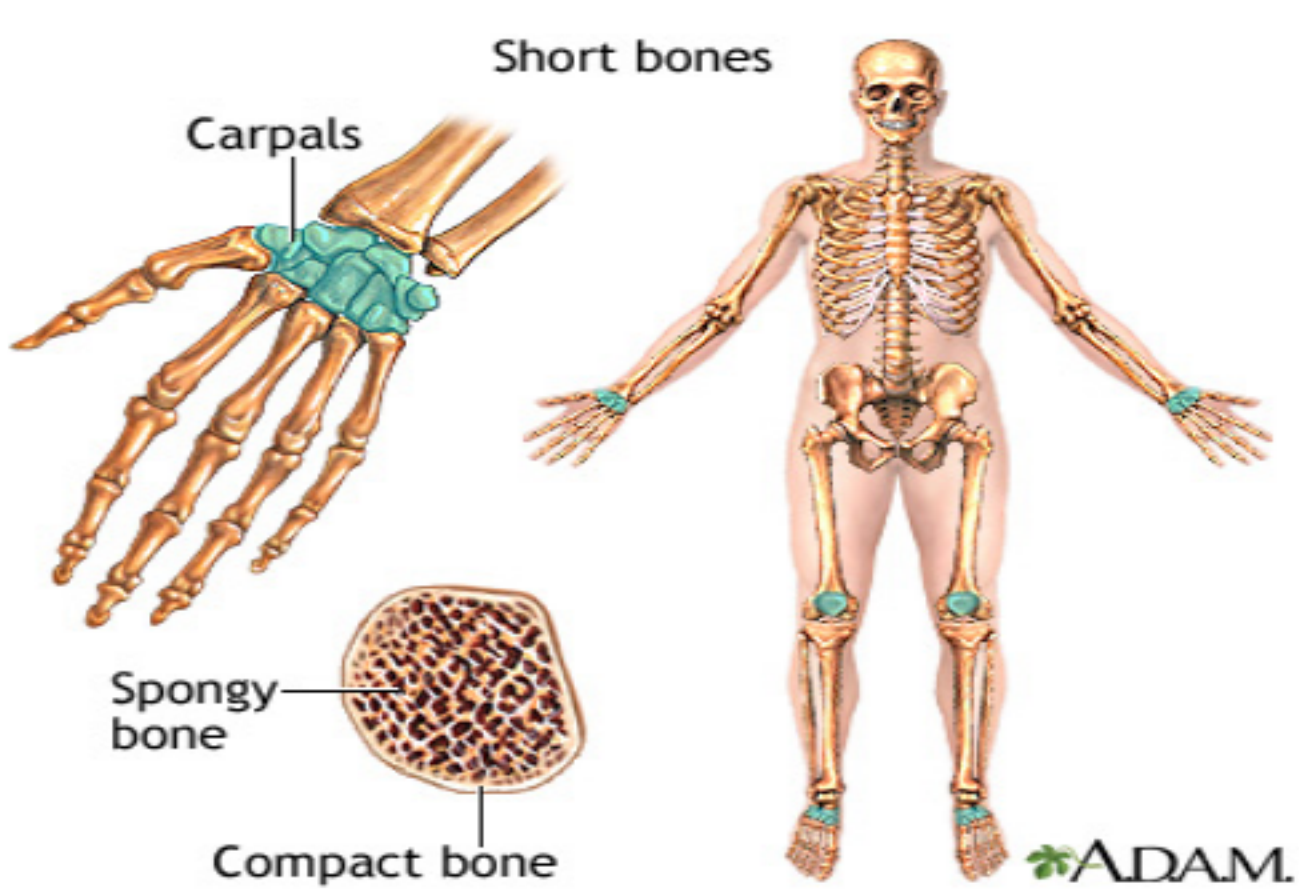
# BONES AND CARTILAGE



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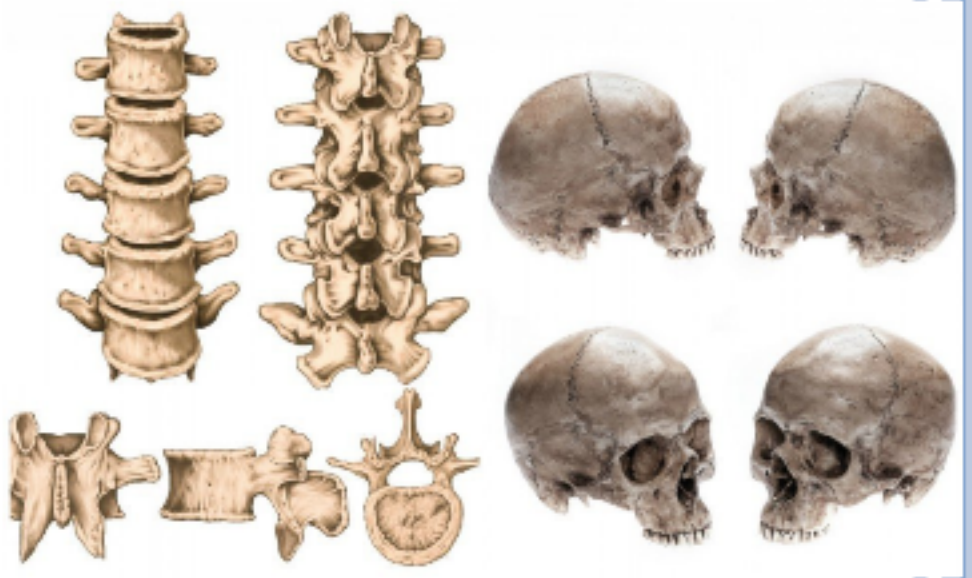


- **Osteology:**

Branch of anatomy which deals with study of bones and cartilages

- Composed of bony and cartilaginous tissue called “Skeleton”
- Two types of Skeleton:

1-Exo-skeleton

2-Endo-Skelton

**1-Exo-skeleton**

- Part of Skeleton present in relation with skin. E.g. Enamel of tooth

**2-Endo-Skelton**

Deeply situated and forms main skeleton of human beings

- 2-Types:

1-Visceral: In relation with certain viscera (mandible, hyoid bone)

2- Somatic: almost all bones of body belongs to this variety

# THE SKELETAL SYSTEM

- Parts of the skeletal system include:
  - Bones (skeleton)
  - Joints
  - Cartilages
  - Ligaments
- Divided into two divisions:
  - Axial skeleton  (skull, ribs and vertebra)
  - Appendicular skeleton (pelvis, extremities)

# BONE

- Rigid, Highly Vascular (Cartilage), dynamic, constantly changing, mineralized Connective Tissue

# FUNCTIONS OF BONES

1-Gives Characteristics form to human body

2-Support of the body (Mechanical Support)

