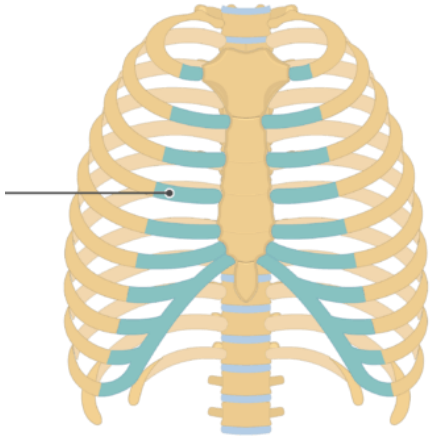
Supporting C.T. (lab)

Cartilage & Bone

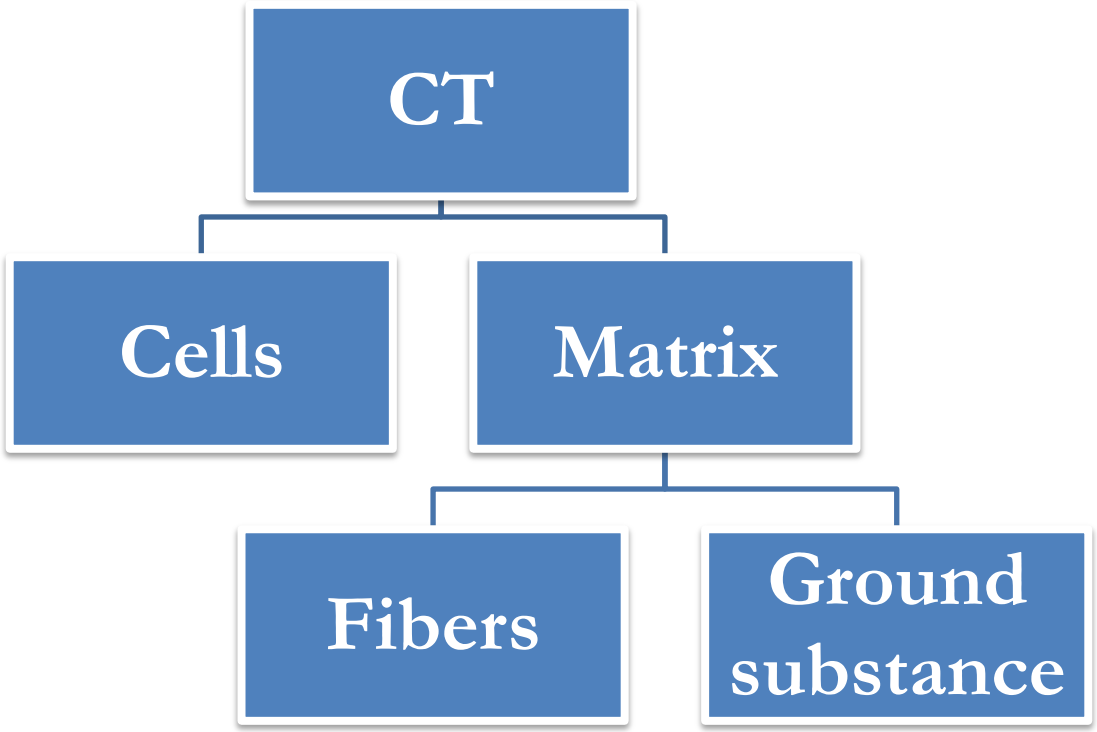


Heba Elsayed Sharaf Eldin

Associate professor of Histology

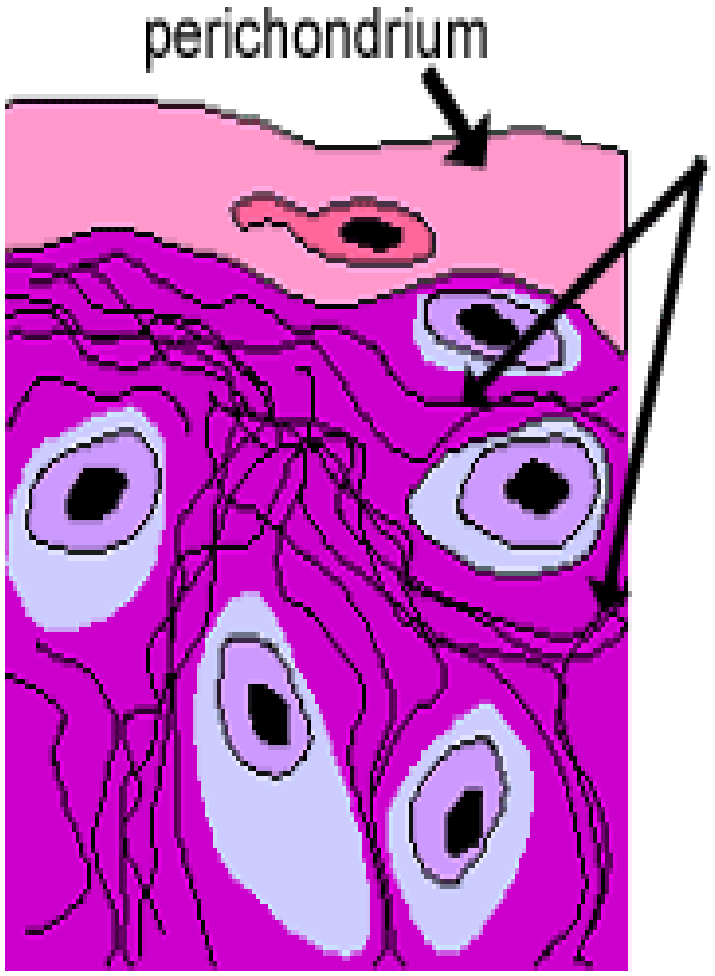
Cartilage

Structure:



Structure of cartilage

- **The perichondrium**
- **Cartilage cells**
- **The extracellular matrix**



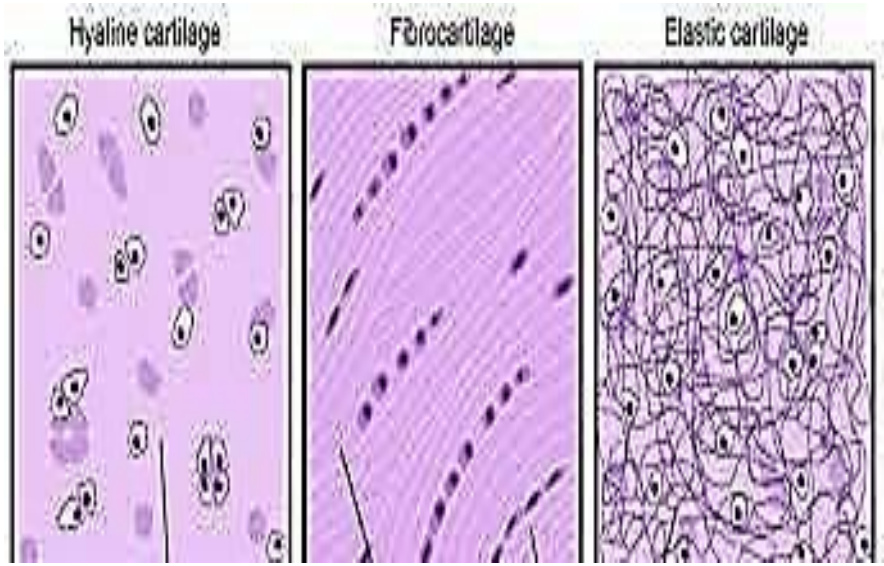
Types of cartilage

According to the type of fibers embedded in the matrix:

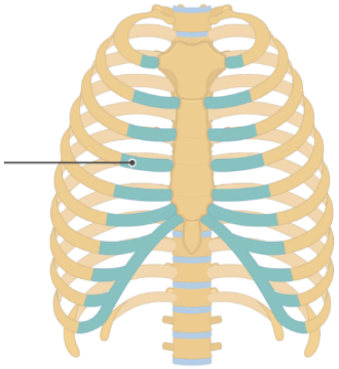
1-Hyaline cartilage

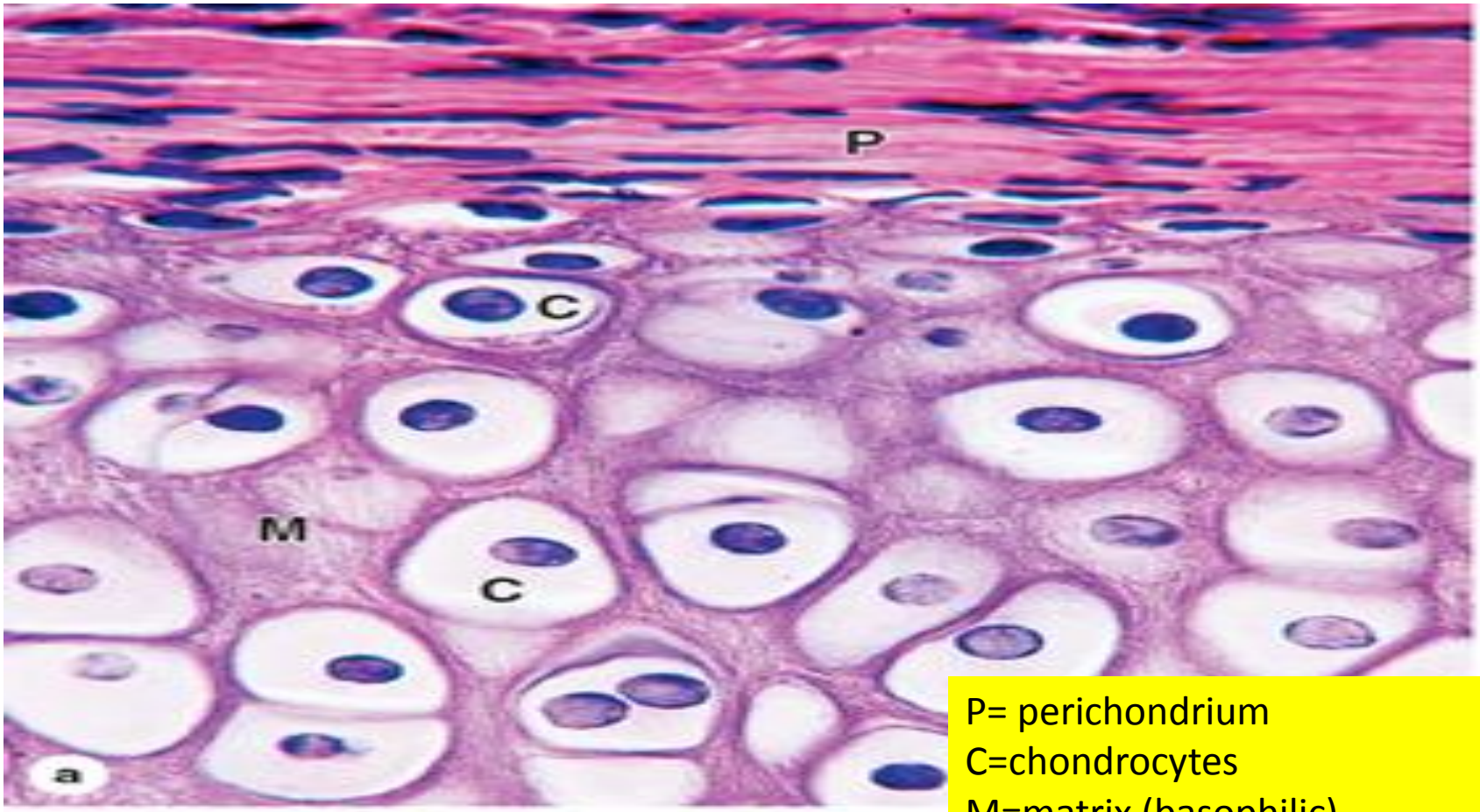
2-Elastic cartilage

3-Fibro-cartilage



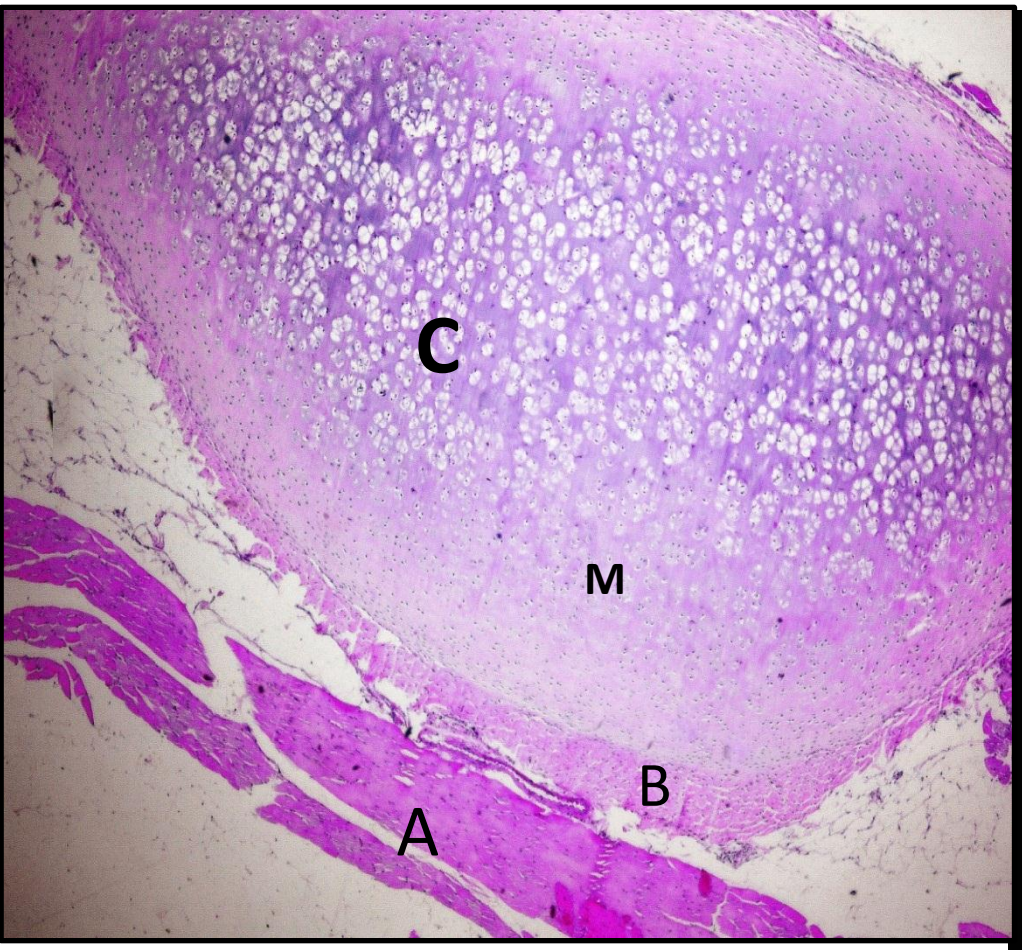
Hyaline cartilage

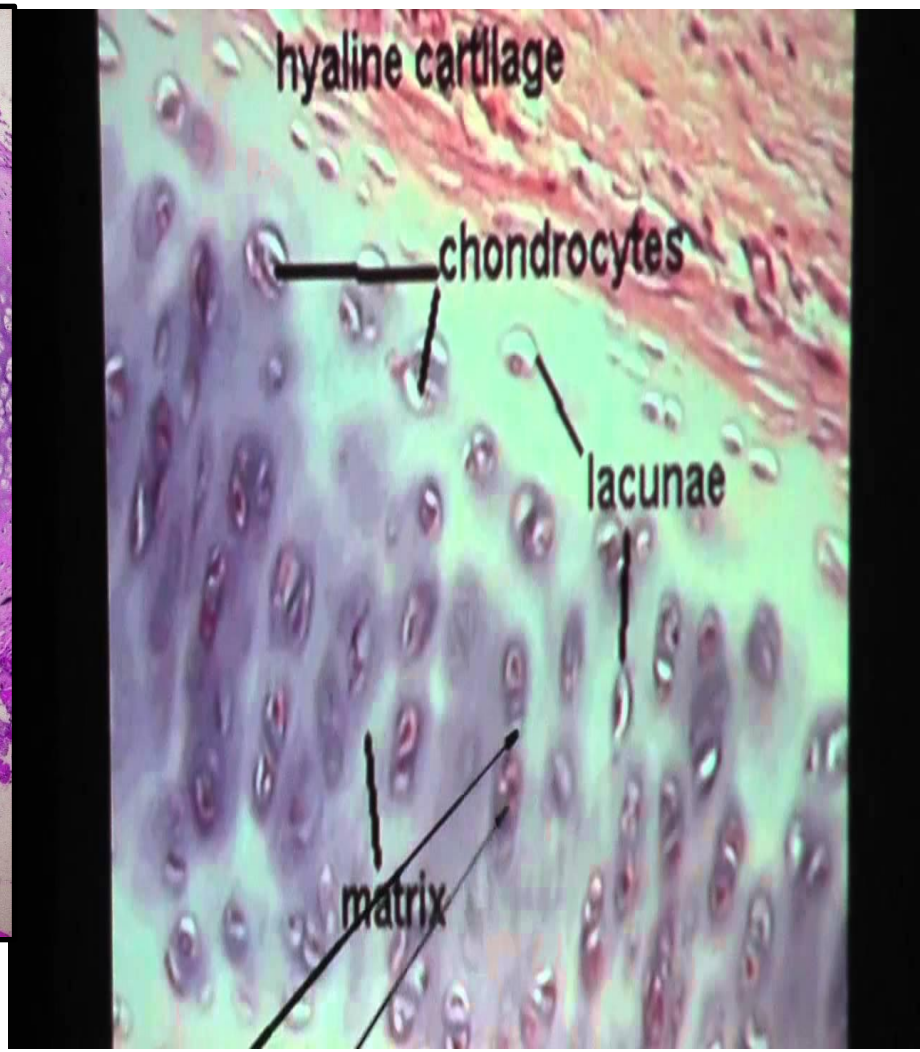




P= perichondrium
C=chondrocytes
M=matrix (basophilic)

