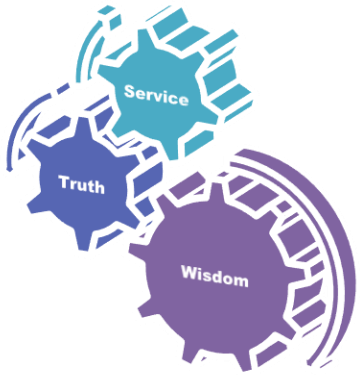
MSK-1 Module(LGIS)
Bone

Dr. Mohtasham Hina

27- 04-2023

Vision; The Dream/Tomorrow

- **Motto**



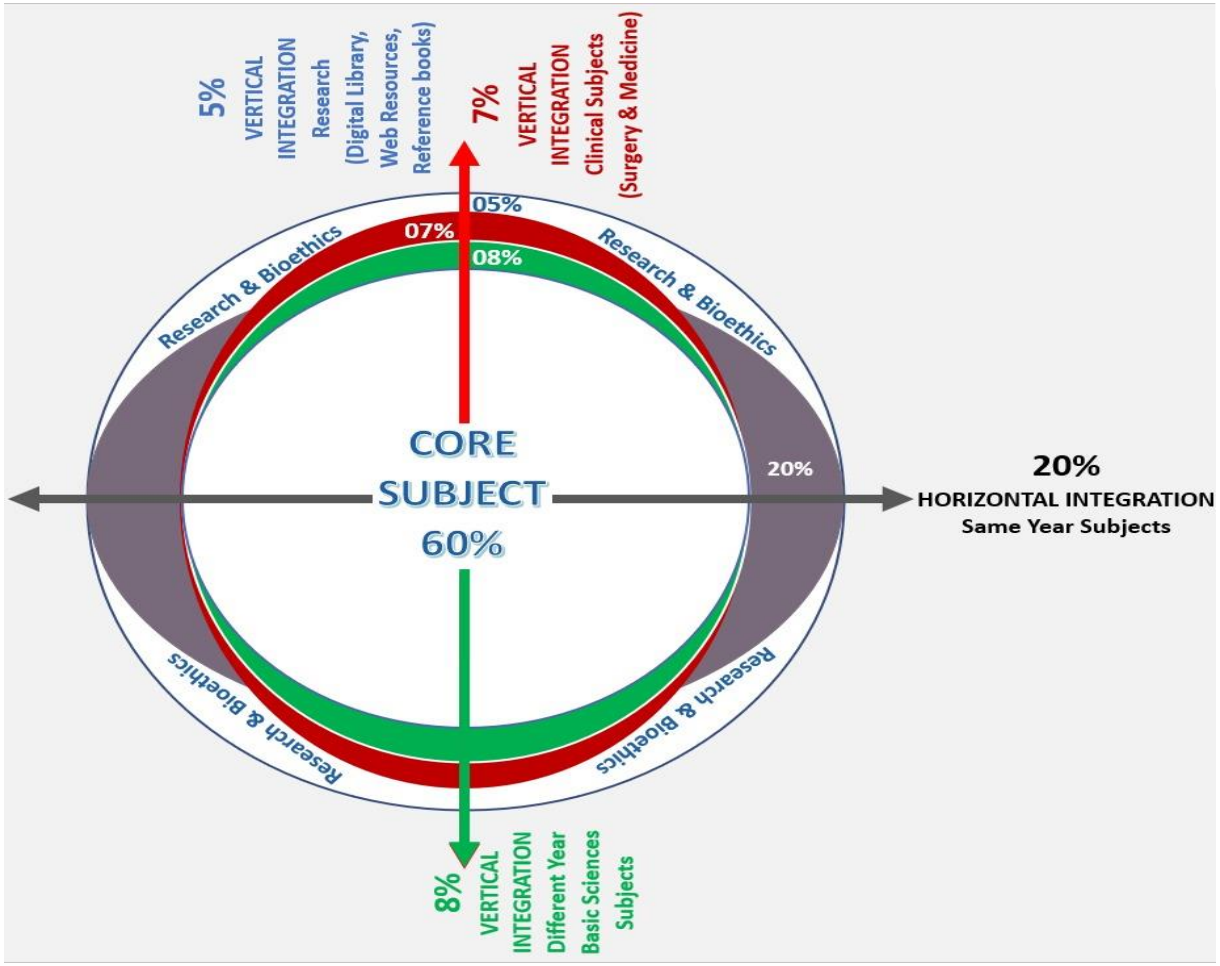
- To impart evidence based research oriented medical education
- To provide best possible patient care
- To inculcate the values of mutual respect and ethical practice of medicine

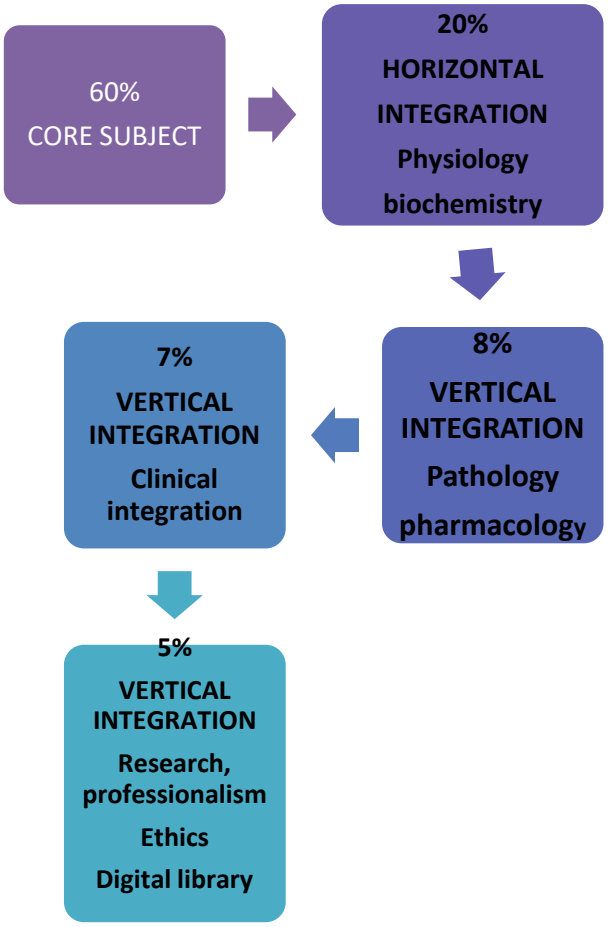
Learning Objectives

At the end of lecture 1st year students should be able to

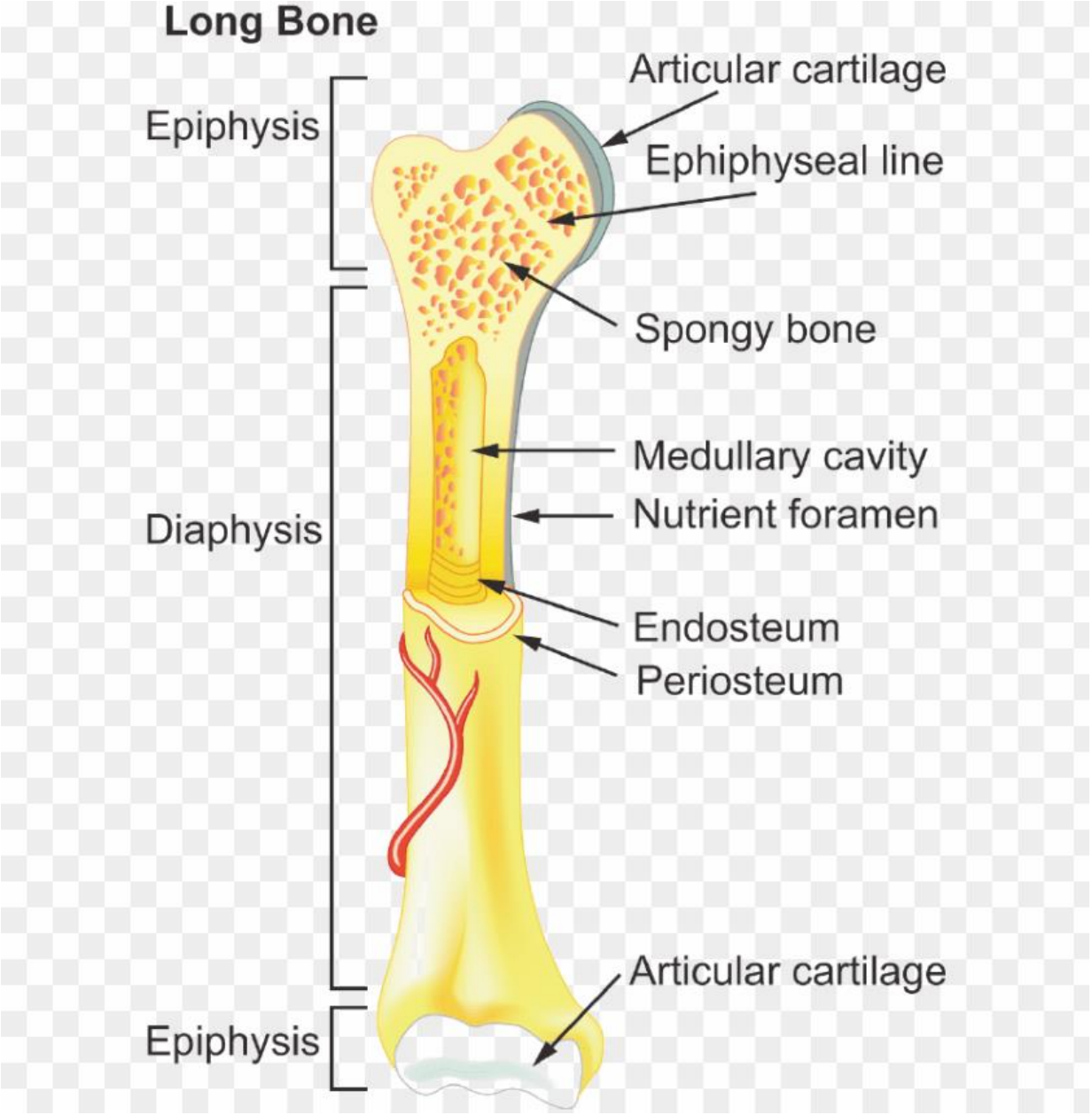
- Understand the histological structure of bone
- Describe different structural components of bone
- Histological features of various types of bone
- correlate clinical aspects
- To understand bio-physiological aspect bone
- Read a research article
- Use digital library