3-Protection of vital organs

- Skull: Protects brain
- Thoracic: Protects lungs and heart

4-Movement due to attachment with skeletal muscles

5-Storage of minerals and fats

E.g. Ca and Phosphorus

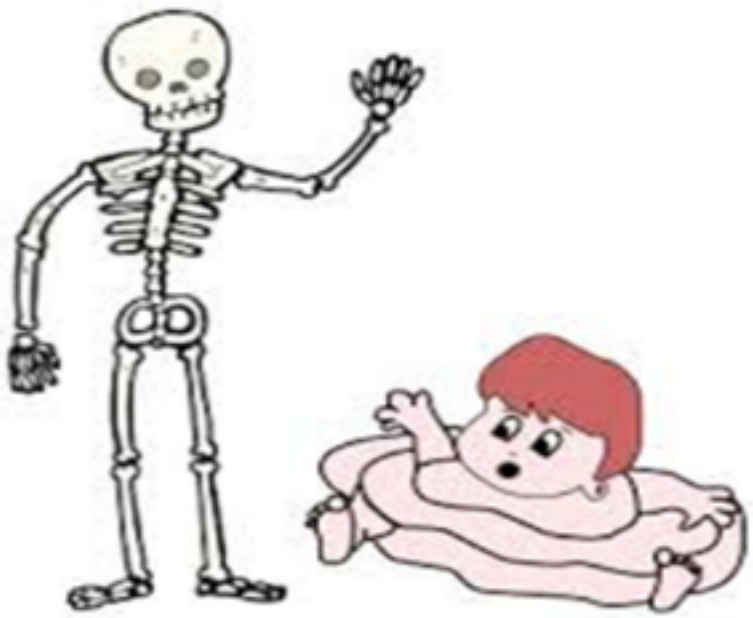
6- Assist in respiration: Ribs

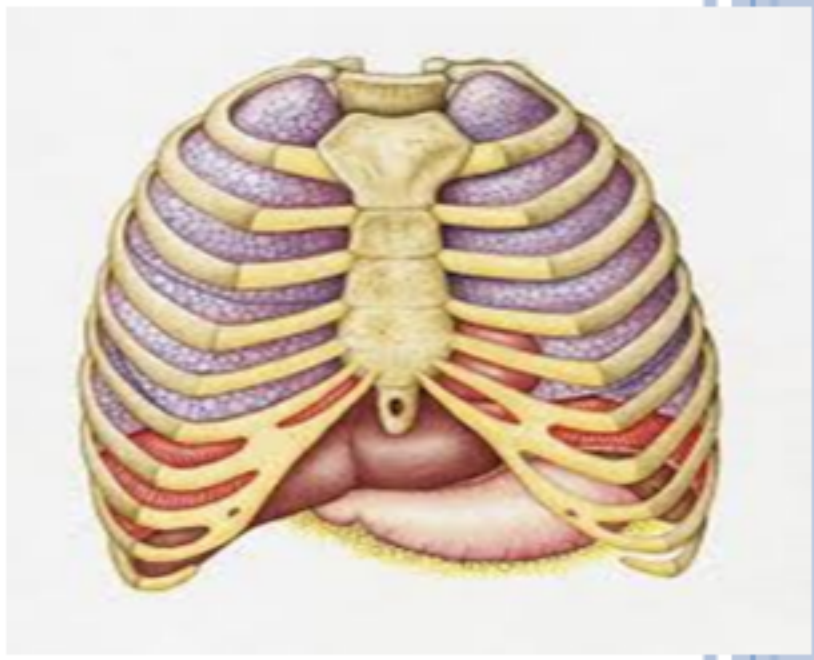
7-Helps in speech:  Mandible, hyoid bone, bones of palate

8-Chief sites for defense system of body

9-Maintain electrolyte balance: Ca and P

10-Blood cell formation: Erythropoiesis





# CLASSIFICATION OF BONES

- Developmental Classification
- Structural Classification
- Regional Classification

# 1-DEVELOPMENTAL CLASSIFICATION

- Membrane bones
- Cartilaginous bones
- Membrano-cartilaginous bones

## 1-Membrane bones

- Intramembranous method of osteogenesis
- Formed by condensation of the mesenchyme
- Flat bones of skull vault
- Bones of the face (maxilla, zygomatic and nasal)

## 2-Cartilaginous bones

- Intra-cartilaginous method
- Most of the bones of body
- Bones of limbs, ribs and vertebrae

- **Membranous-cartilaginous bones**
- Partly in membrane and partly in cartilage
- Occipital
- Temporal
- Mandible
- clavicle