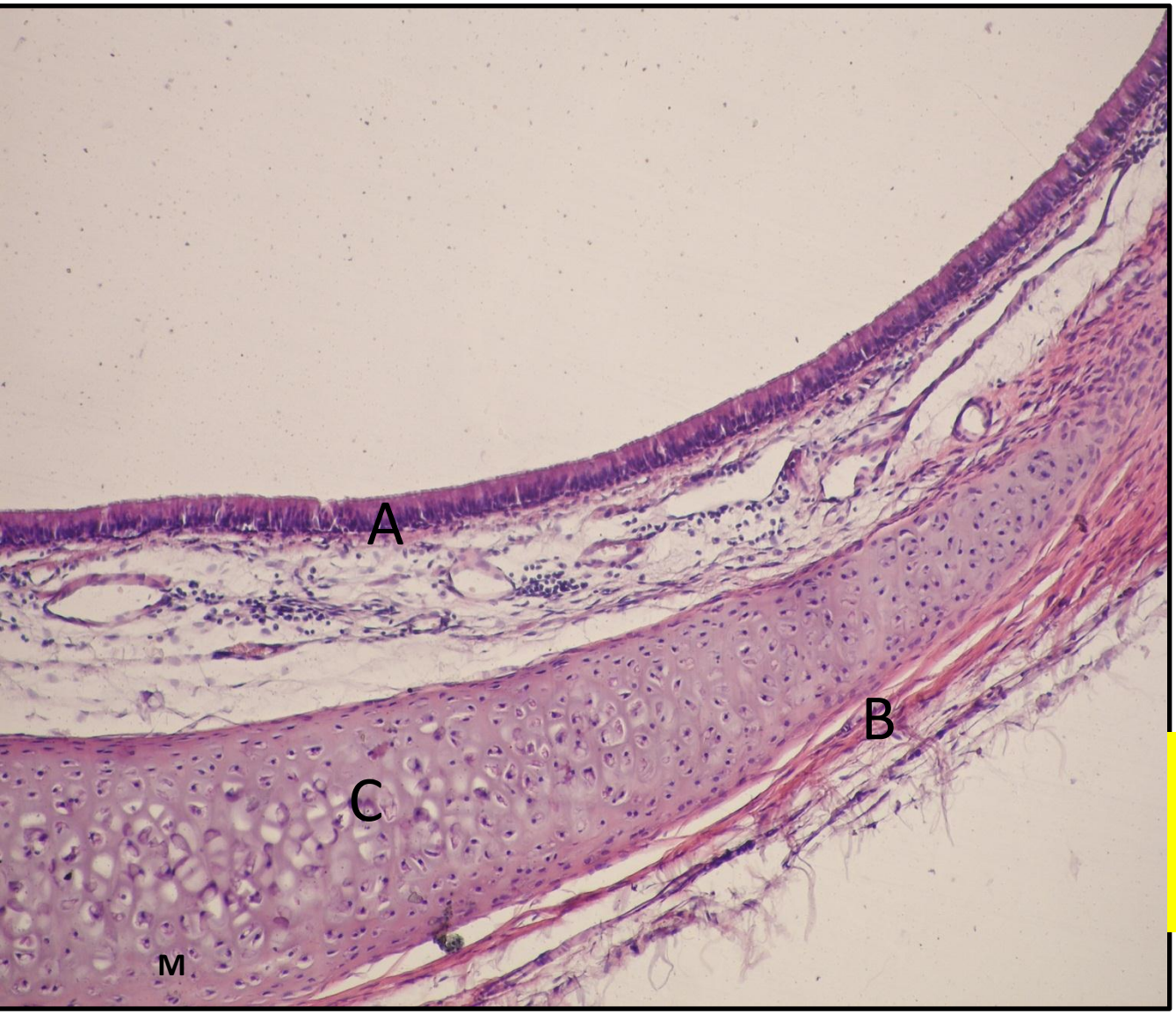
Hyaline cartilage (costal cartilage)

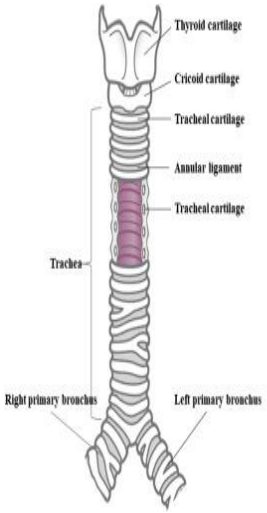


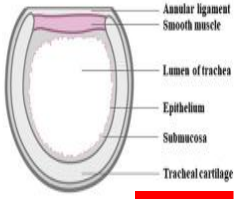


A=intercostal muscles **B**=perichondrium
C= chondrocytes **M**=matrix (basophilic)

Hyaline cartilage (Trachea)

