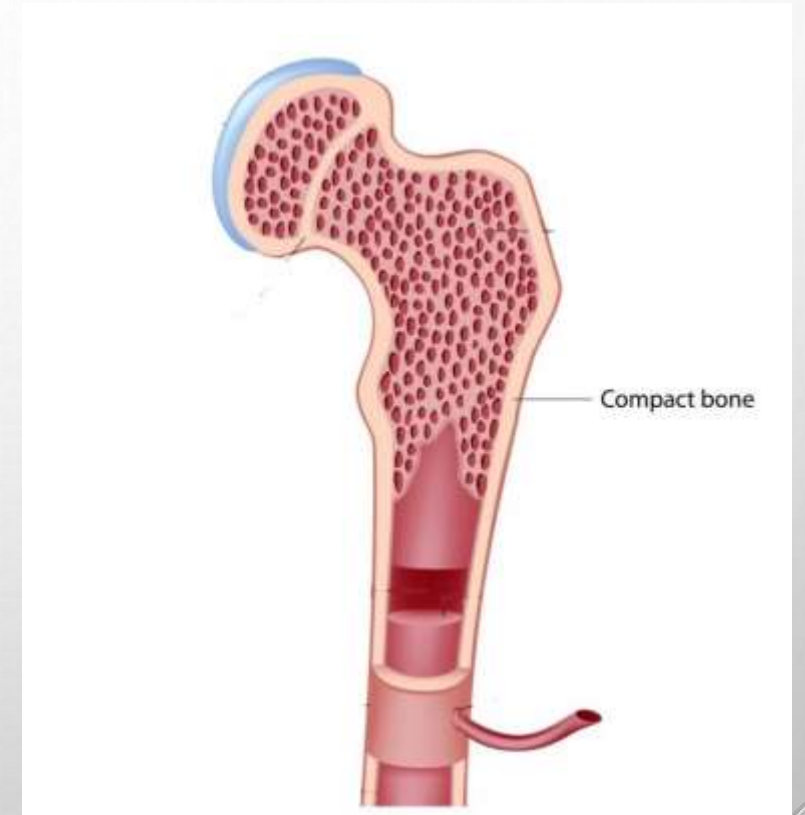
ON THE BASIS OF STRUCTURE:

THEY ARE SUB DIVIDED INTO TWO PARTS, WHICH ARE:

- **1. MACROSCOPIC APPROACH.**
- **2. MICROSCOPIC APPROACH.**

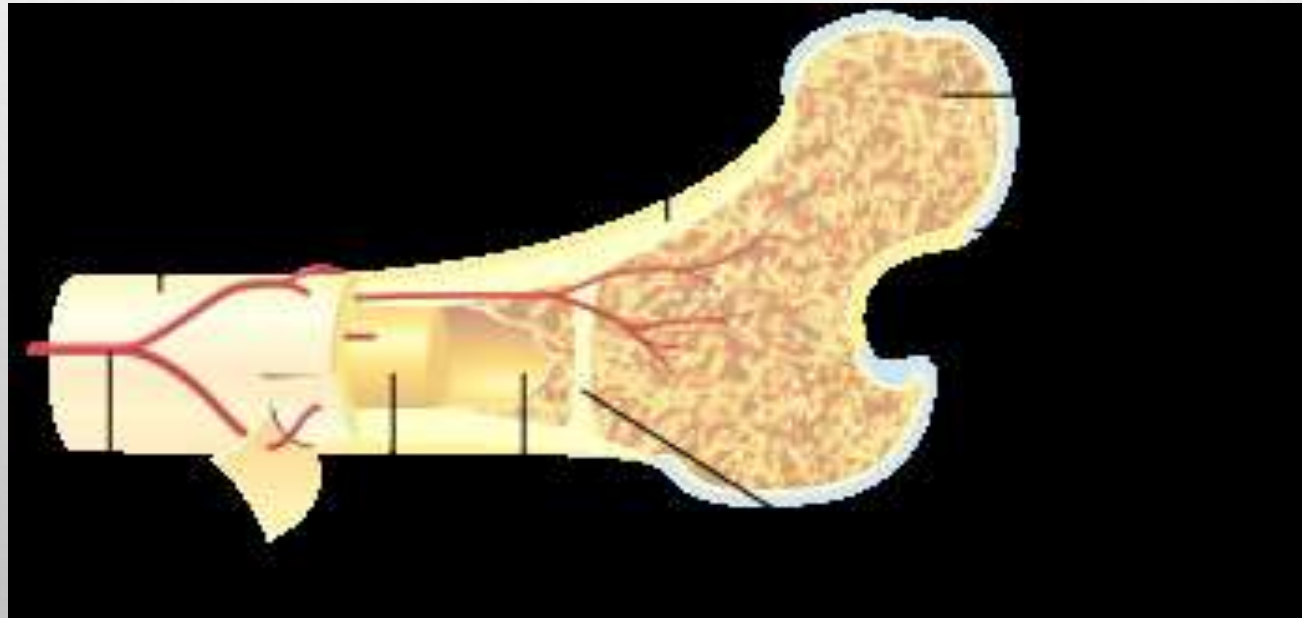
1. MACROSCOPIC APPROACH:

- **A. COMPACT BONE:**
- **COMPACT BONE IS DENSE IN TEXTURE BUT IS EXTREMELY POROUS.**
- **EXAMPLE: IN THE CORTEX OF LONG BONES.**



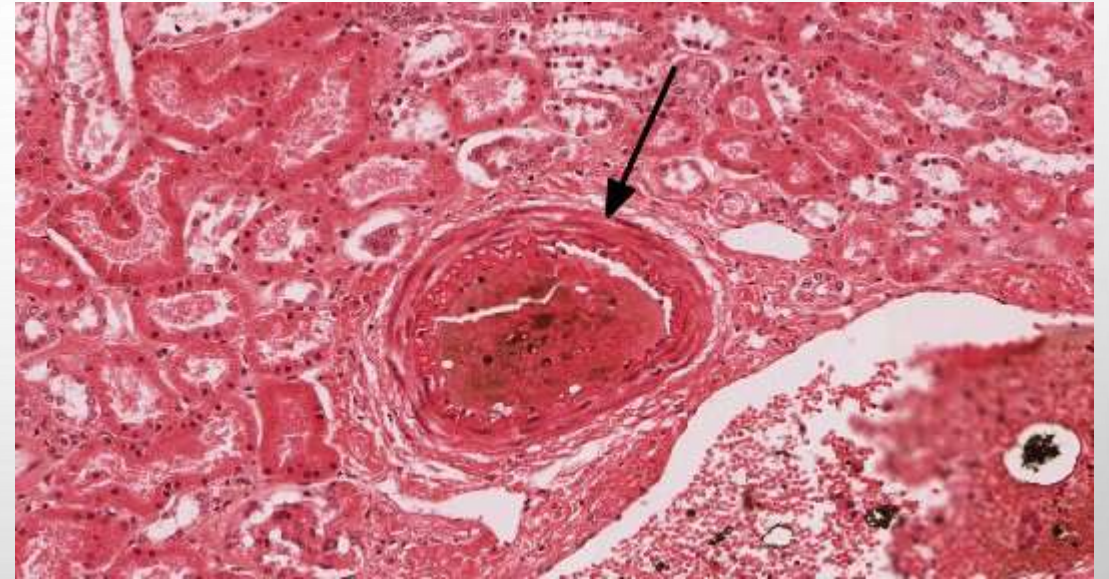
B. CANCELLOUS OR SPONGY BONE:

- **THE PART OF BONE WHERE THERE IS MORE EMPTY SPACE AND LESS BONE TISSUE.**
- **EXAMPLE: THE INNER PART OF LONG BONES.**

