BONES

BY

DR ABULMAATY MOHAMED

ASSISTANT PROFESSOR

ANATOMY & EMBRYOLOGY

MUTAH UNIVERSITY

Learning Outcomes

- Functions of bones
- Classification of bones
- Parts of young long bone
- Periosteum
- Arterial supply of bone

FUNCTIONS OF BONES

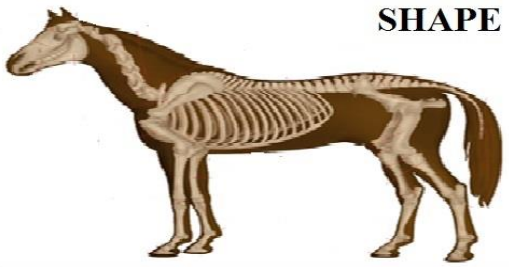
1-gives the body its characteristic shape

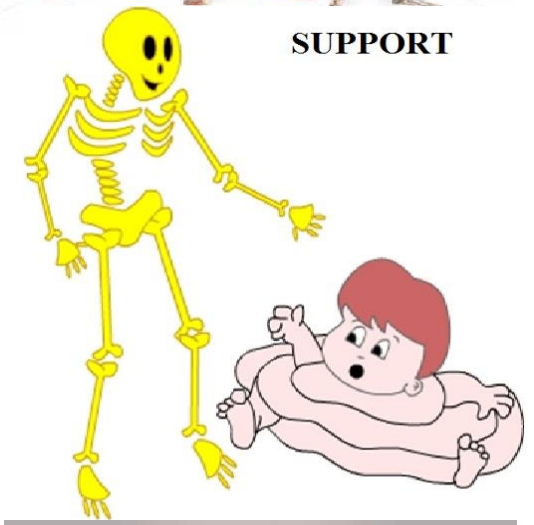
2- support the body

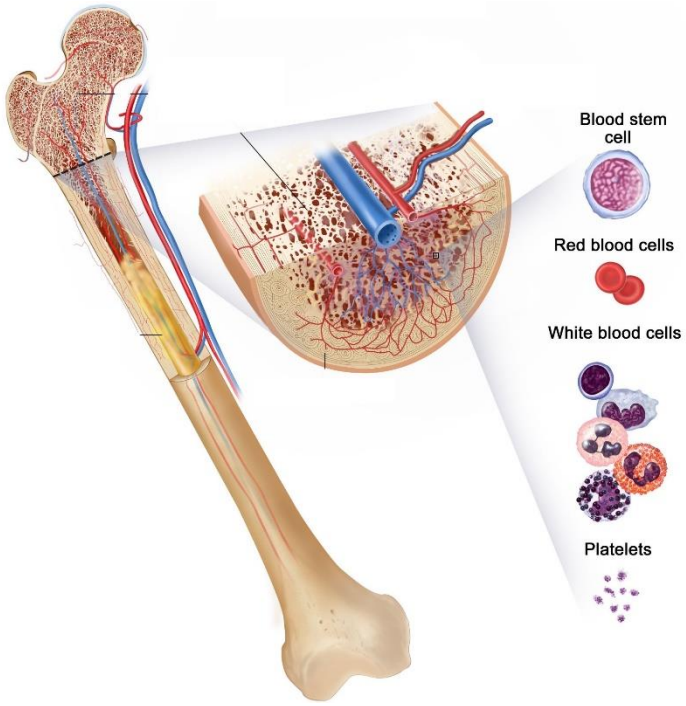
3-protect the soft vital organs e.g. brain in the skull