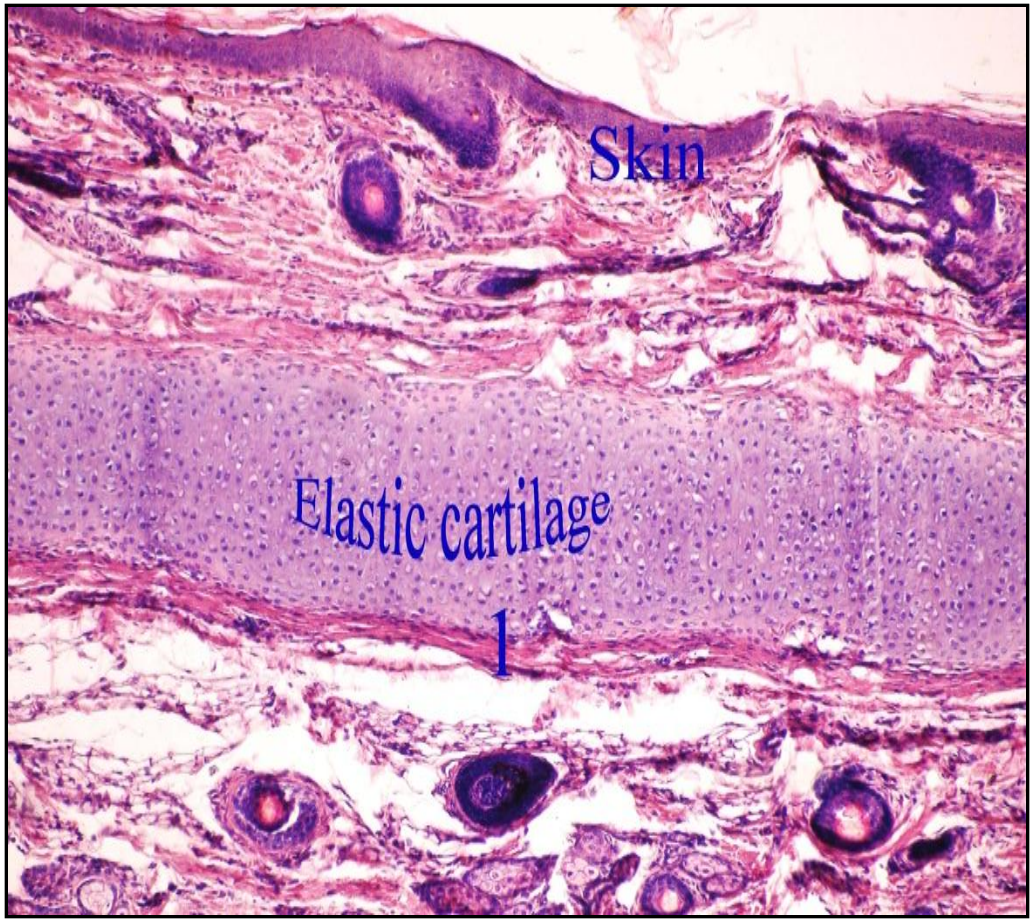


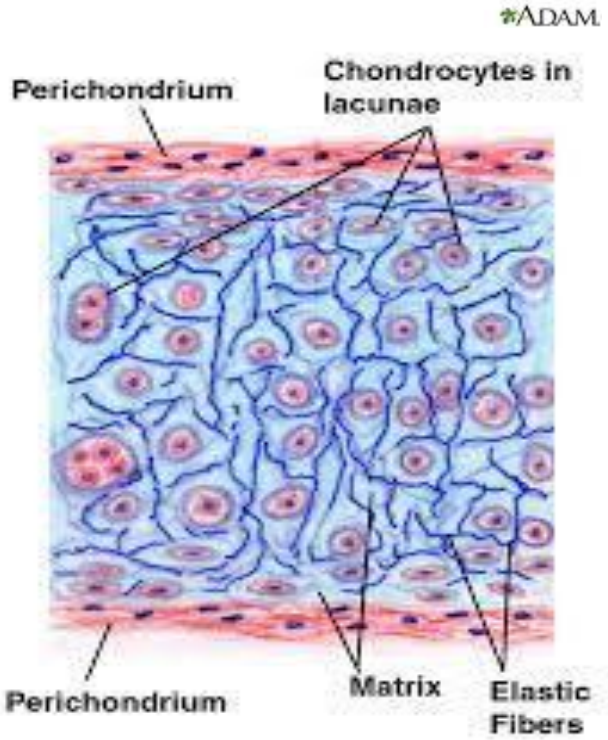




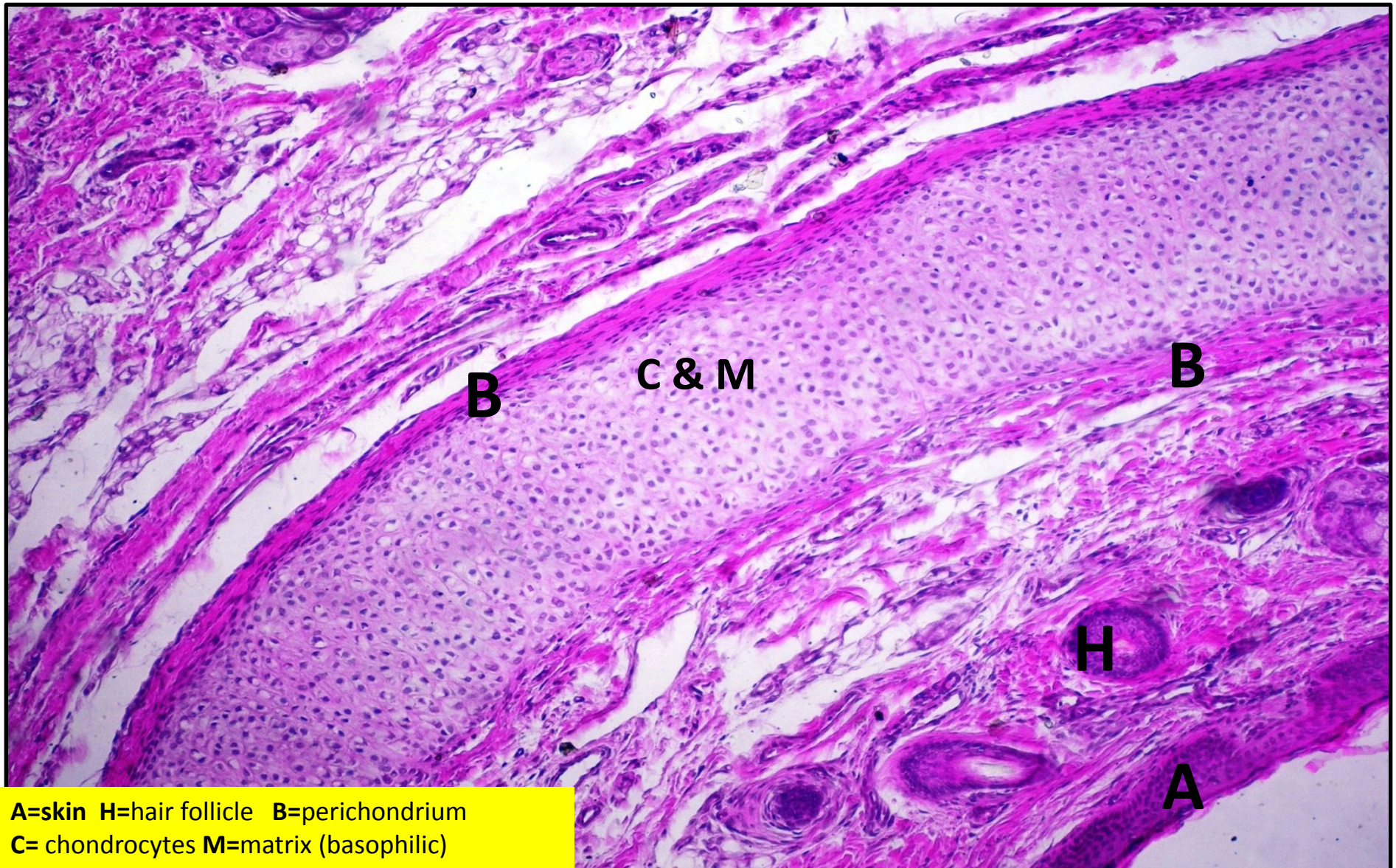
- **A=**epithelium
- **B=**perichondrium
- **C=** chondrocytes
- **M=**matrix (basophilic)

Elastic cartilage (Ear pinna)



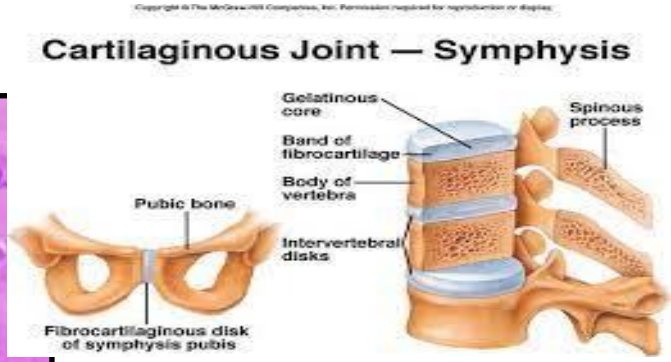


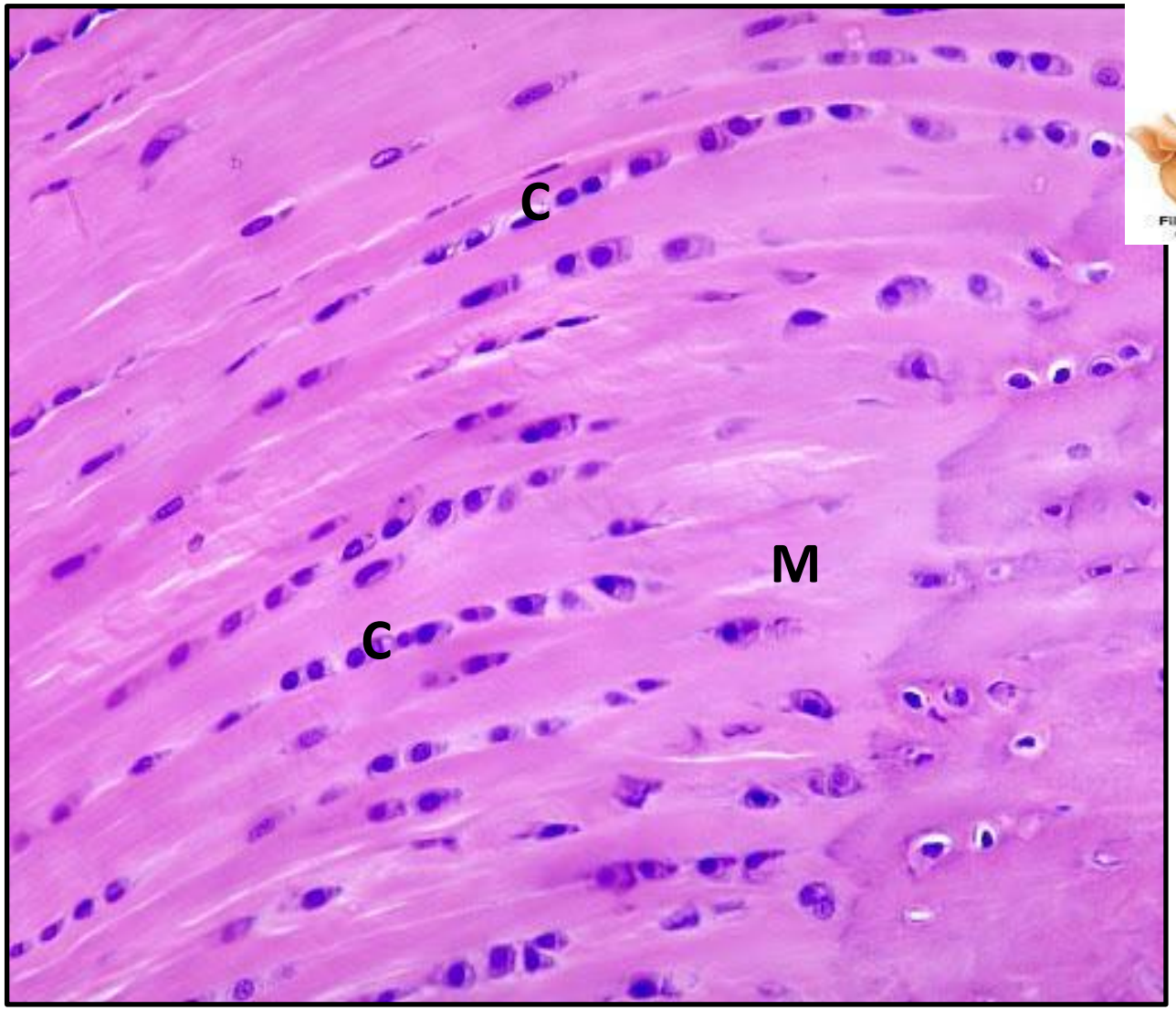
Elastic cartilage (Ear pinna)



A=skin **H=**hair follicle **B=**perichondrium
C= chondrocytes **M=**matrix (basophilic)