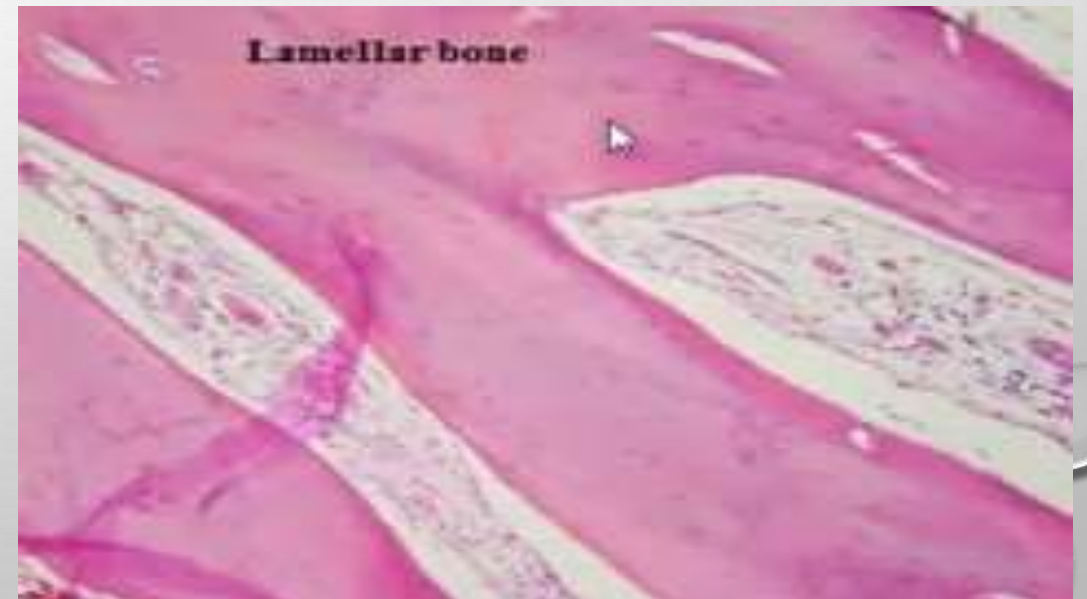


FIBROUS BONE:

- **THESE HAVE MORE FIBERS IN THEM. ALSO KNOWN AS IMMATURE BONES.**
- **EXAMPLE: FOUND ONLY IN FETUS, SOCKETS OF ALVEOLAR BONES AND SUTURES OF THE SKULL.**

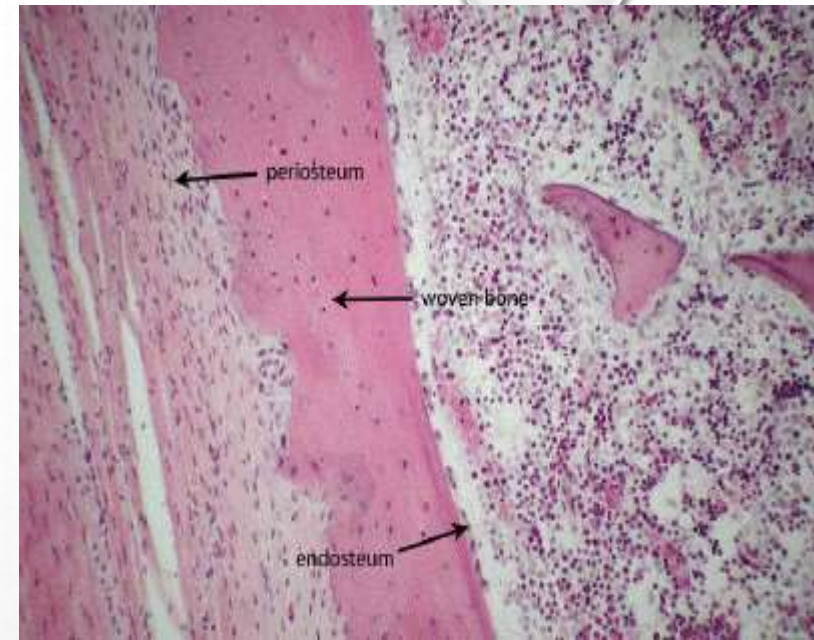


- **LAMELLAR BONE:**
- **MOST OF THE MATURE HUMAN BONES, WHETHER COMPACT OR CANCELLOUS, ARE COMPOSED OF THIN PLATES OF BONY TISSUE CALLED LAMELLAE.**
- **EXAMPLE: FORMED ON THE PERIOSTEAL SURFACE OF DIAPHYSIS.**