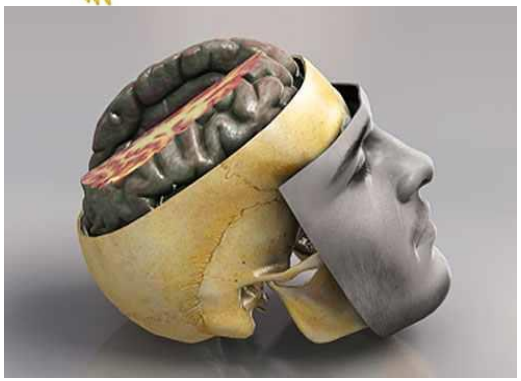
4-calcium & Phosphorus source during emergencies

5-bone marrow forms blood & immune cells









CLASSIFICATION

The bone is classified according to

1-Regional position

2- Development

3- Structure

4- Morphology

Regional classification

1- Axial bones:-

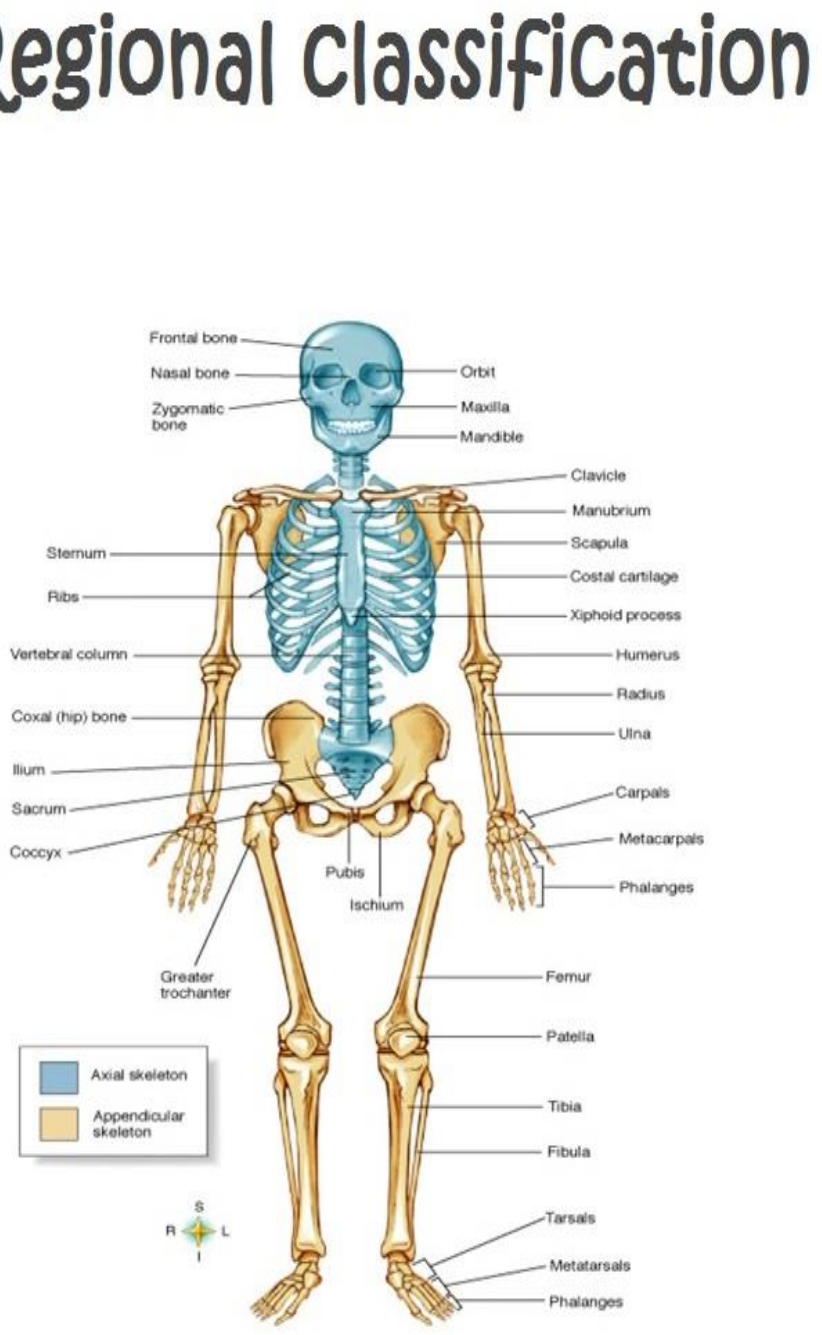
present in the axis of body

e.g. the vertebral column

2- Appendicular bones:-

present in the limbs

e.g. humerus in upper limb



CLASSIFICATION

Developmental classification

1-Membranous bones

Develop from connective tissue membrane
E.g. vault of skull.