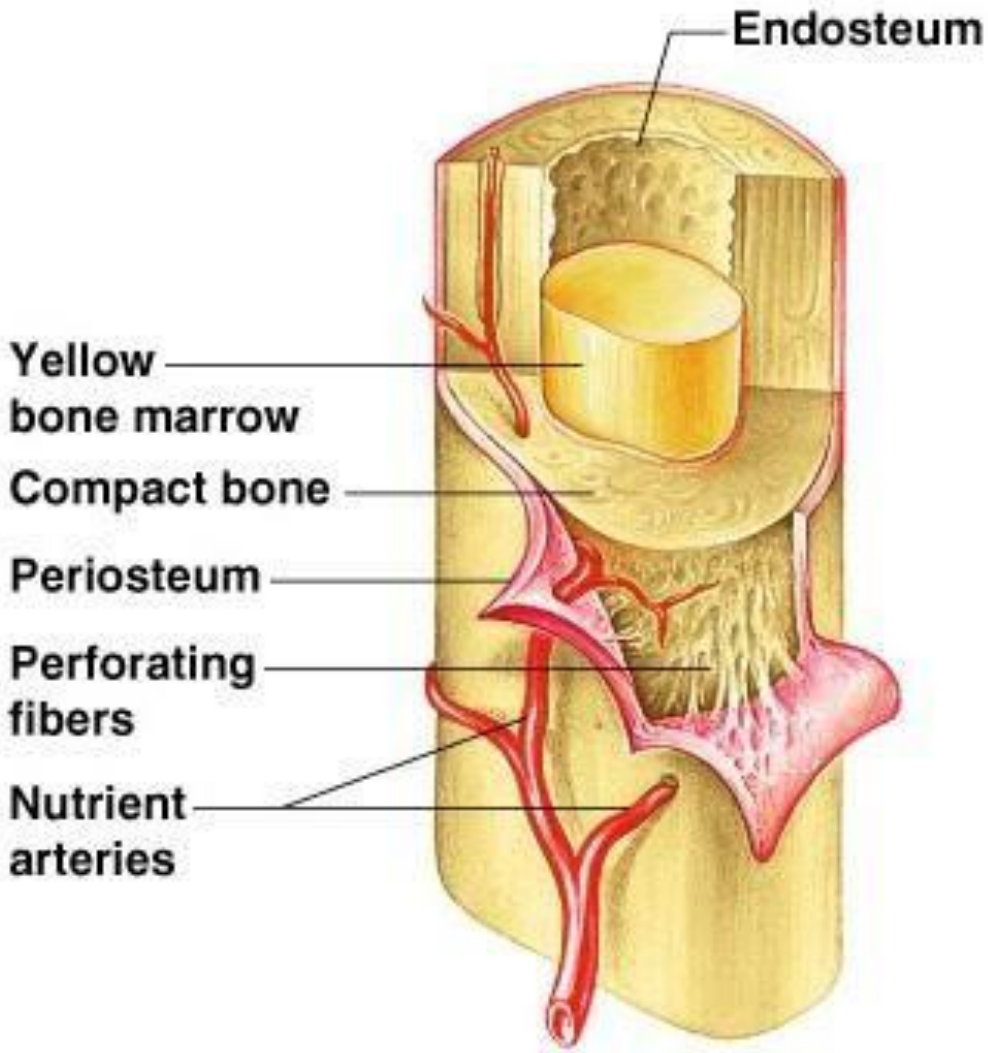
Professor Umar Model of Integrated Lecture