# 3-REGIONAL CLASSIFICATION

Depending on location

**1-Axial bones**

- Skull
- Vertebral column
- Ribs and sternum

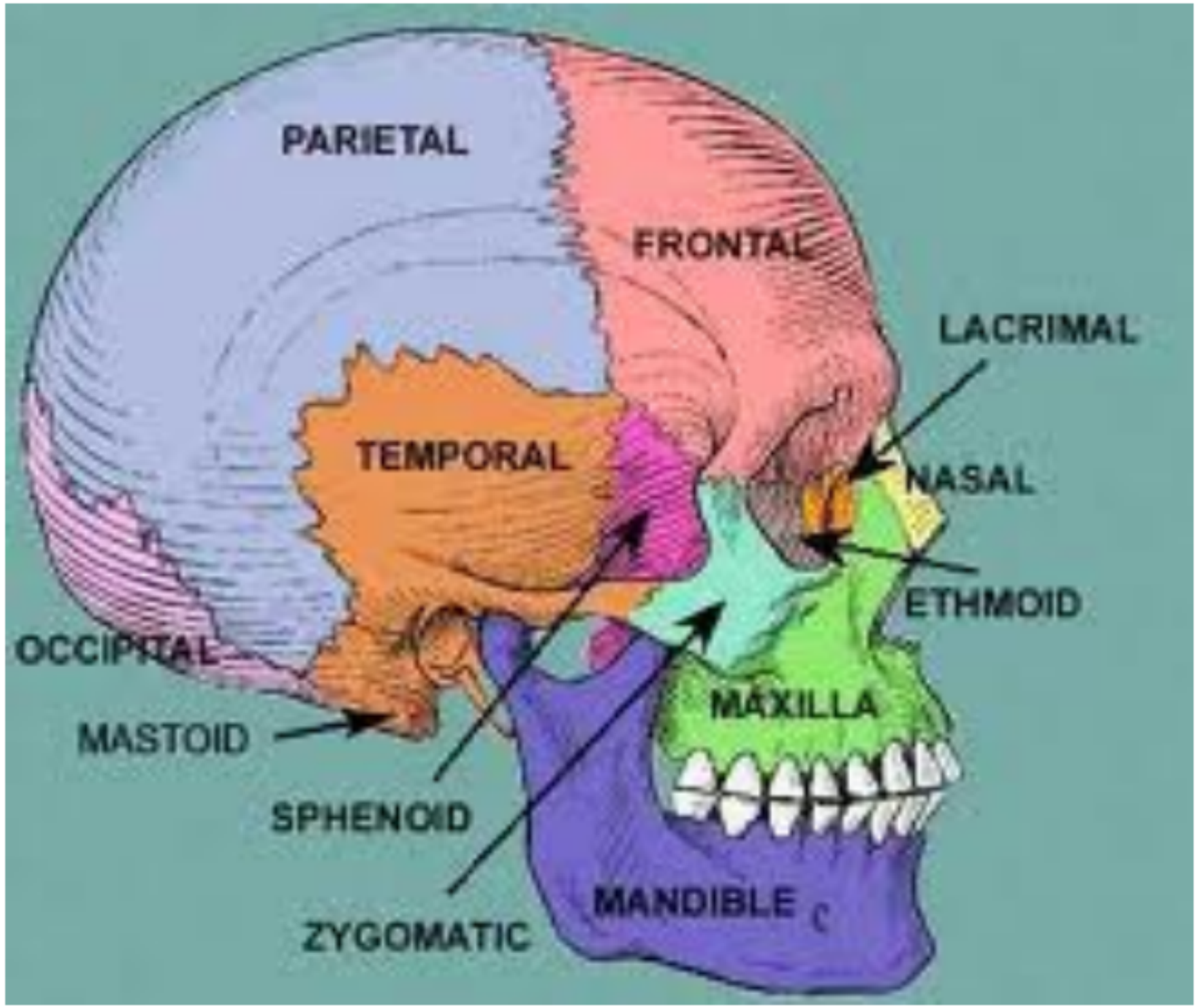
**2-Appendicular bones**

- Bones of limb


Frontal bone
Nasal bone
Zygomatic bone
Maxilla
Mandible
Axial skeleton
Appendicular skeleton
Sternoclavicular joint
Clavicle
Scapula
Sternum
Costal cartilage
Ribs
Xiphoid process
Vertebral column
Coxal (hip) bone
Sacroiliac joint
Ilium
Sacrum
Pubis
Ischium

# AXIAL BONES

| | |
|---|---|
| Skull | 22 |
| Ear ossicles | 6 |
| Hyoid | 1 |
| Vertebral column | 26 |
| Ribs | 24 |
| Sternum | 1 |
| Total | 80 |


PARIETAL
FRONTAL
LACRIMAL
TEMPORAL
NASAL
ETHMOID
OCCIPITAL
MÁXILLA
MASTOID
SPHENOID
MANDIBLE
ZYGOMATIC

# APPENDICULAR BONES

- Upper extremities 64 bones
- Clavicle
- Scapula
- Humerus
- Ulna
- Radius
- Carpal bone 8
- Metacarpals 5
- Phalanges 14