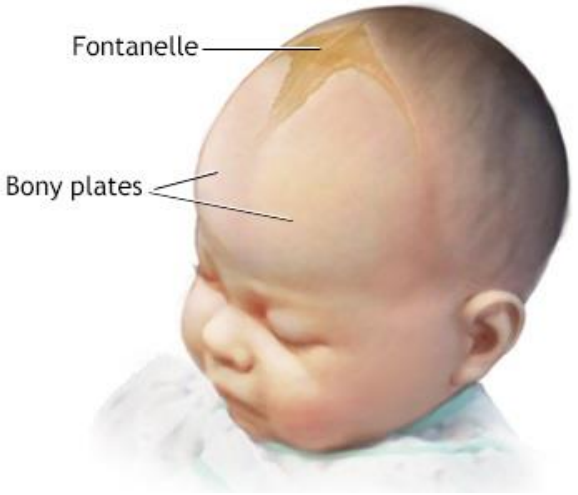
2-Cartilaginous bones

Develop from model of hyaline cartilage
E.g. most of bones of limbs.

3-Membranocartilagenous (mixed) bones

Develop partially from membrane & partially from cartilage.

E.g. mandible & clavicle



CLASSIFICATION

Structural classification

Compact bone

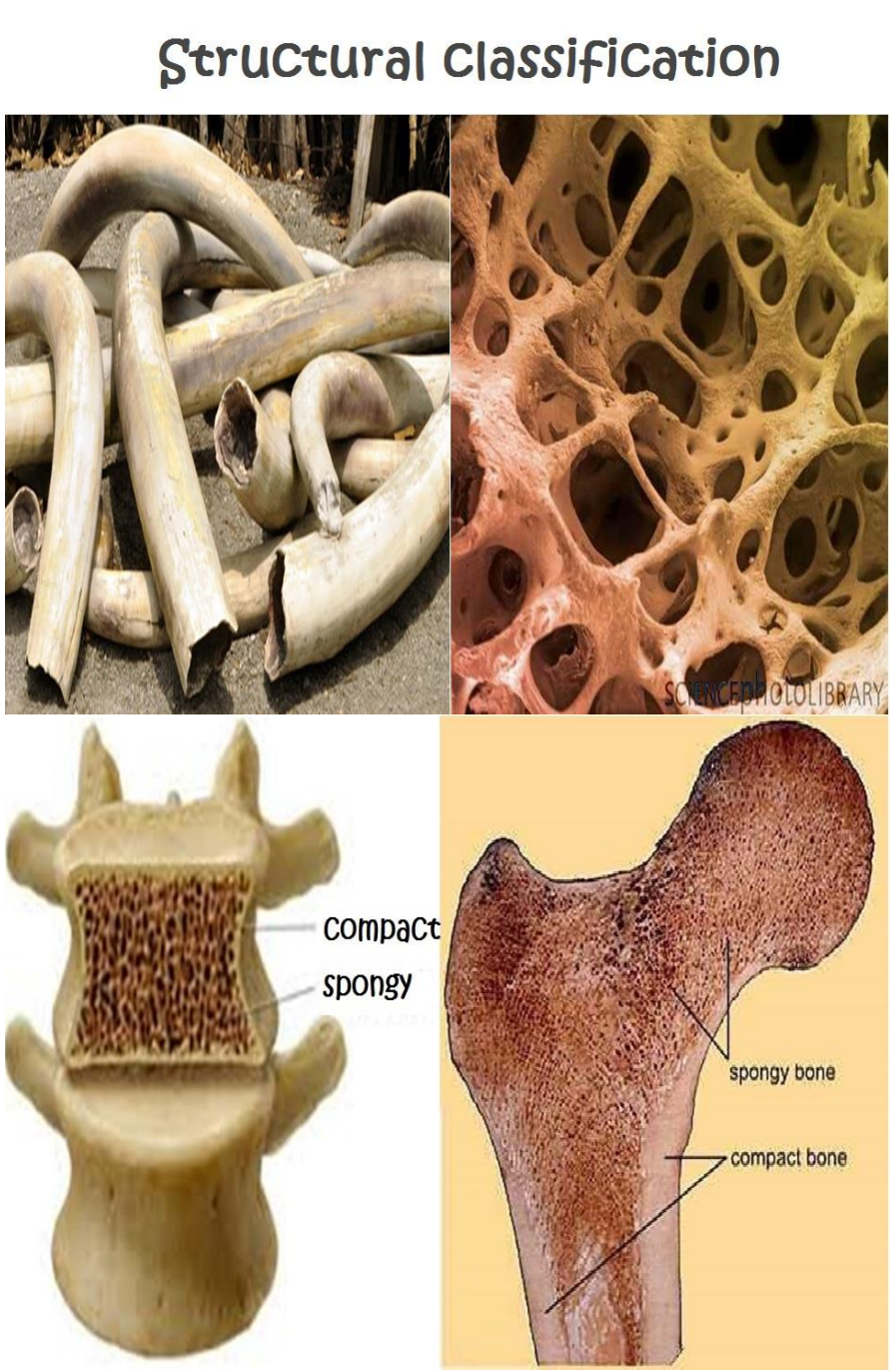
-Dense, Hard, ivory like

-Present in the cortex of all bones specially the shaft of long bones

Spongy (cancellous) bone

-Trabecular Meshwork contains spaces filled with bone marrow