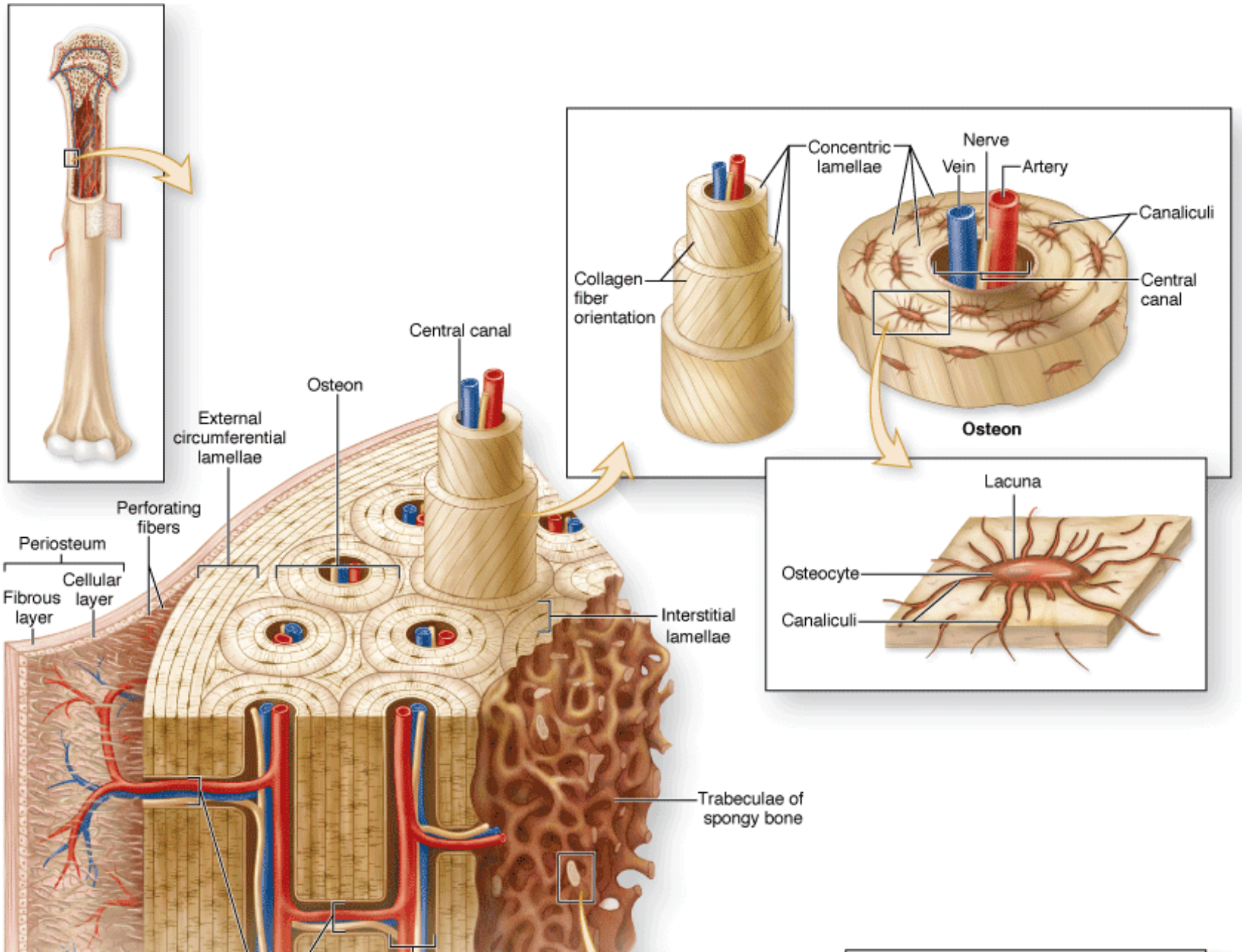


Osteopetrosis

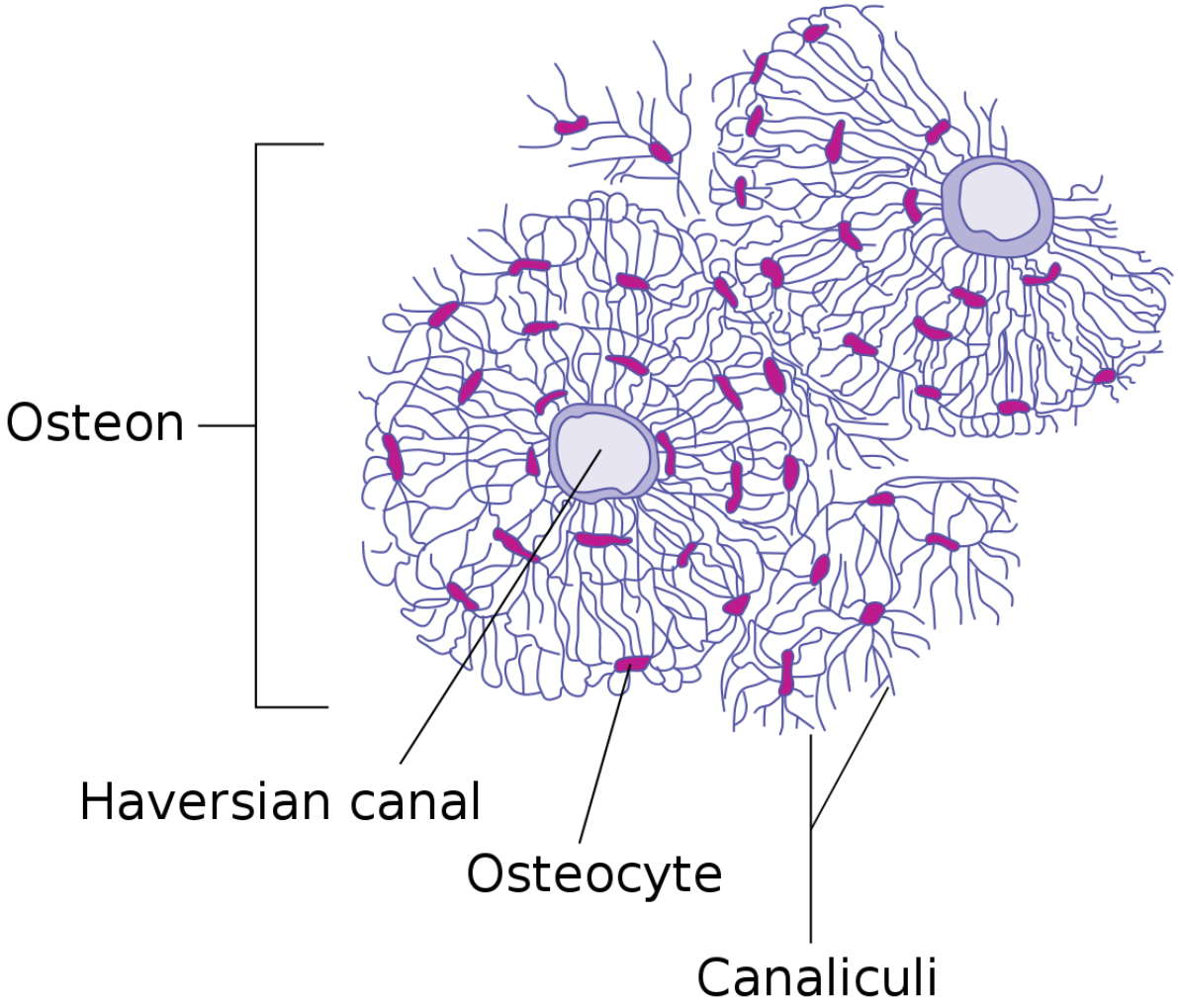

Long Bone
Articular cartilage
Epiphysis
Ephiphyseal line
Spongy bone
Medullary cavity
Diaphysis
Nutrient foramen
Endosteum
Periosteum
Articular cartilage
Epiphysis


Endosteum
Yellow bone marrow
Compact bone
Periosteum
Perforating fibers
Nutrient arteries

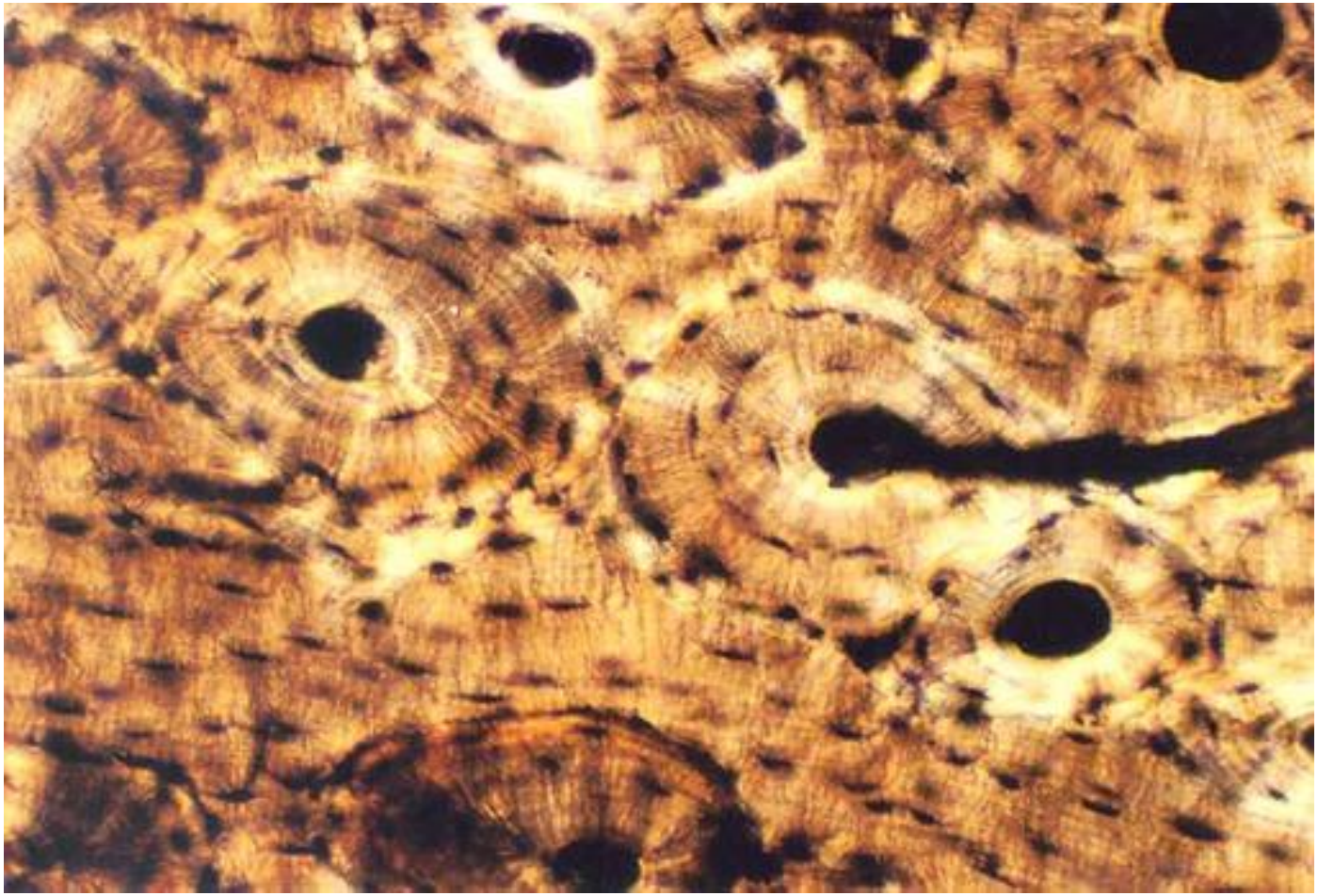
Core Concept



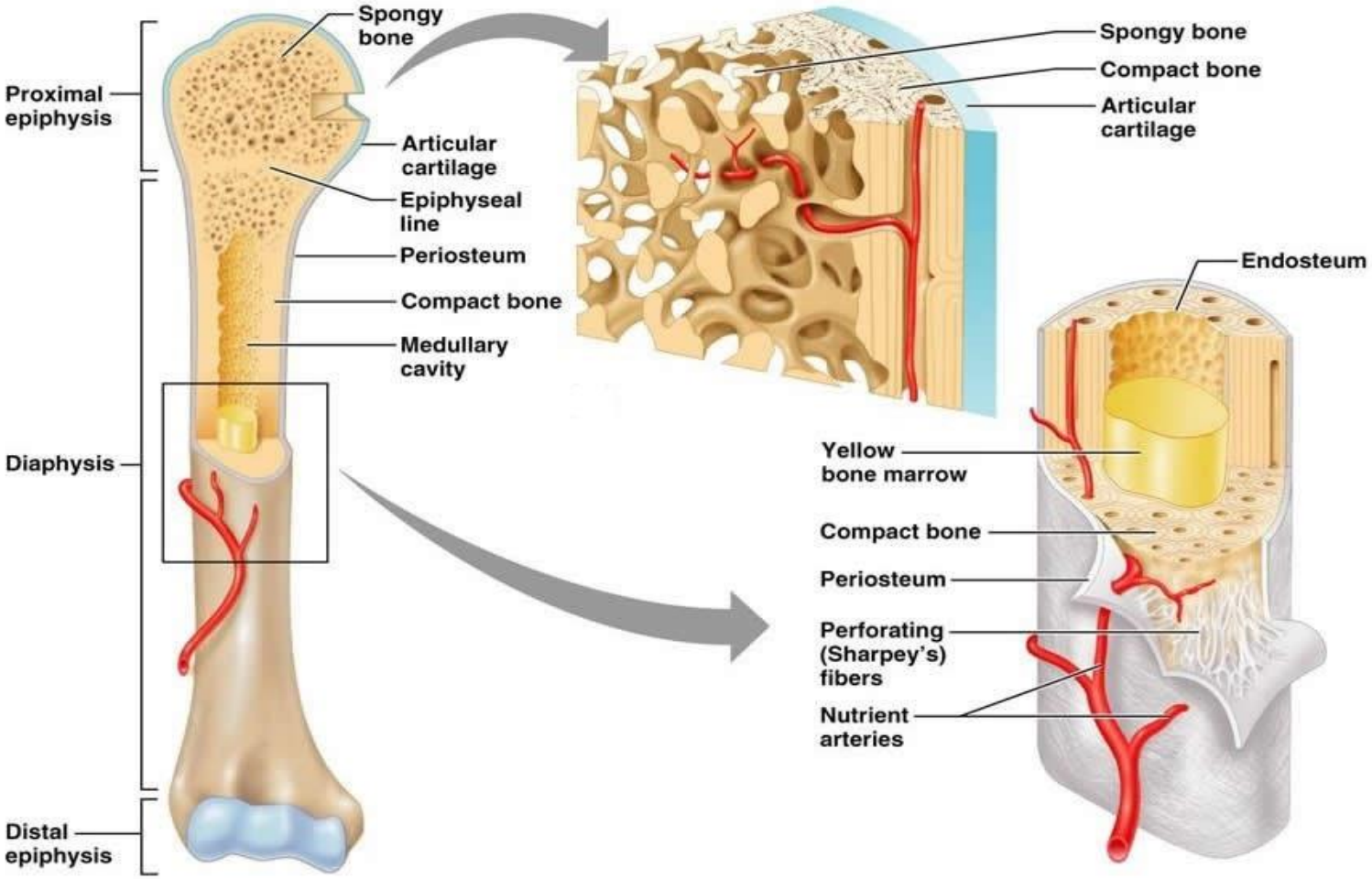
Osteon (Haversion system)