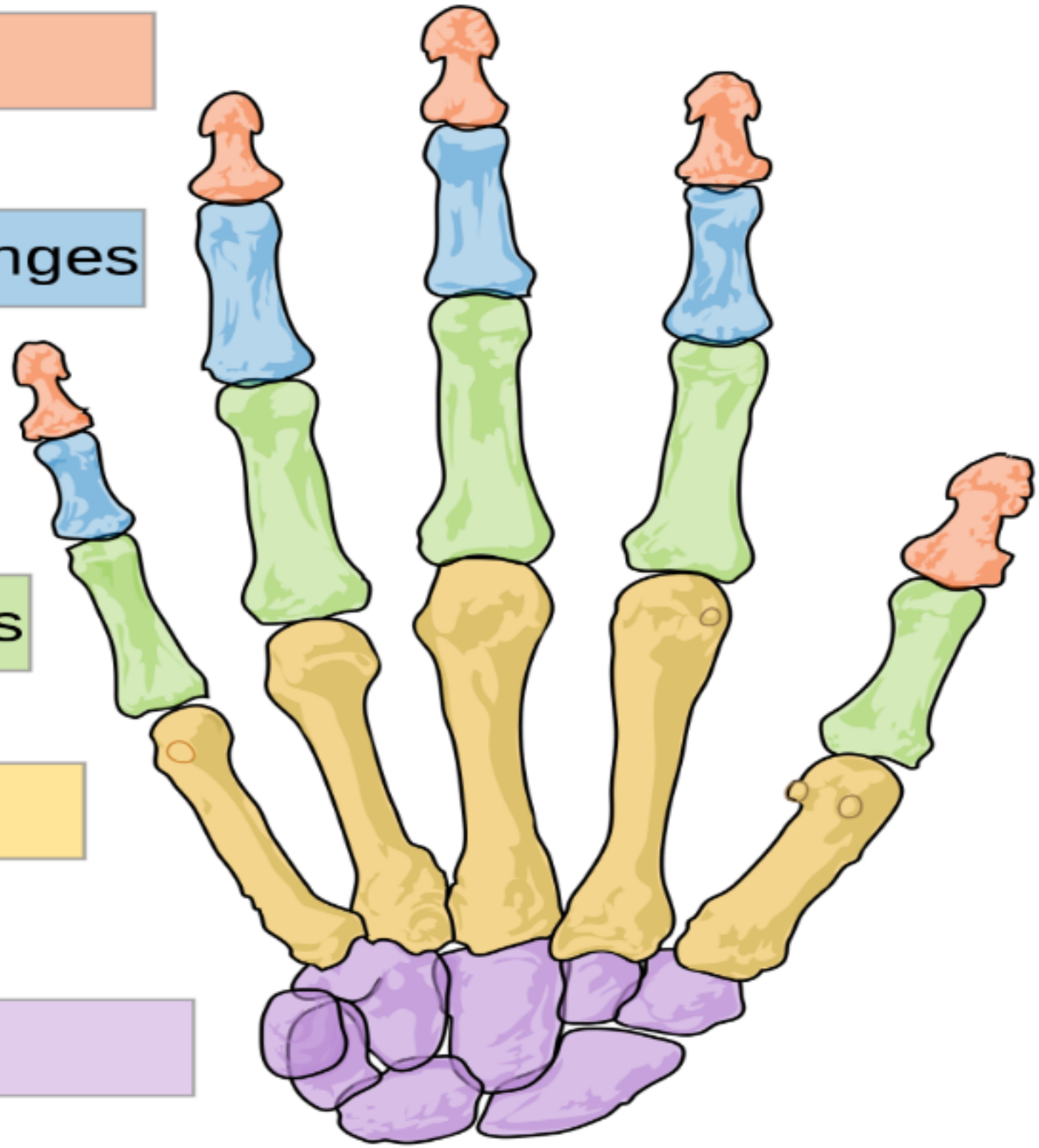
Distal phalanges

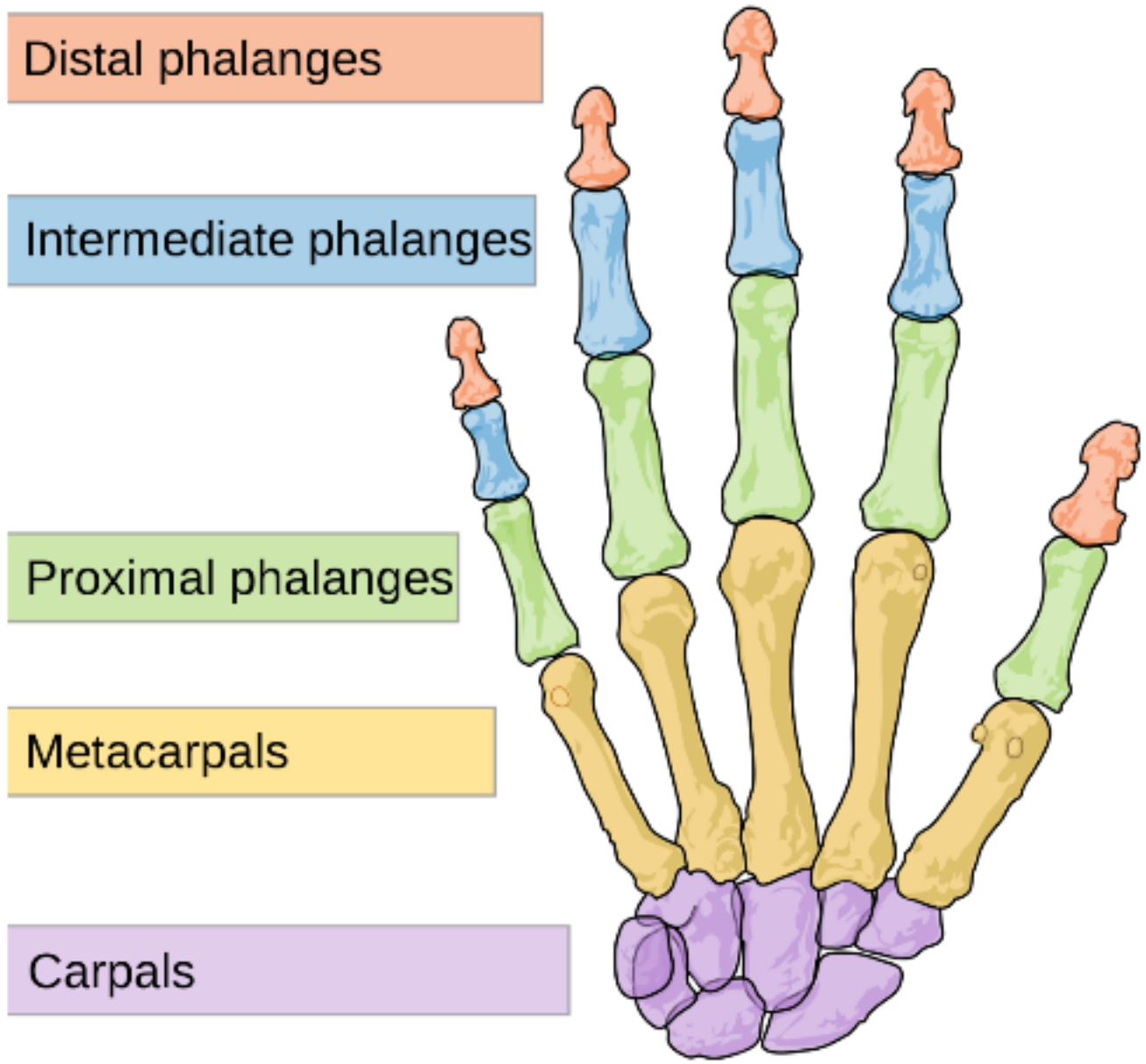
Intermediate phalanges

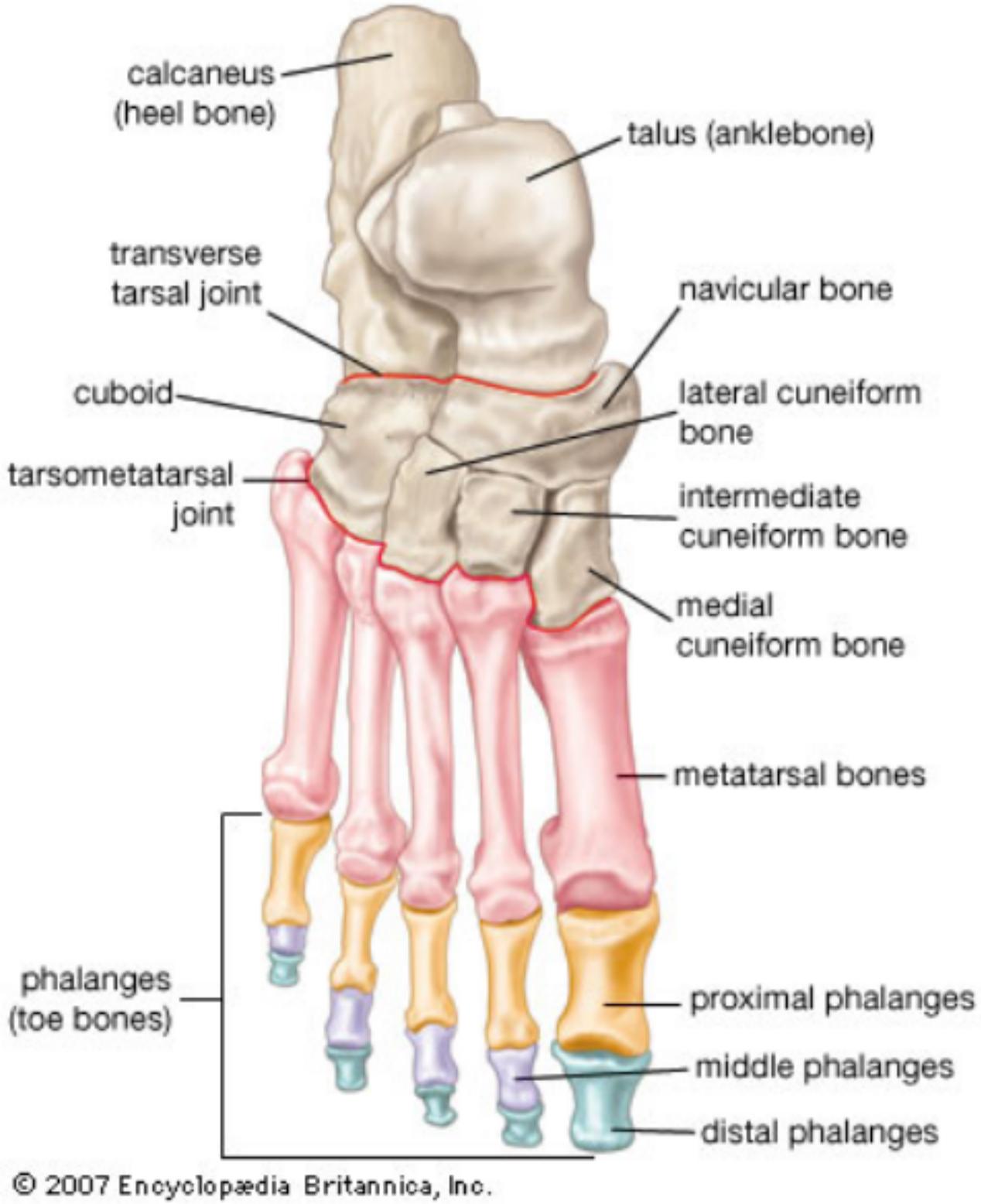
Proximal phalanges