-Present in the core of all bones and the ends of long bones



CLASSIFICATION

Morphological classification

1-long bones

A- Typical long bone: - should have

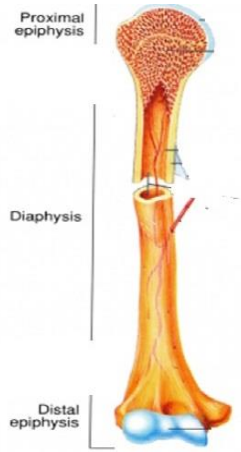
Shaft (diaphysis)

Elongated

with Medullary cavity contains bone marrow

2 ends (epiphysis)

expanded to carry and distribute
body weight equally on the shaft

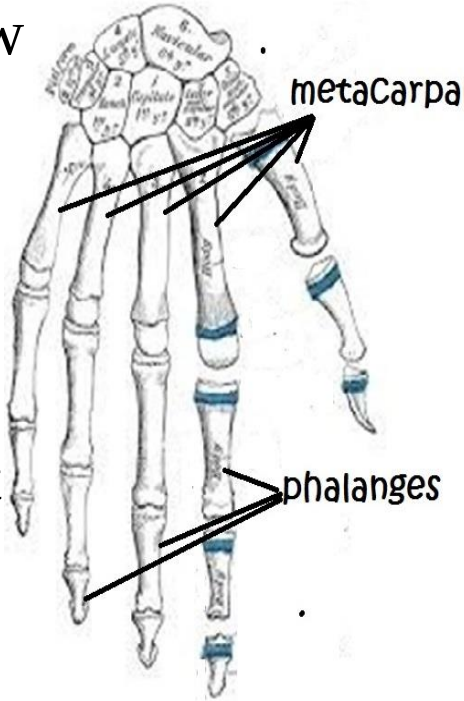


typical long bone

B- Atypical long bone:-

Either without medullary cavity in the shaft
e.g. clavicle (as it is of mixed ossification).