Fibrocartilage

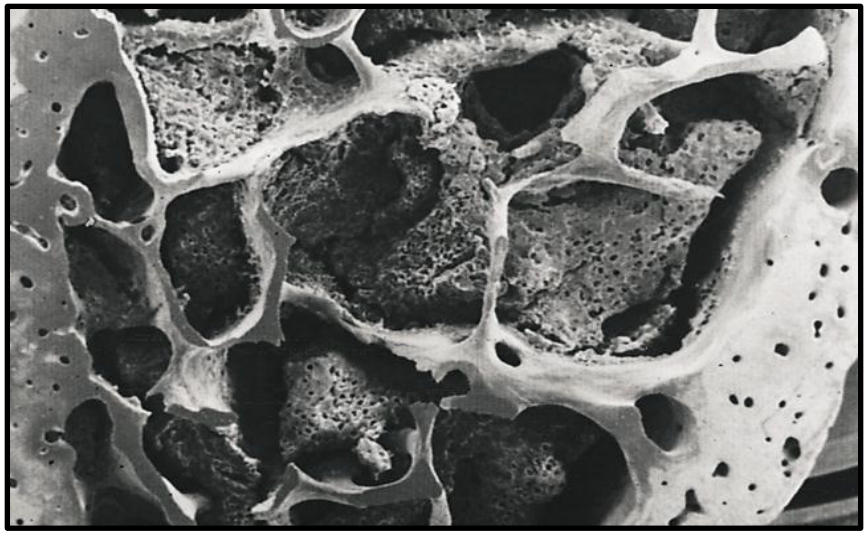


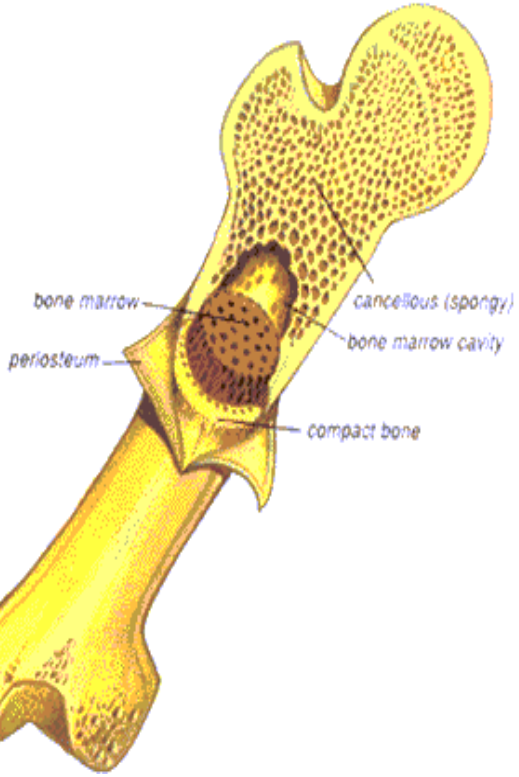


C= rows of chondrocytes
M=matrix (Acidophilic)
due to collagen fibers type I

Bone tissue

- Supportive CT with **hard** matrix.
- **TYPES:**
- **1- Compact bone**
- **2- Spongy (cancellous) bone**





Structure of bone tissue

Covering layers

- Periosteum
- Endosteum

Extracellular matrix

- Inorganic component
- Organic component
  - Collagen fibers (type I).
  - Ground substance.

Bone cells: 4 cells

- osteogenic cells
- osteoblasts
- osteocytes
- osteoclasts.

Methods of histological study of bone

two methods :

1.Unstained ground bone

-In which the bone is grinned by special bone – grinding machine to produce very ***thin slices of bone.***

- the bone is mounted on glass slide then examined directly by LM.

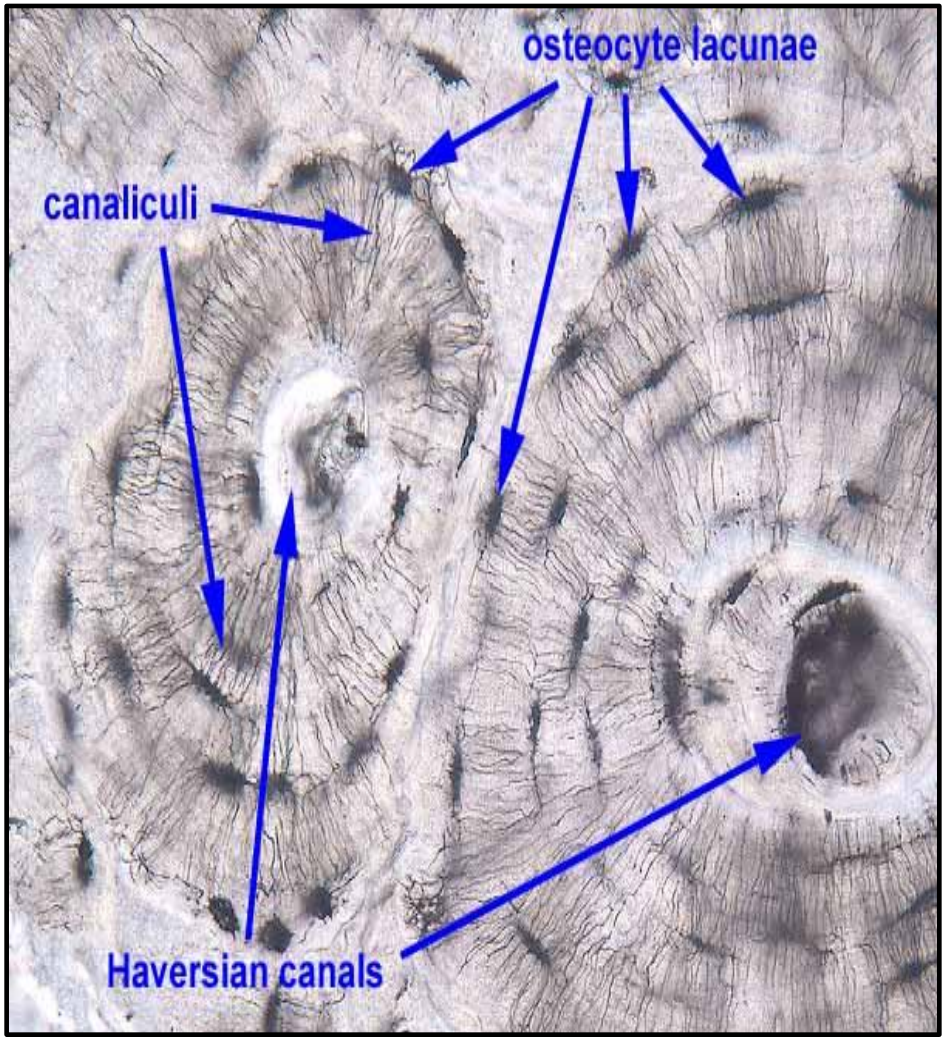
2. Stained decalcified sections :

The calcium salts are removed from bone using strong acid solution e.g. (5% nitric acid) or chelating agent e.g. EDTA thus the bone became soft and is embedded sectioned & stained as usual with routine **H&E stain**

Ground bone

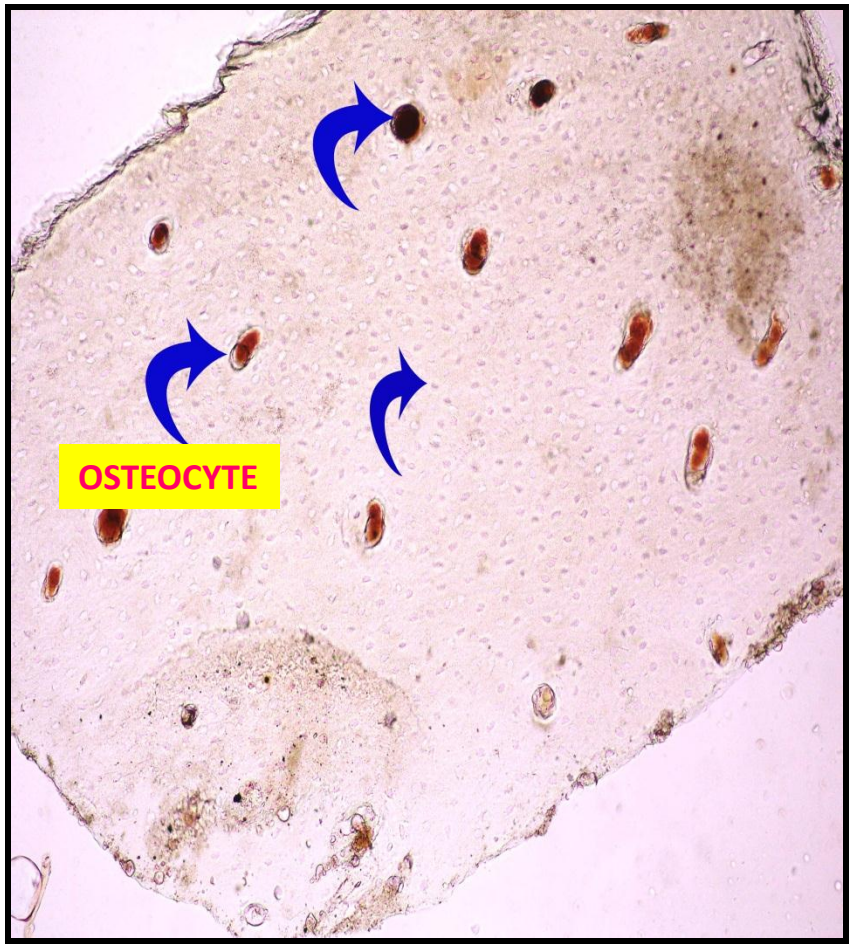
the bone is left to dry, all organic materials & cells will die, leaving the solid calcified ground substance, then the bone is cut with abrasive into thin pieces and examined under the microscope (without staining).