Metacarpals

Carpals




Distal phalanges
Intermediate phalanges
Proximal phalanges
Metacarpals
Carpals


calcaneus
(heel bone)
talus (anklebone)
transverse
tarsal joint
navicular bone
cuboid
lateral cuneiform
bone
tarsometatarsal
joint
intermediate
cuneiform bone
medial
cuneiform bone
metatarsal bones
phalanges
(toe bones)
proximal phalanges
middle phalanges
distal phalanges
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## 2-STRUCTURAL CLASSIFICATION

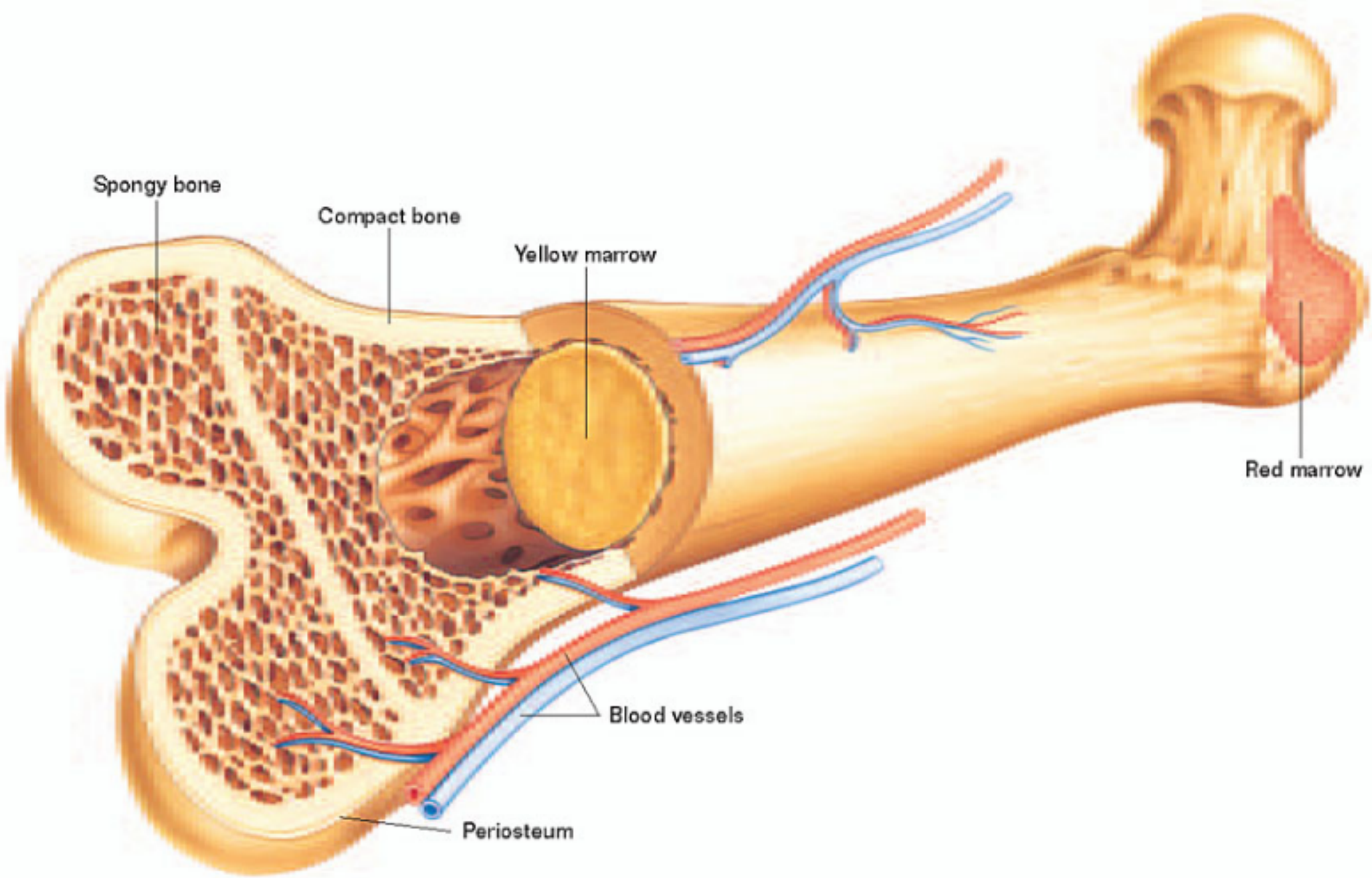
- 2 types of osseous tissue:
- Compact bone tissue
- Spongy bone tissue