OR with 1 end (miniature long bone)
e.g. metacarpals& phalanges



atypical long bone

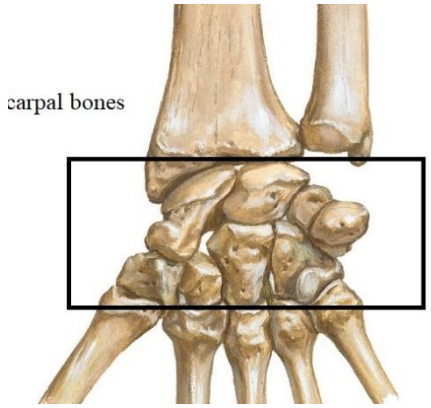
CLASSIFICATION

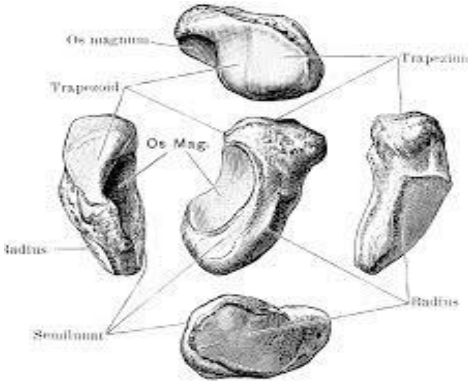
Morphological classification

2-short bones

Characters no shaft
cubical, trapezoidal or scaphoidal in shape

E.g. carpal & tarsal bones

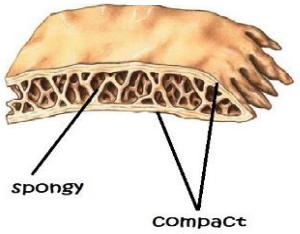




3-flat bones

Characters formed of 3 layers
(outer, inner lamina of compact bone
separated by middle lamina of spongy bone

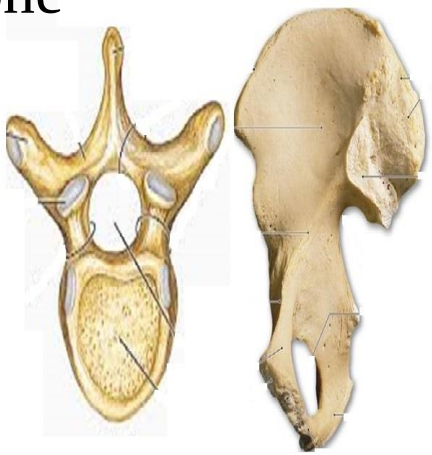
E.g. vault of the skull, sternum& scapula.



4-irregular bones:-

Characters not long, short or flat.

E.g. vertebrae & hip bone



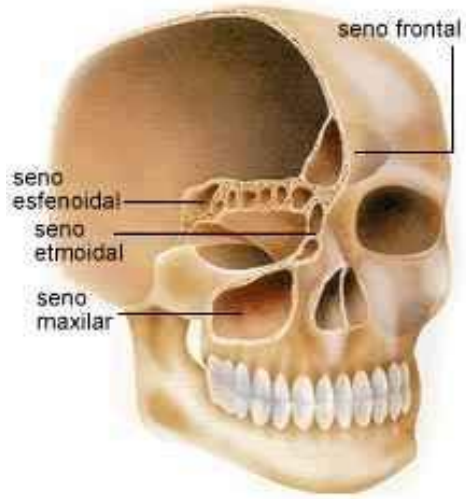
CLASSIFICATION

Morphological classification

5-pneumatic bones

Characters contain large air cavity

E.g. bones of Para nasal sinuses.