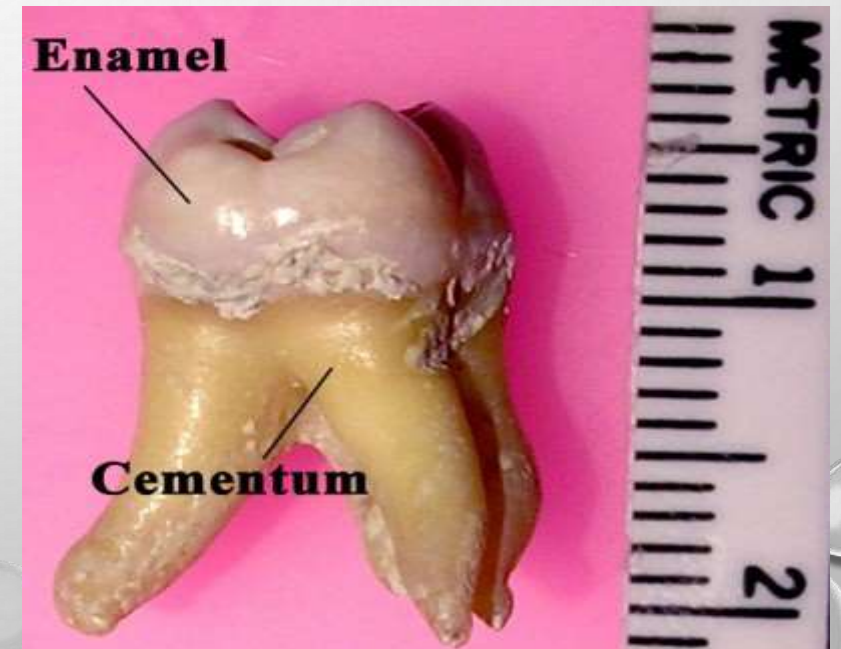
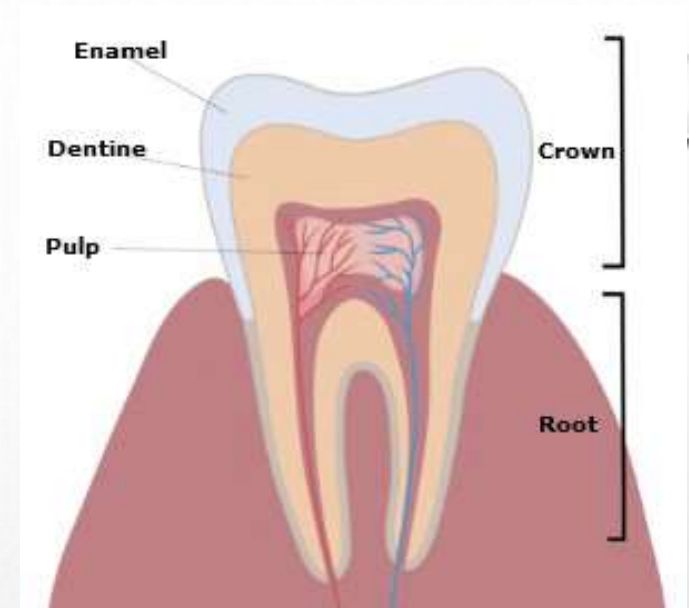
WOVEN BONE:

- **OCCURS INITIALLY IN FETAL BONES. IN ADULTS WOVEN BONE IS CREATED AFTER FRACTURES.**
- **EXAMPLE: SEEN IN FETAL BONE, FRACTURE REPAIR AND IN CANCER OF BONE.**



CEMENTUM AND DENTINE:

- **CEMENTUM** IS A SPECIALIZED CALCIFIED SUBSTANCE COVERING THE ROOT OF A TOOTH. IT HARDENS TO ACT AS AN ADHESIVE GLUE.
- **DENTINE** IS ONE OF THE HARD TISSUES OF THE TEETH WHICH CONSTITUTES MOST OF ITS BULK.
- **EXAMPLE: OCCUR IN TEETH.**



DO YOU KNOW?

- **HYALINE CARTILAGE IS THE MOST ABUNDANT CARTILAGE.**
- **BY AGE 25 THE SKELETON IS COMPLETELY HARDENED.**
- **206 BONES MAKE UP THE ADULT SKELETON (20% OF BODY MASS)**
- **80 BONES OF THE AXIAL SKELETON**
- **126 BONES OF THE APPENDICULAR SKELETON**
- **THE LARGEST BONE IN THE HUMAN SKELETON IS FEMUR.**
- **BABIES ARE BORN WITH ABOUT 300 BONES.**
- **ALMOST A THIRD OF BONES OF BABIES EVENTUALLY FUSE TOGETHER TO FORM THE 206-BONE SKELETON OF AN ADULT.**

The background is a light gray gradient with several realistic water droplets of various sizes scattered in the corners. The droplets have highlights and shadows, giving them a three-dimensional appearance. The text 'THANK YOU' is centered in the lower half of the image.

THANK YOU