- 

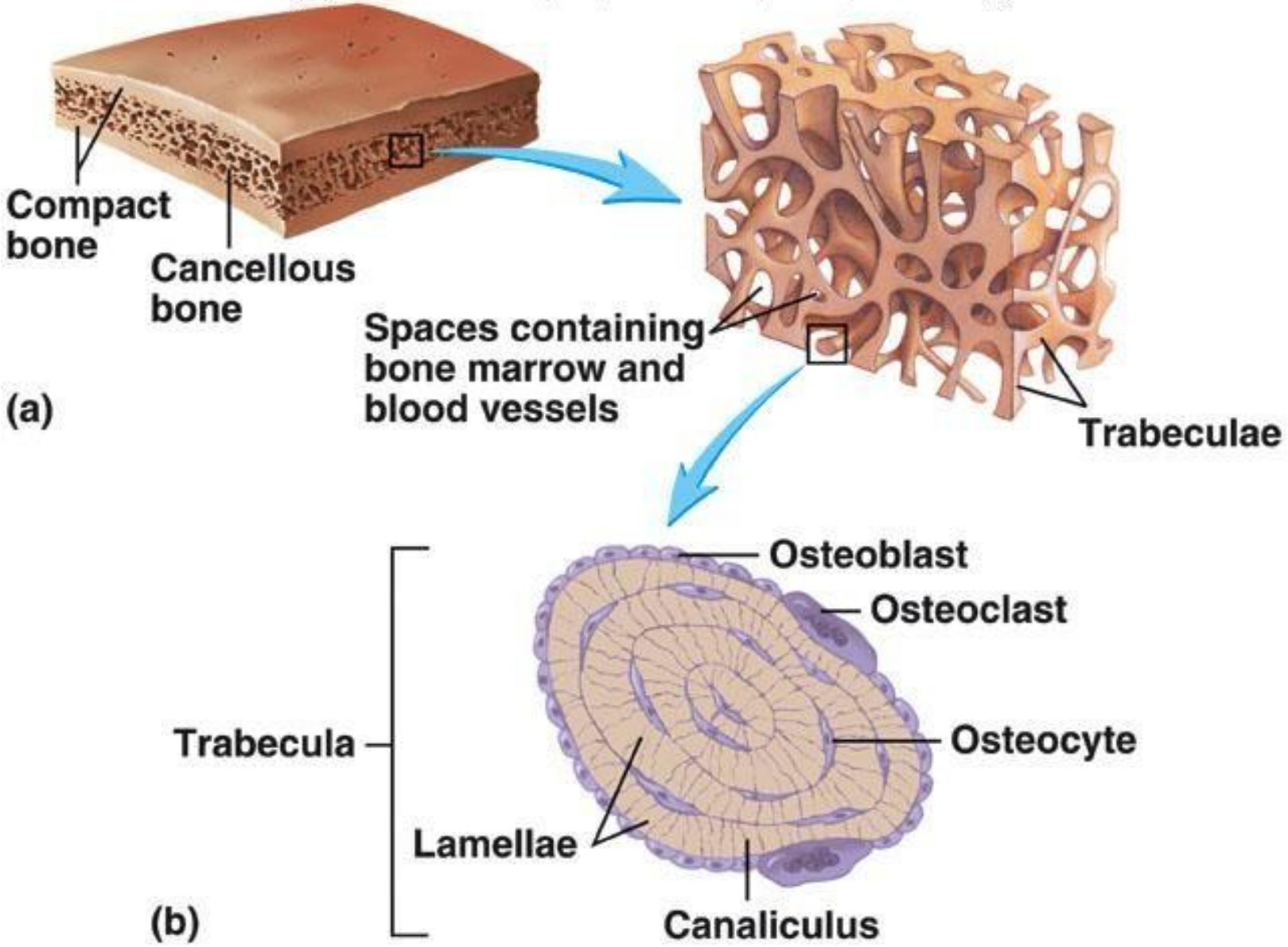
Osteon (Haversion system)