6-sesamoid bones

Characters

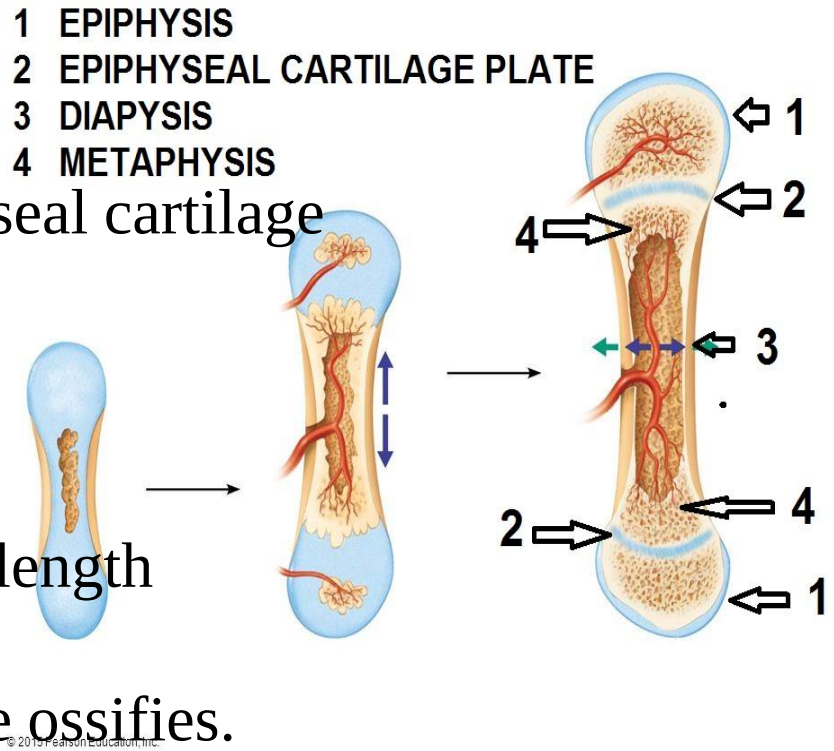
bony nodules embedded in tendons of some muscles to decrease the friction between the tendon and the underlying bone

E.g. Patella in lower limb (the largest sesamoid bone)

PARTS OF YOUNG LONG BONE

A. 2 ends (epiphysis)

- covered by articular cartilage
- separated from the shaft by the epiphyseal cartilage



B- epiphyseal cartilage

-Plate of hyaline cartilage between the epiphysis and diaphysis .

- It is responsible for growth of bone in length
- After complete growth in length (at 15-22 years) the epiphyseal cartilage ossifies.

C. Shaft (diaphysis)

- Formed of cylinder of compact bone surrounds a space called medullary cavity filled with bone marrow

D-metaphysis

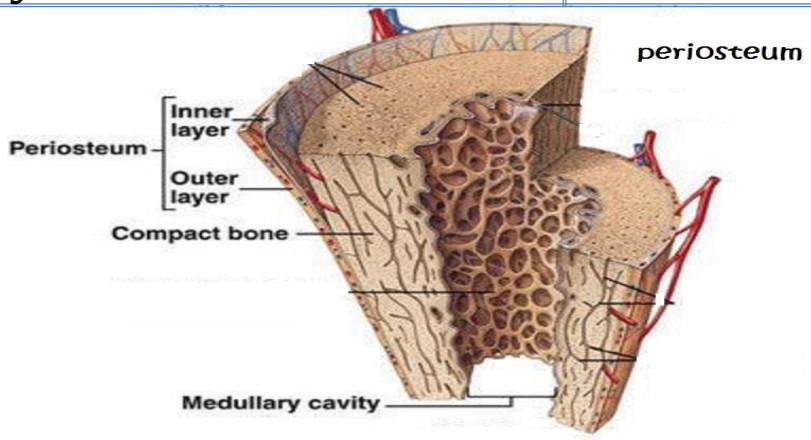
The new part of diaphysis close to the epiphyseal cartilage.