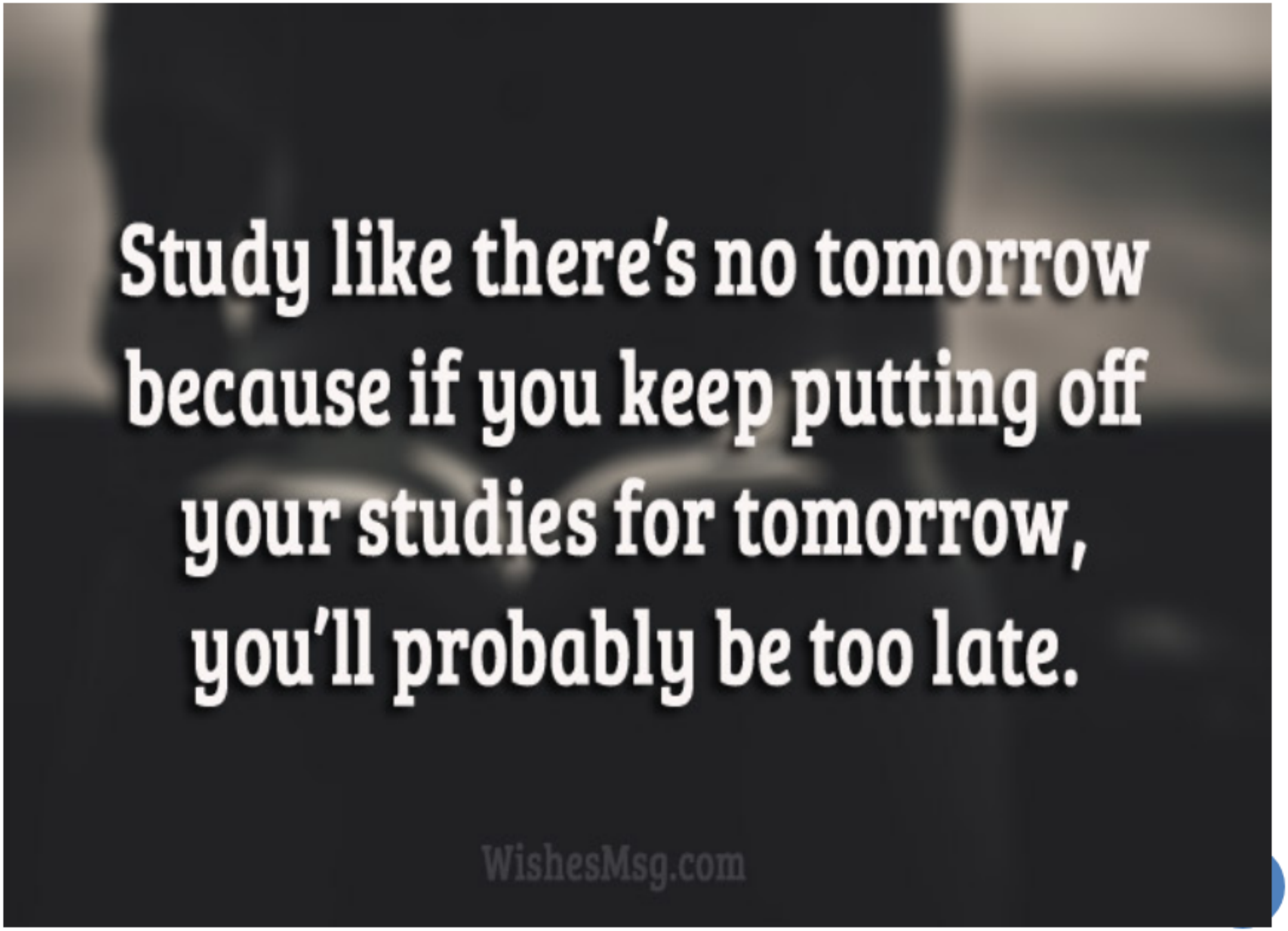
# COMPACT BONE TISSUE

- Hard and dense
- Solid to naked eye
- Cylinders of calcified bone (haversian system or osteons)
- Center of osteon__ longitudinal channel---- haversian canal
- Provide strength

# SPONGY OR CANCELLOUS BONE TISSUE

- Intercalated pattern of tissue consisting an irregular meshwork of intercommunicating bony trabeculae
- Spaces red bone marrow
- Surrounded by an outer shell of compact bone


Spongy bone
Compact bone
Yellow marrow
Red marrow
Blood vessels
Periosteum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