- 

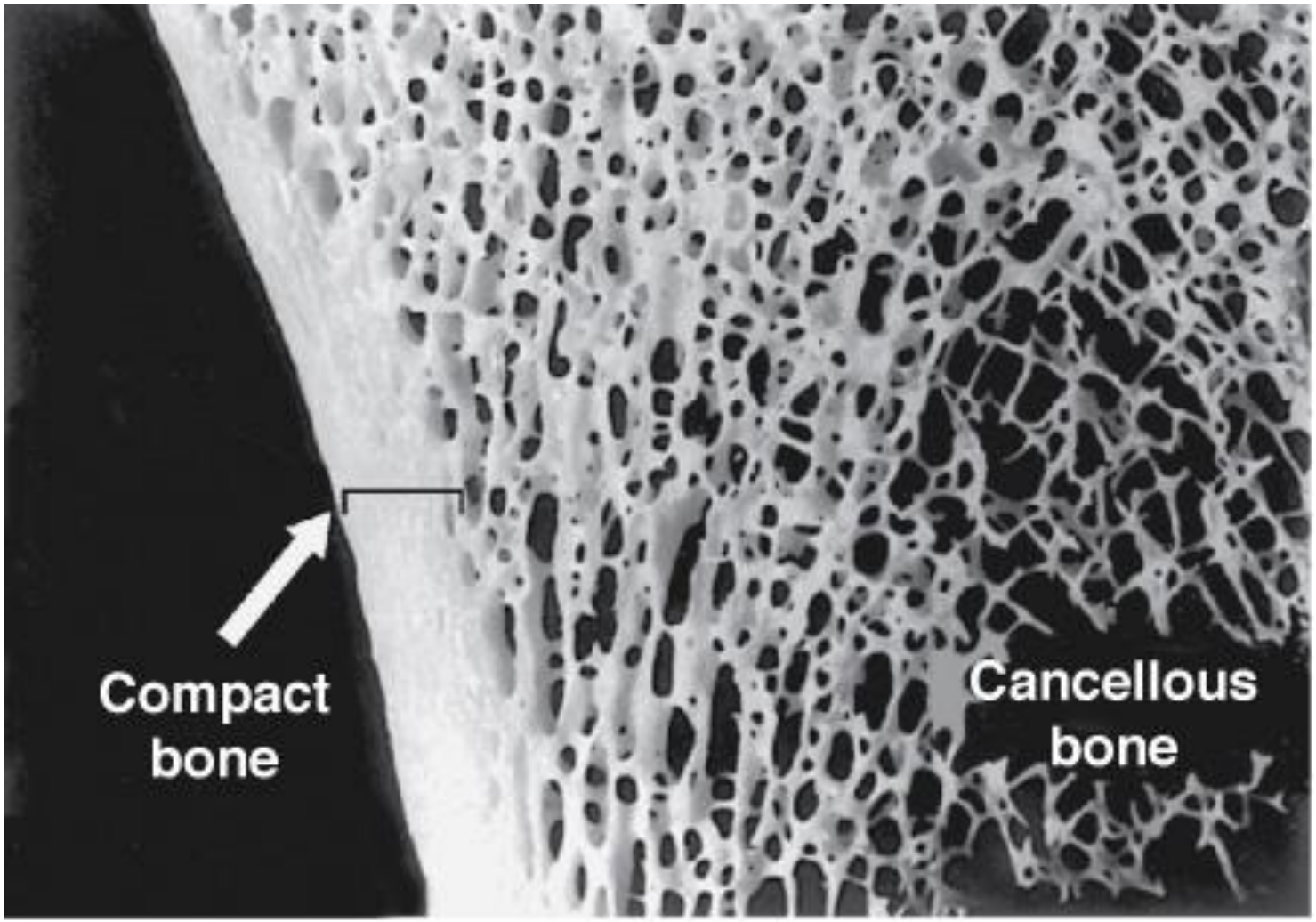
Compact and cancellous bone



Core Concept

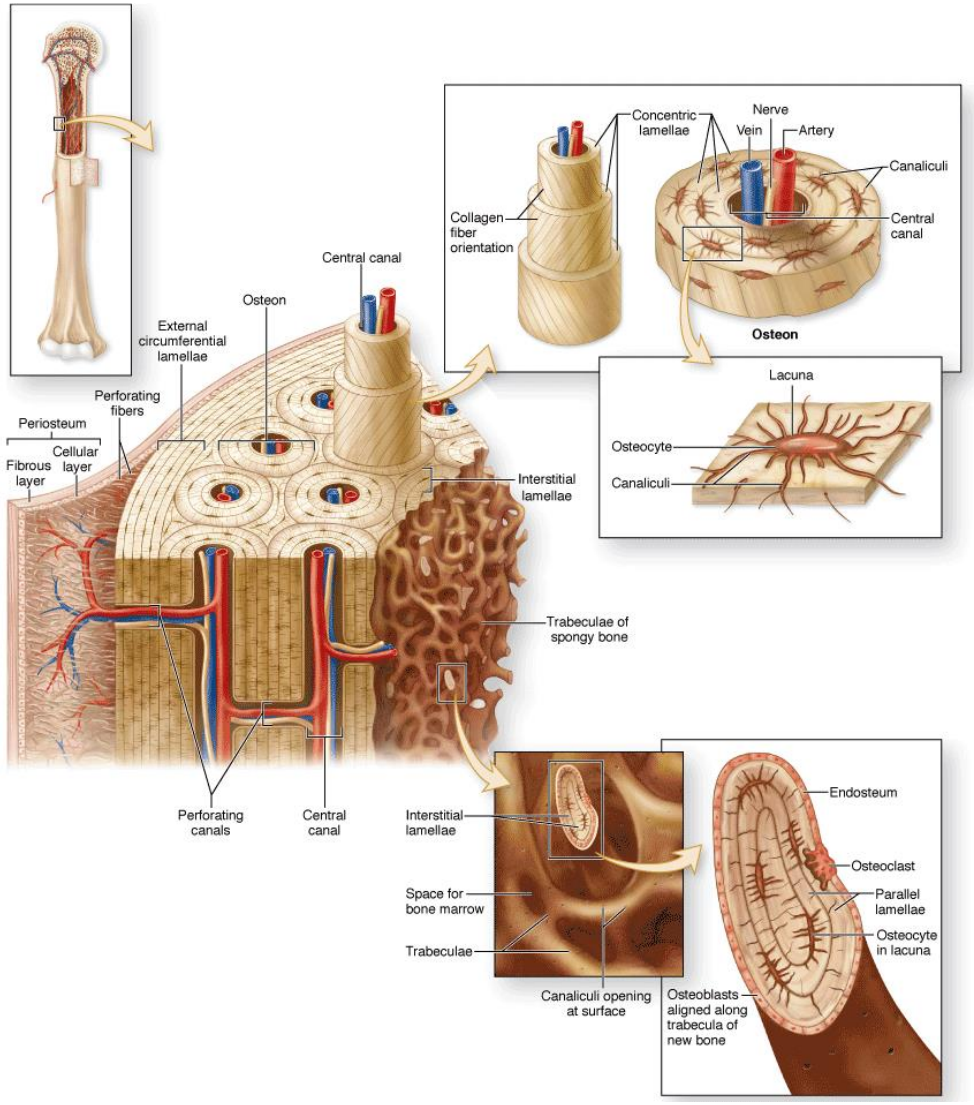


Core Concept

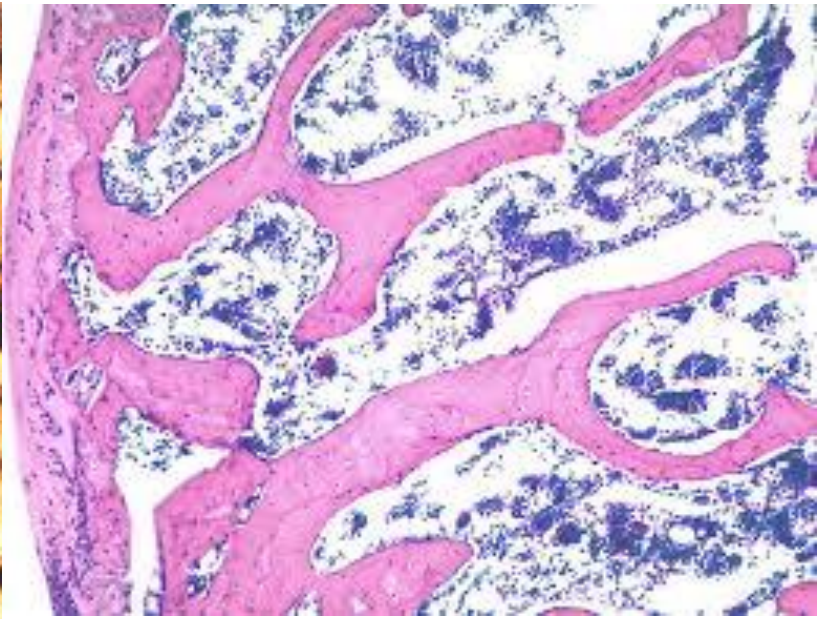
- 

Source: Mescher AL: *Junqueira's Basic Histology: Text and Atlas, 12th Edition:* http://www.accessmedicine.com