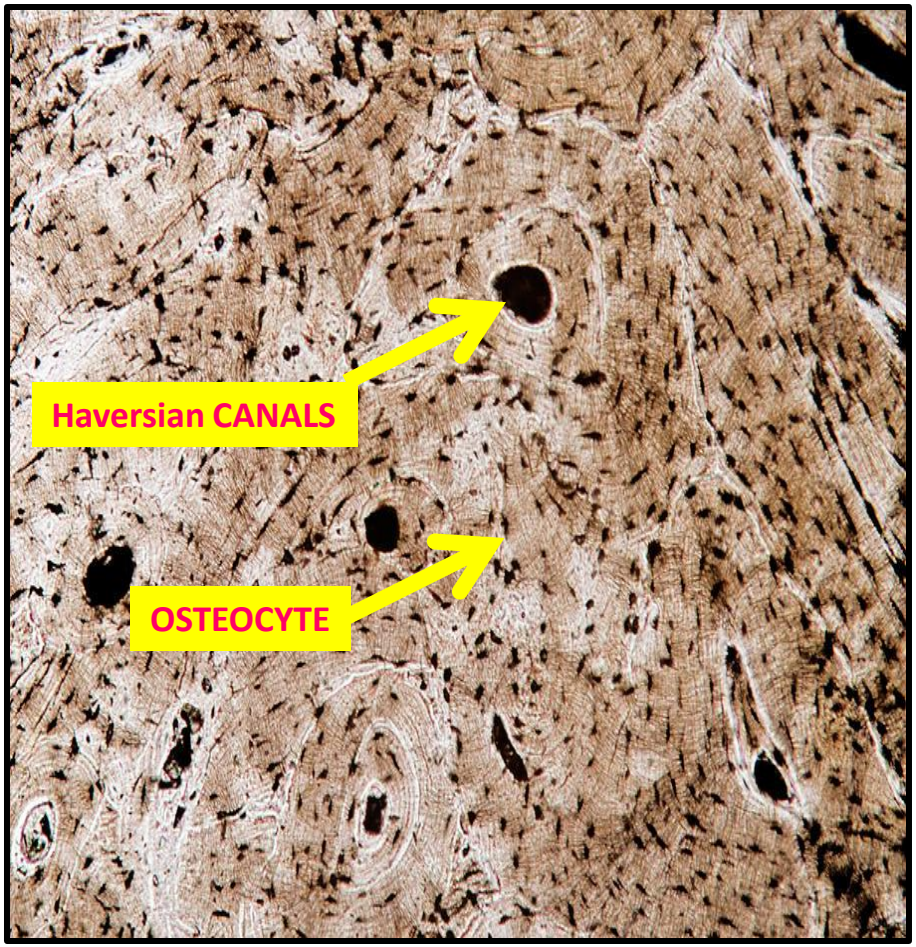
The *empty spaces* (canals, lacunae and canaliculi) appear *black* because they contain air.



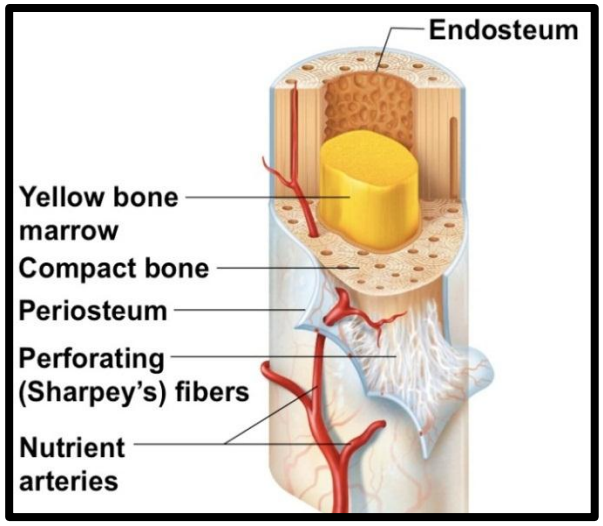
Ground bone

Ground bone



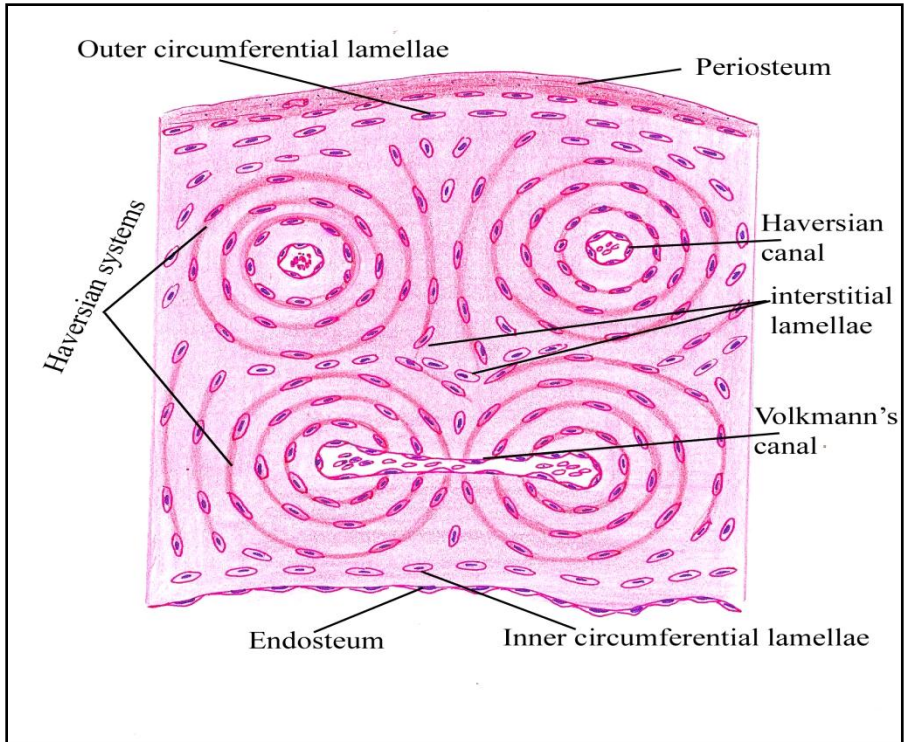


compact bone

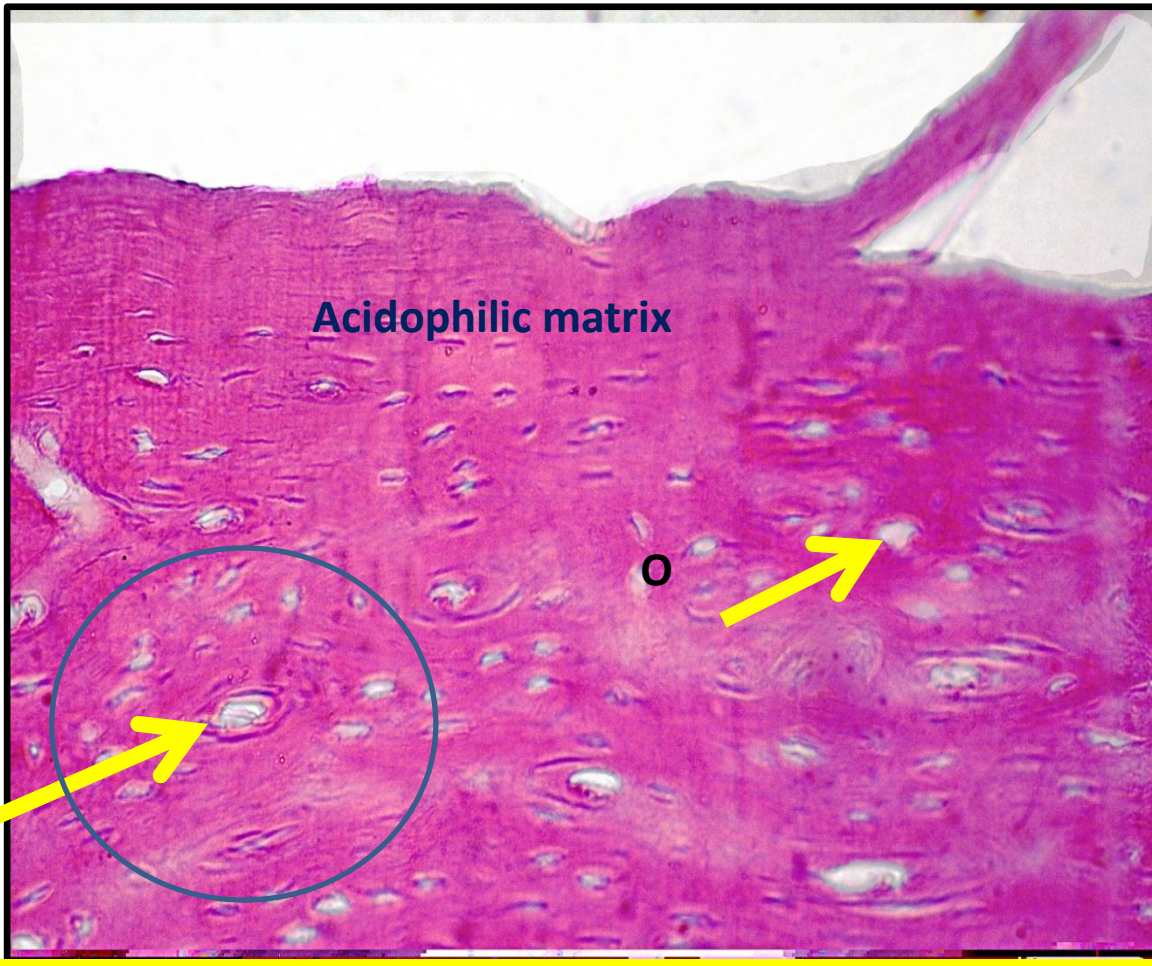


Structure:

- ***2 membranes:***
  - periosteum.
  - endosteum.
- ***2 circumferential lamellae:***
  - Outer: under & parallel to periosteum.
  - Inner: under & parallel to endosteum.
- ***2 systems:***
  - Haversian system (HS)
  - Interstitial system: irregular inbetween HS.