N.B. The adult long bone formed of 1 diaphysis & 2 epiphysis

PERIOSTEUM

Def.:- membrane covers the bone except the articular cartilage

Features	Functions
Formed of 2 layers A-outer fibrous layer B-inner cellular layer contains osteoblasts	-Gives attachment to muscle, tendons, ligaments. -bone growth in thickness -bone repair after fracture
-Highly vascular -Highly sensitive	-Nourishment of bone -Sensation of bone



ARTERIAL SUPPLY OF BONE

1-Nutrient artery

-enters the bone through the nutrient canal

- Supply:

a)Medullary cavity & bone marrow.

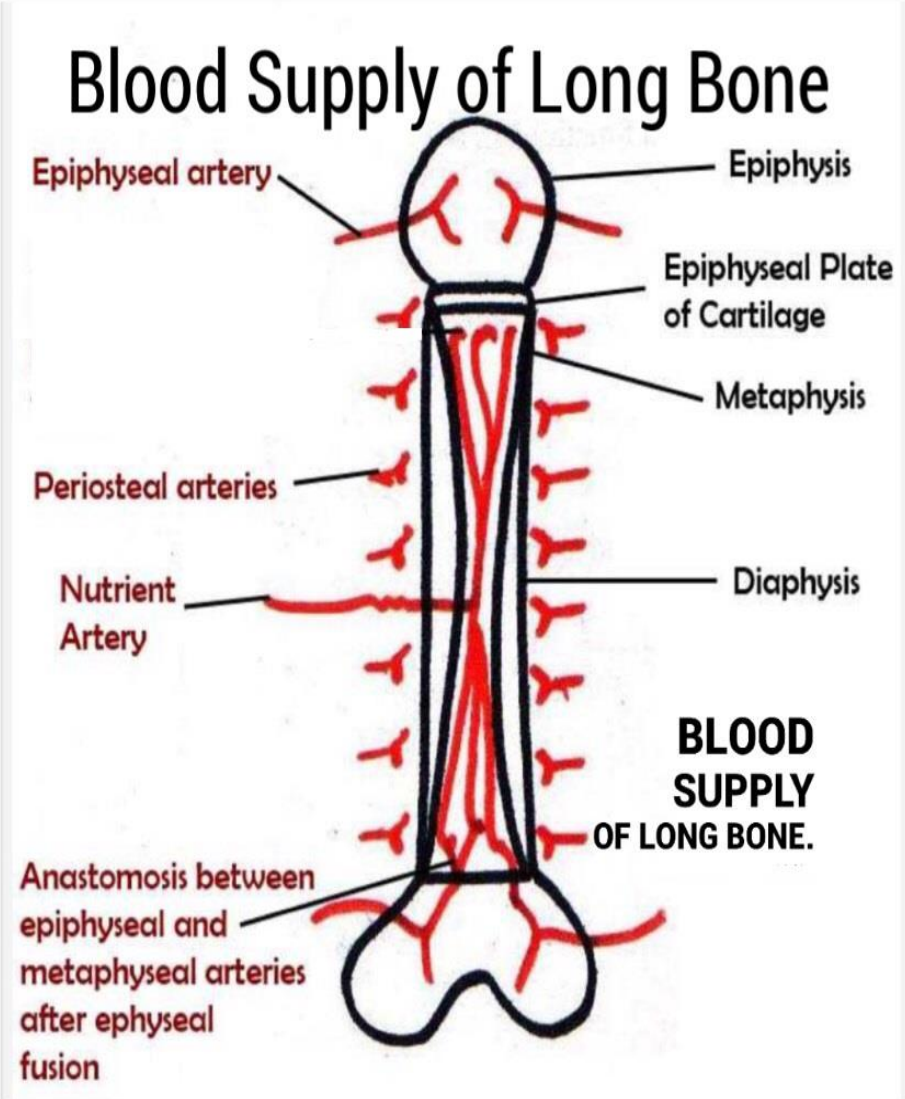
b)Deeper 2/3 of cortex of shaft.

c)Metaphyses

2- Periosteal arteries:

-ramify under the periosteum

-supply outer 1/3 of cortex.