General structure of bone

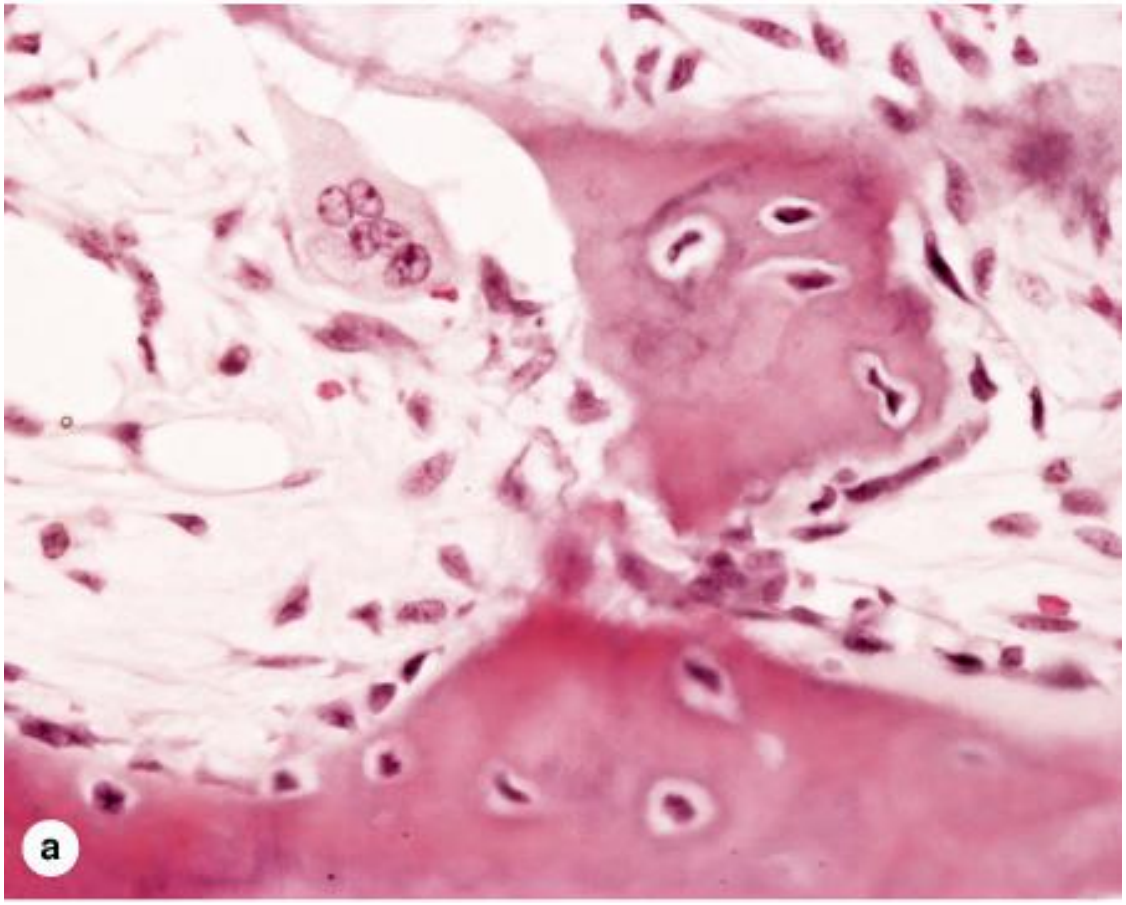
- 

Core Concept

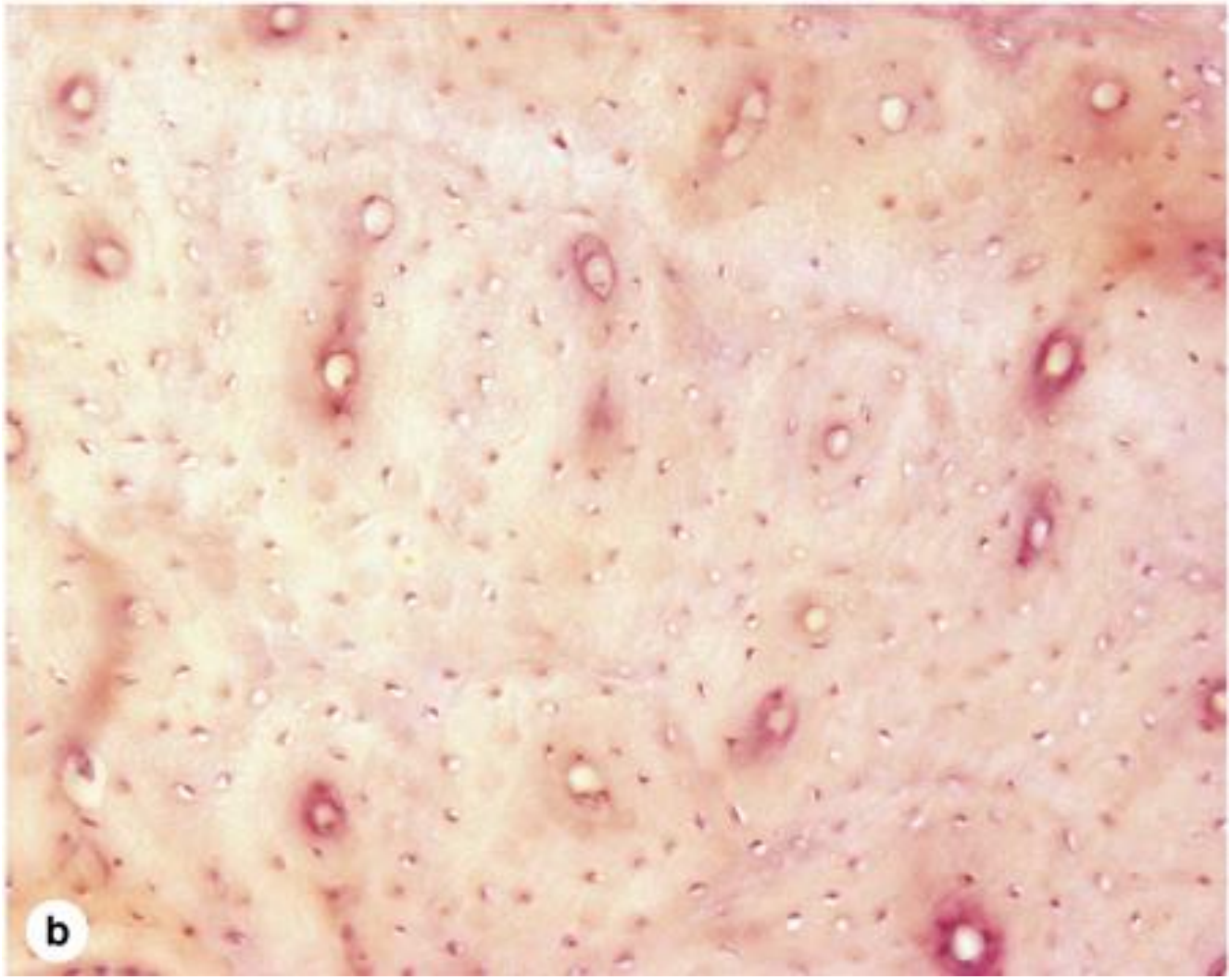


Microscopic Types of bone

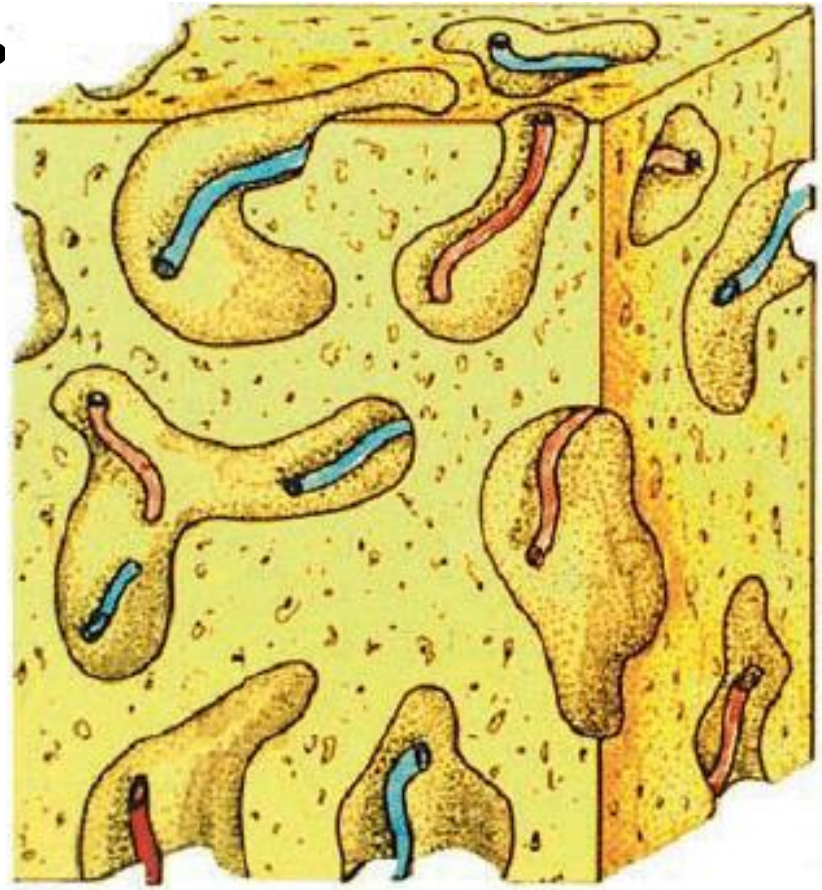
- primary bone (woven)