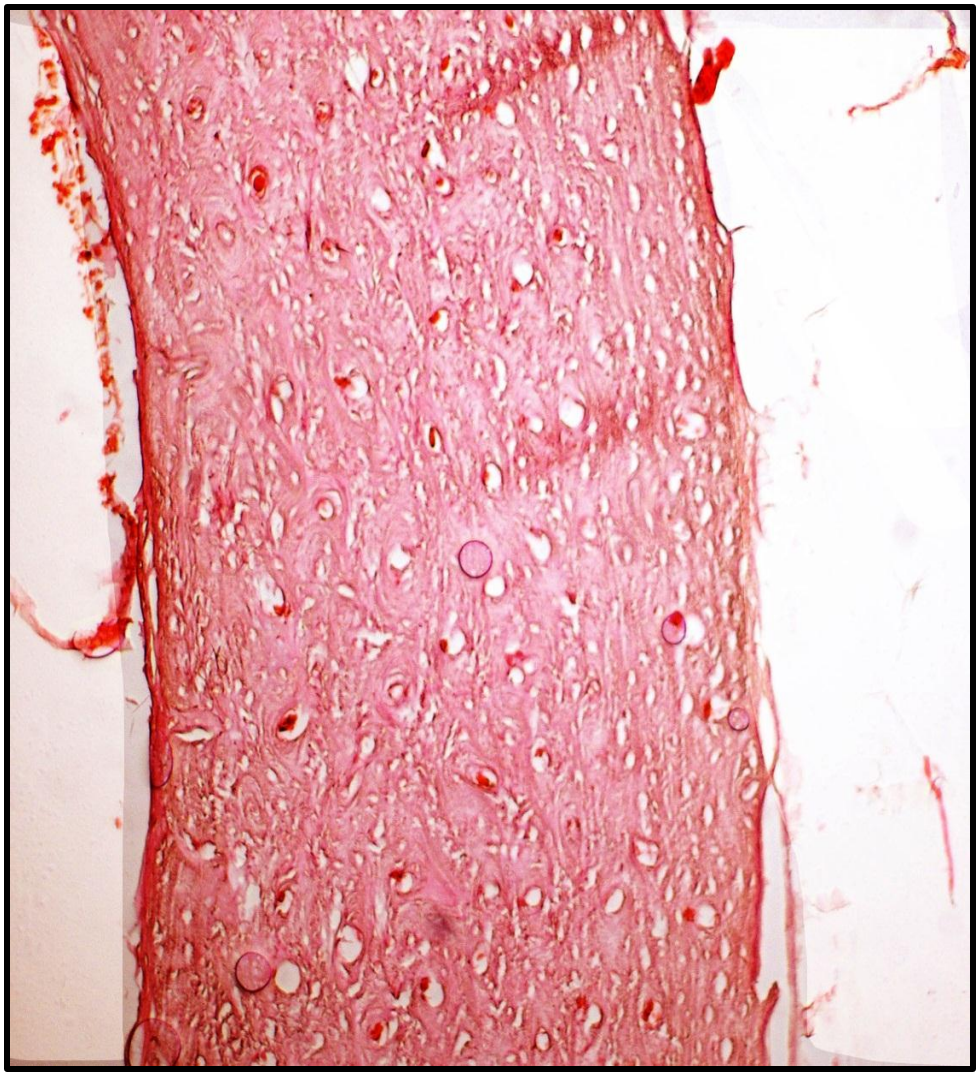


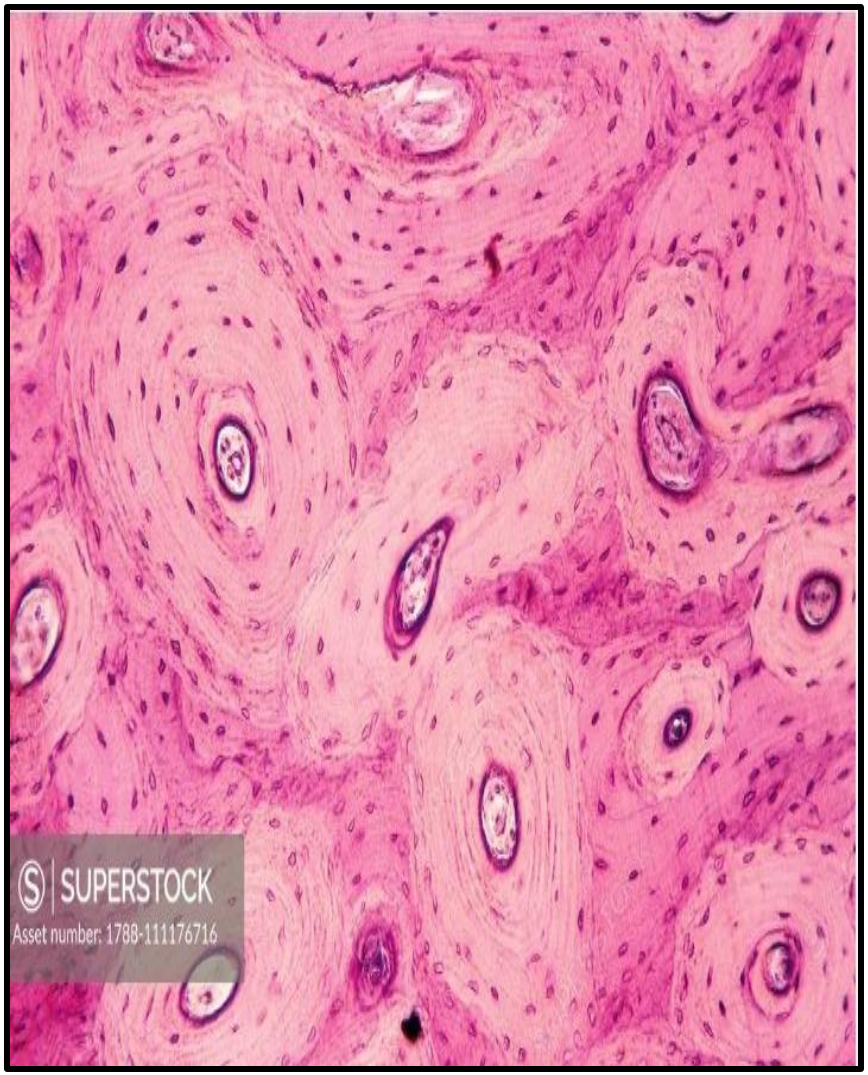
Decalcified compact bone



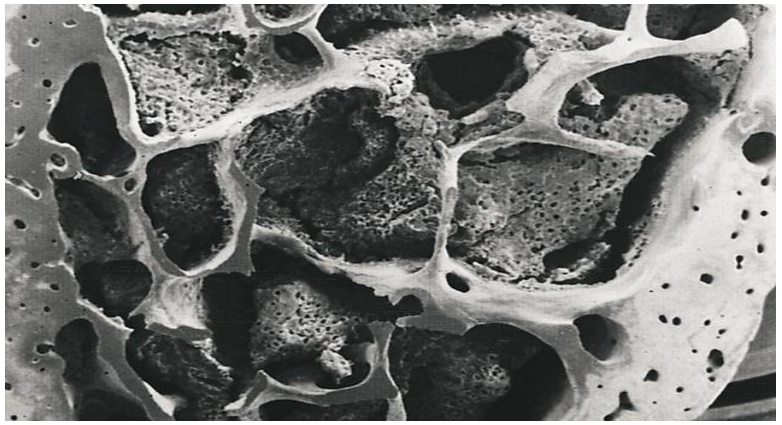
ARROWS REFER TO The Haversian CANALS
Circle= Haversian system
O=osteocyte

Decalcified compact bone





Cancellous (spongy) bone



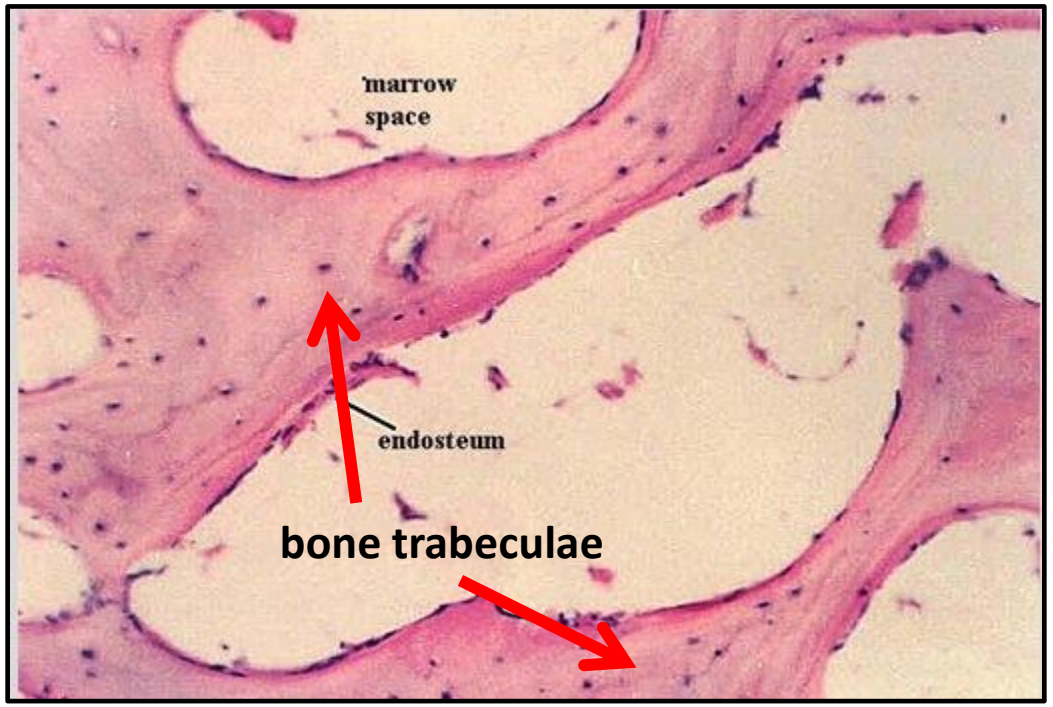
Sites:

1. Flat bones (skull)
2. Shaft of ribs.

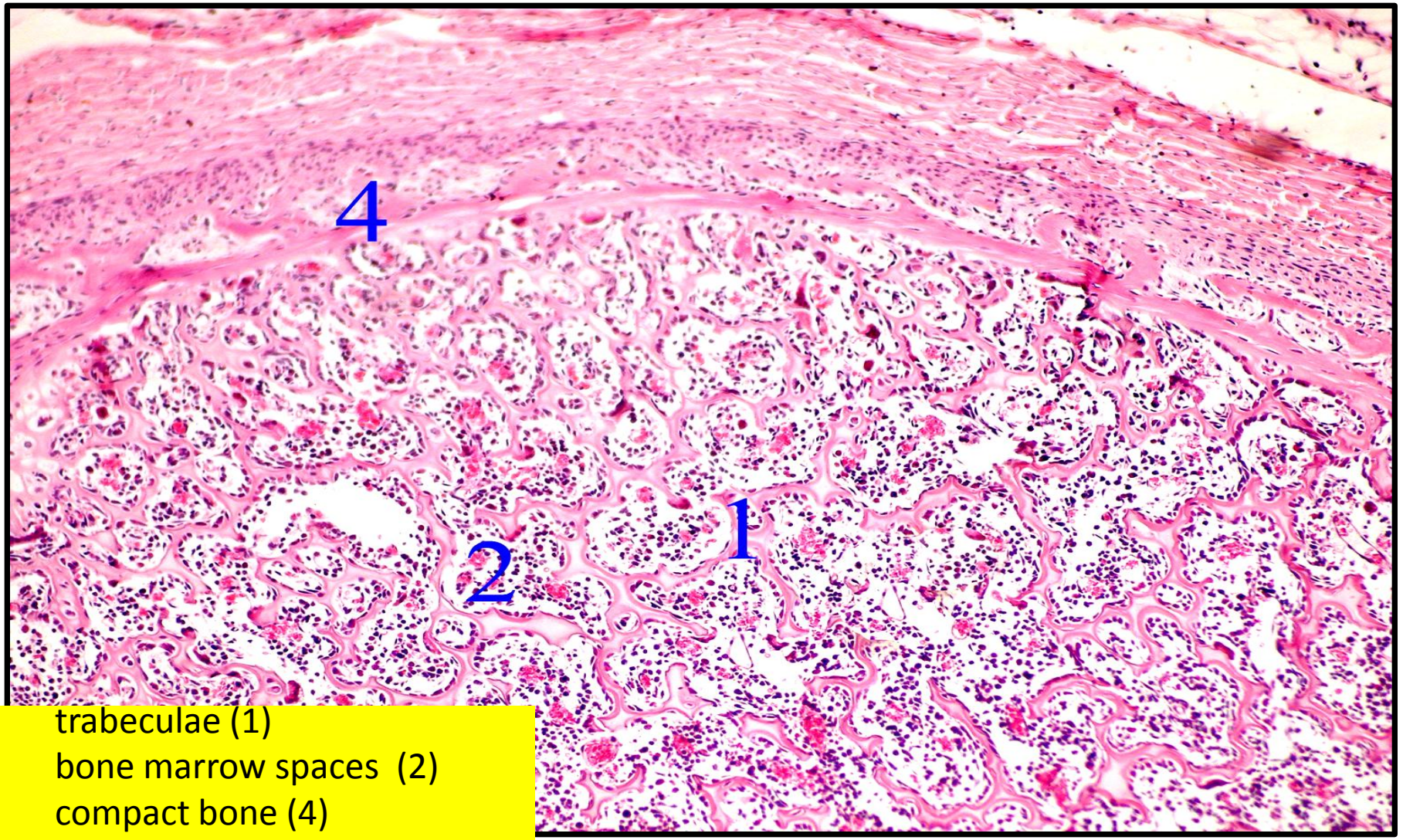
Structure:

Bone trabeculae: irregular lamellae (No Haversian).

Bone marrow cavities: lined by endosteum.

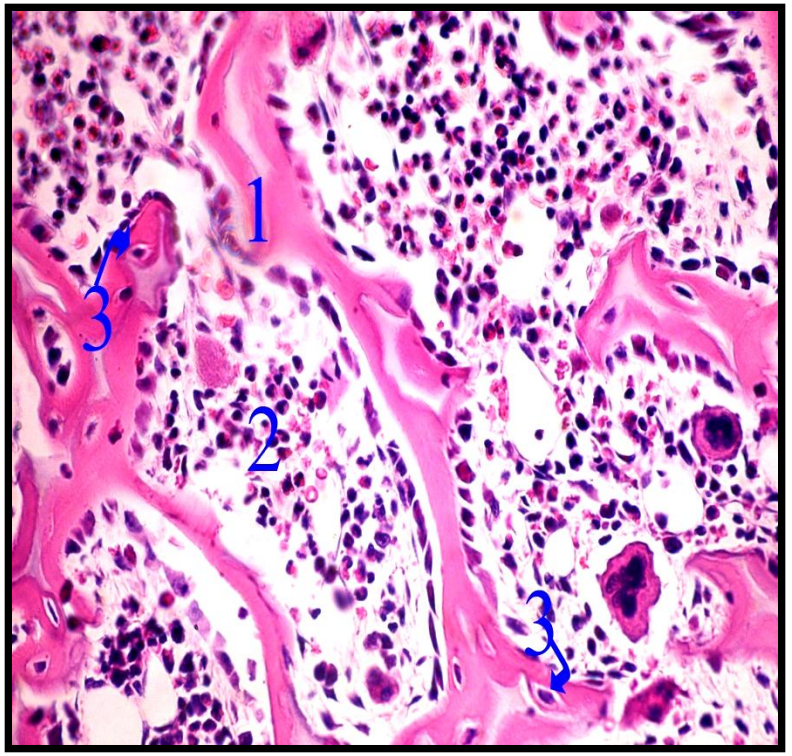


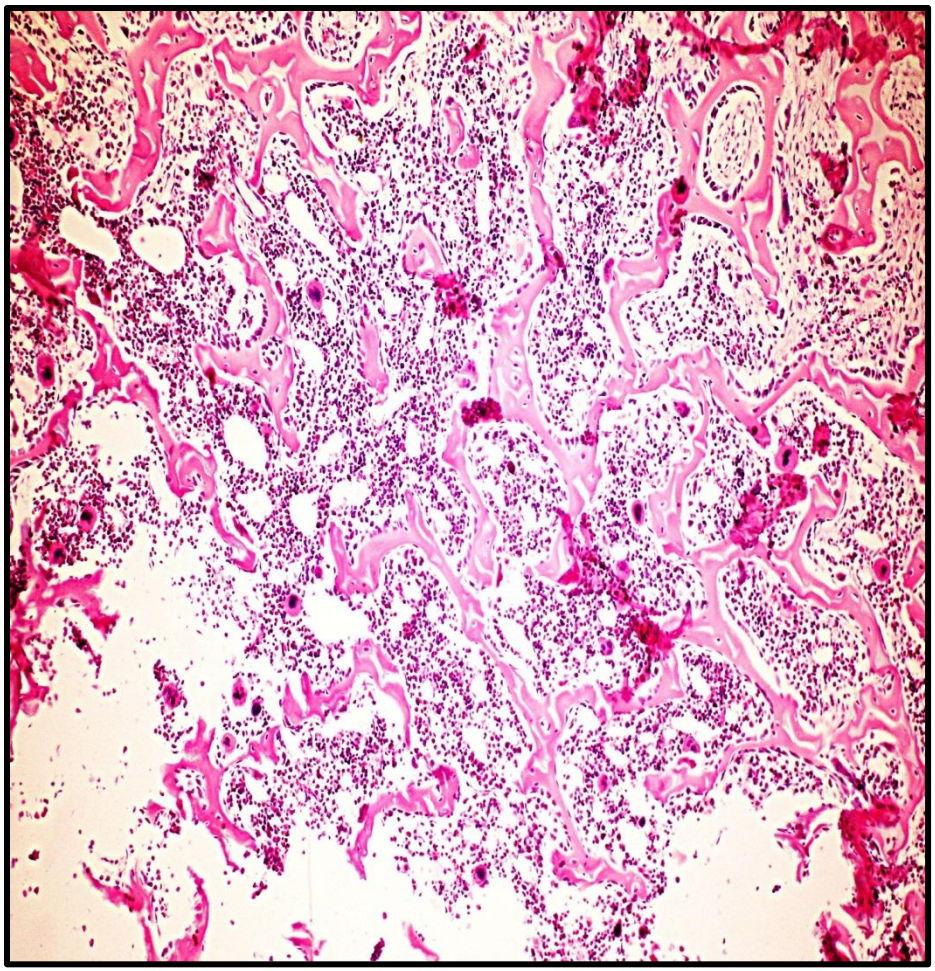
Cancellous (spongy) bone



- trabeculae (1)
- bone marrow spaces (2)
- compact bone (4)

Cancellous (spongy) bone





- trabeculae (1)
- bone marrow spaces (2)
- osteocytes (3) inside lacunae


THANK YOU