ARTERIAL SUPPLY OF BONE

3- Metaphyseal arteries:

- enter the metaphysis

-supply the metaphyses as supplement to the nutrient artery

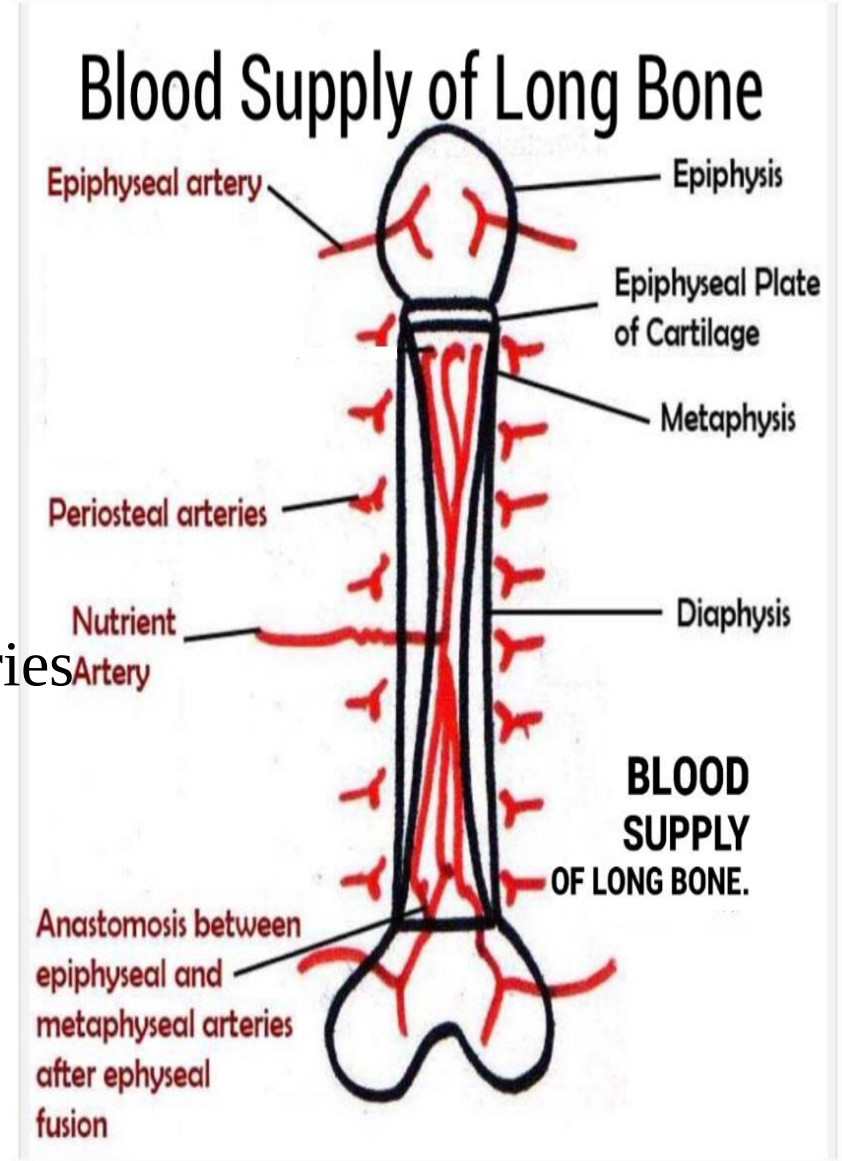
- (in the adult) it anastomoses with nutrient and epiphyseal arteries.

(In young bone during presence of epiphyseal cartilage plate they do not anastomose with epiphyseal arteries i.e. they are end arteries)

4- Epiphyseal arteries:

-enter the epiphyses through multiple foramina

-supply epiphyses.



THANQ