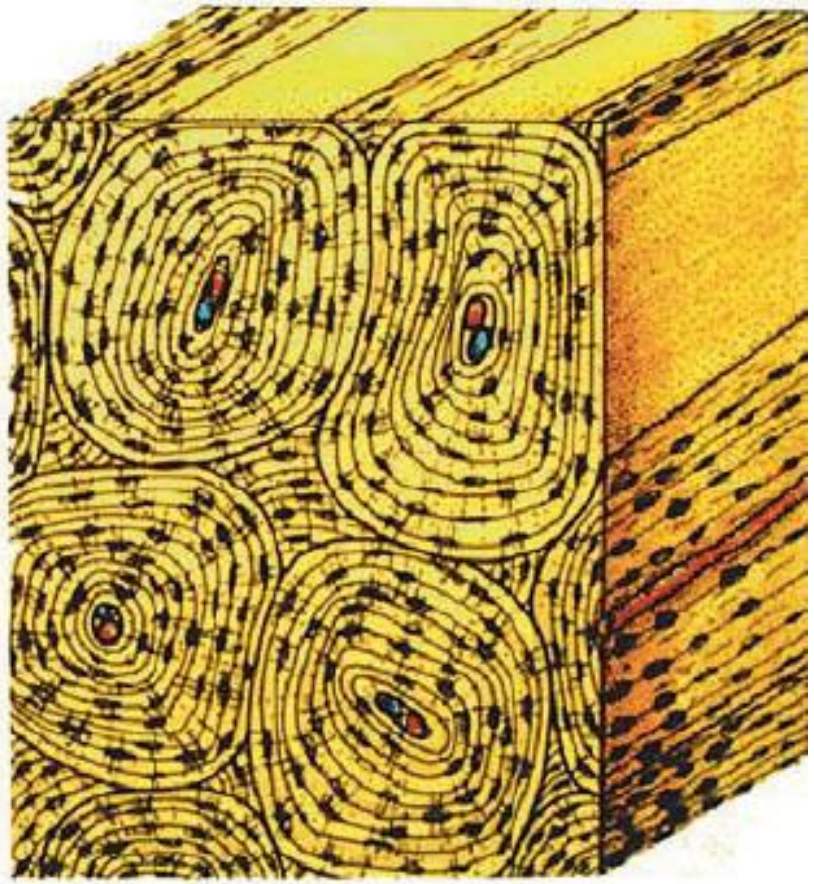
Secondary bone tissue

- 

Microscopic Types of bone

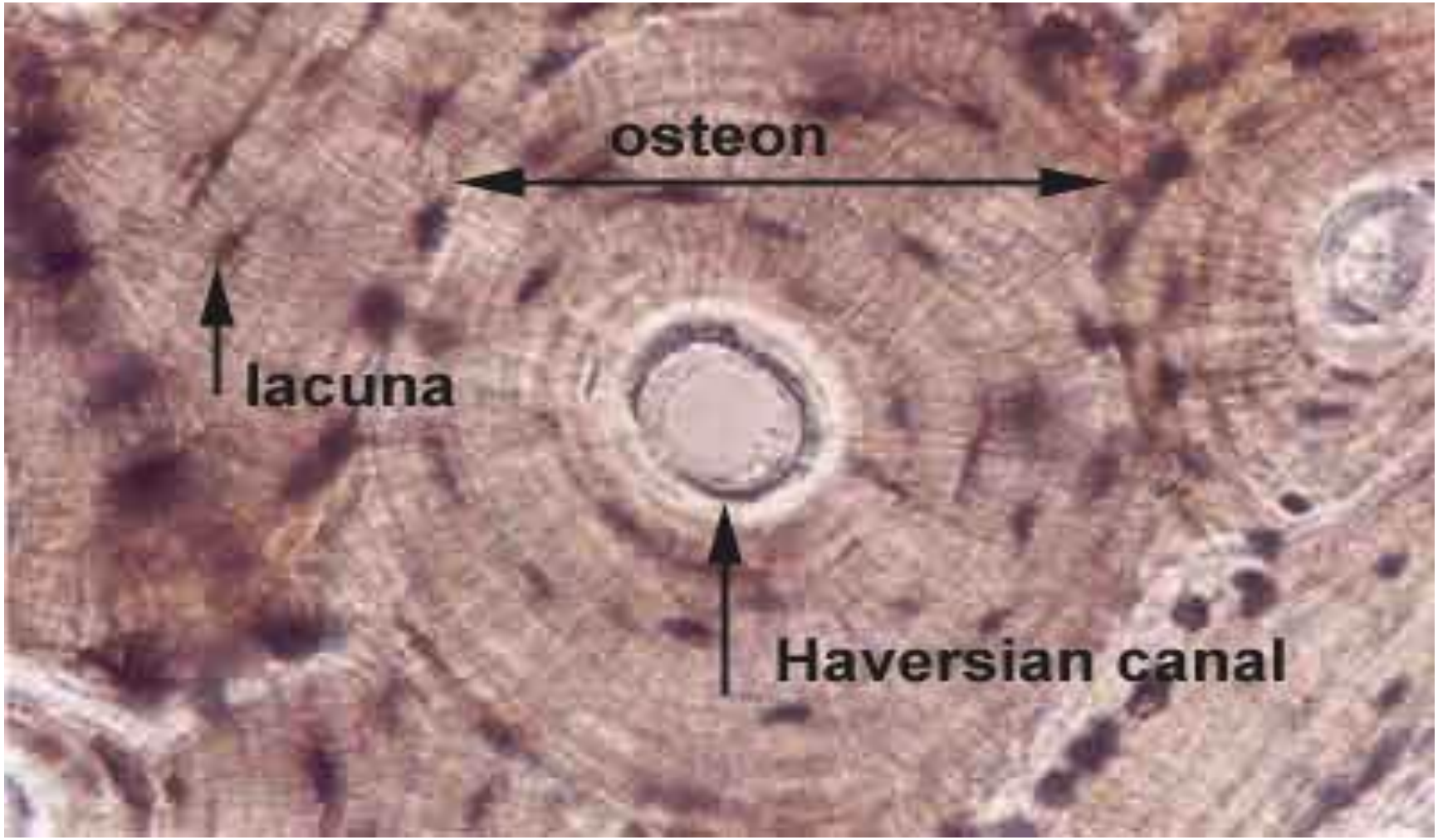
- 

Woven

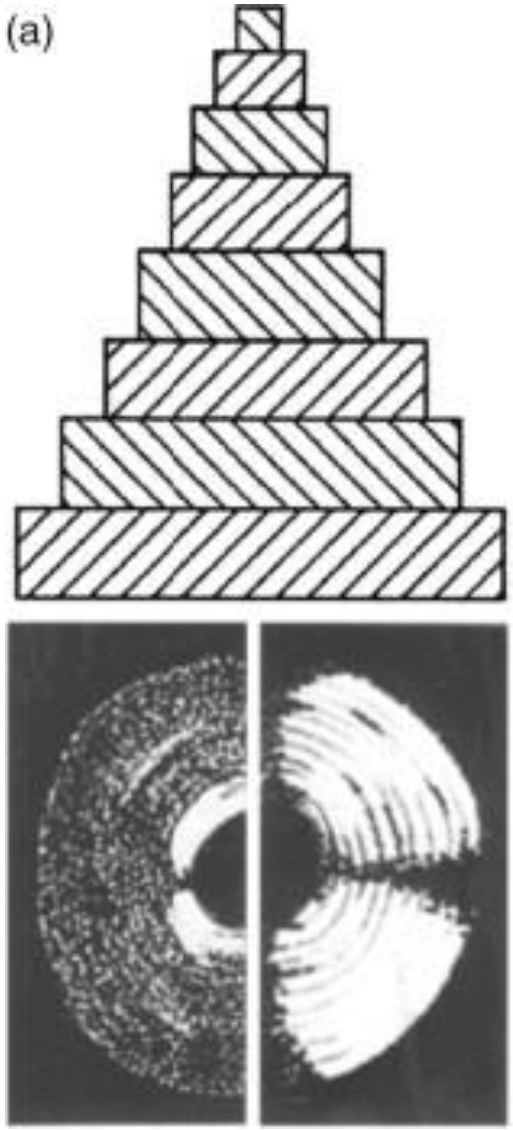


Lamellar

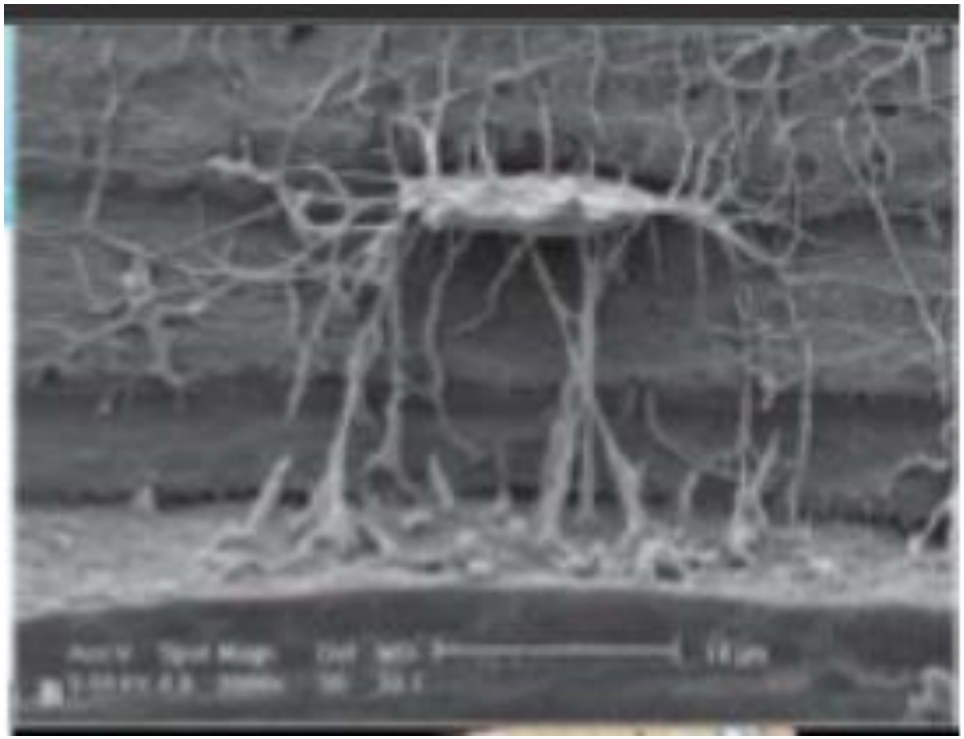
Secondary bone (lamellar)

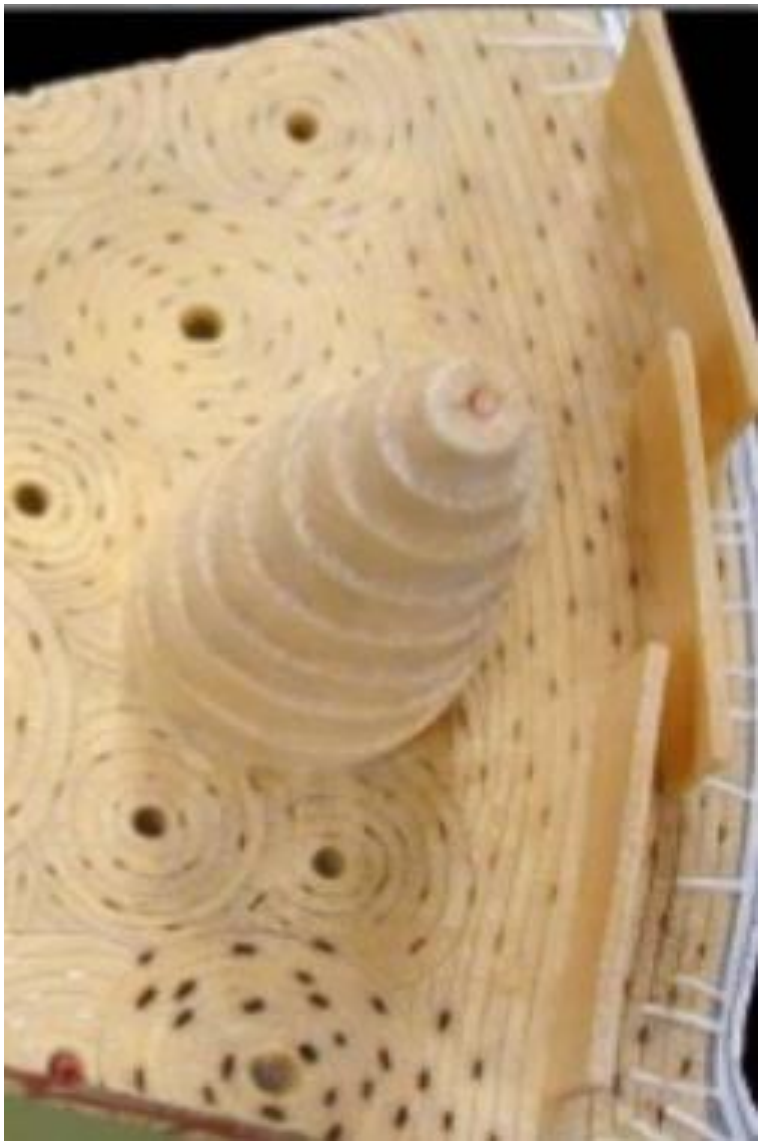


Core Concept

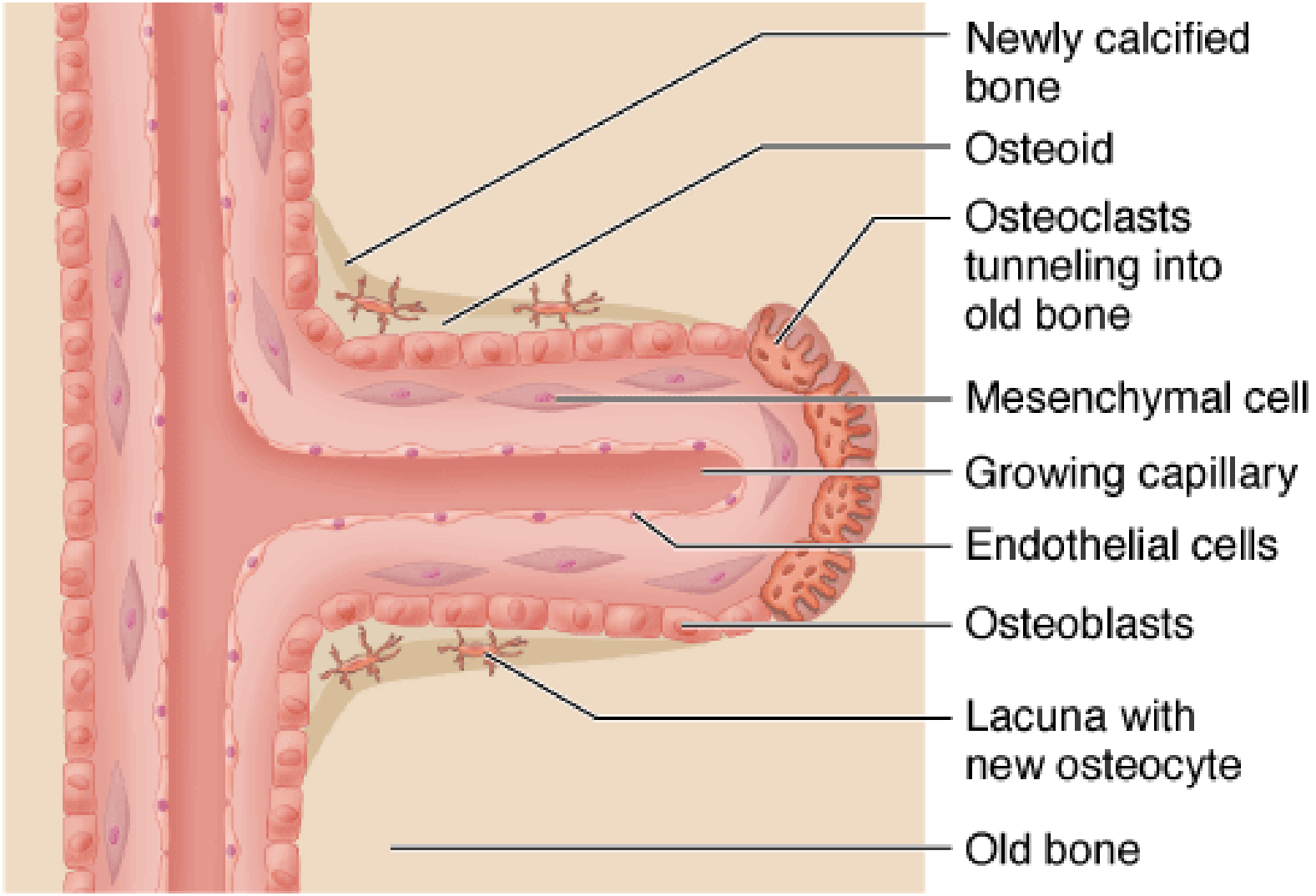
- 

Core Concept

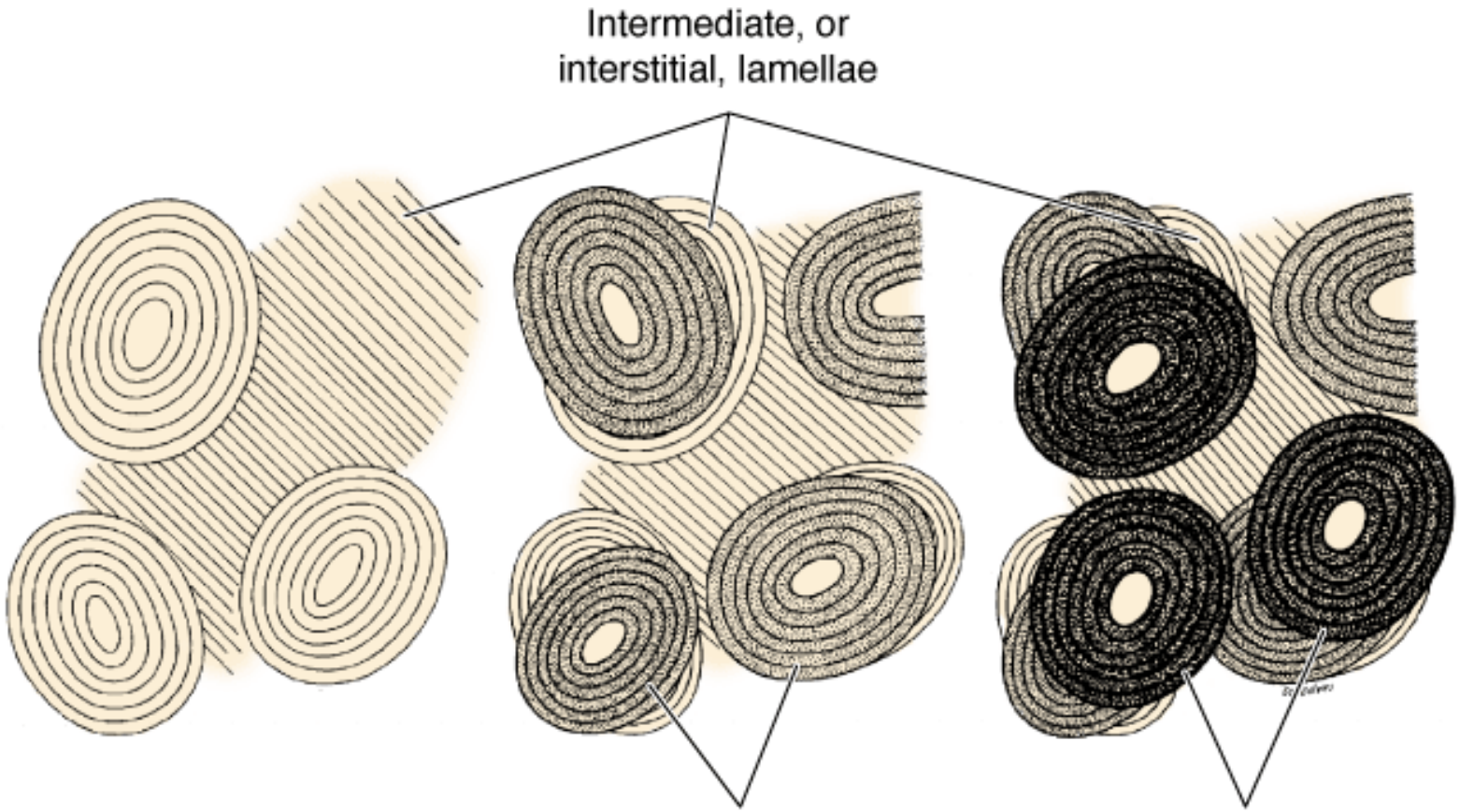




Remodeling


Newly calcified bone
Osteoid
Osteoclasts tunneling into old bone
Mesenchymal cell
Growing capillary
Endothelial cells
Osteoblasts
Lacuna with new osteocyte
Old bone

Core Concept



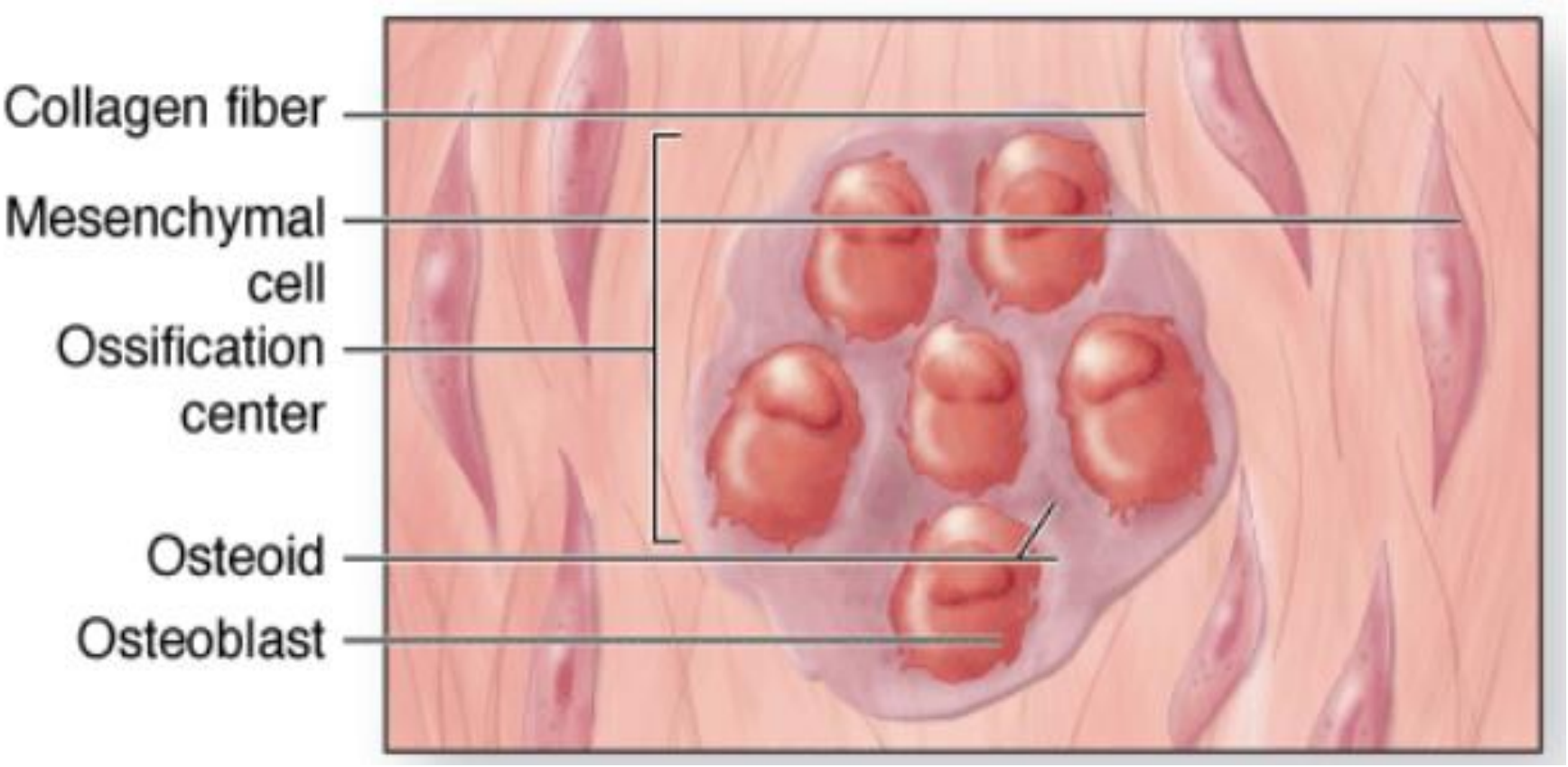
b

Source: Mescher AL: *Junqueira's Basic Histology: Text and Atlas, 12th Edition:* http://www.accessmedicine.com

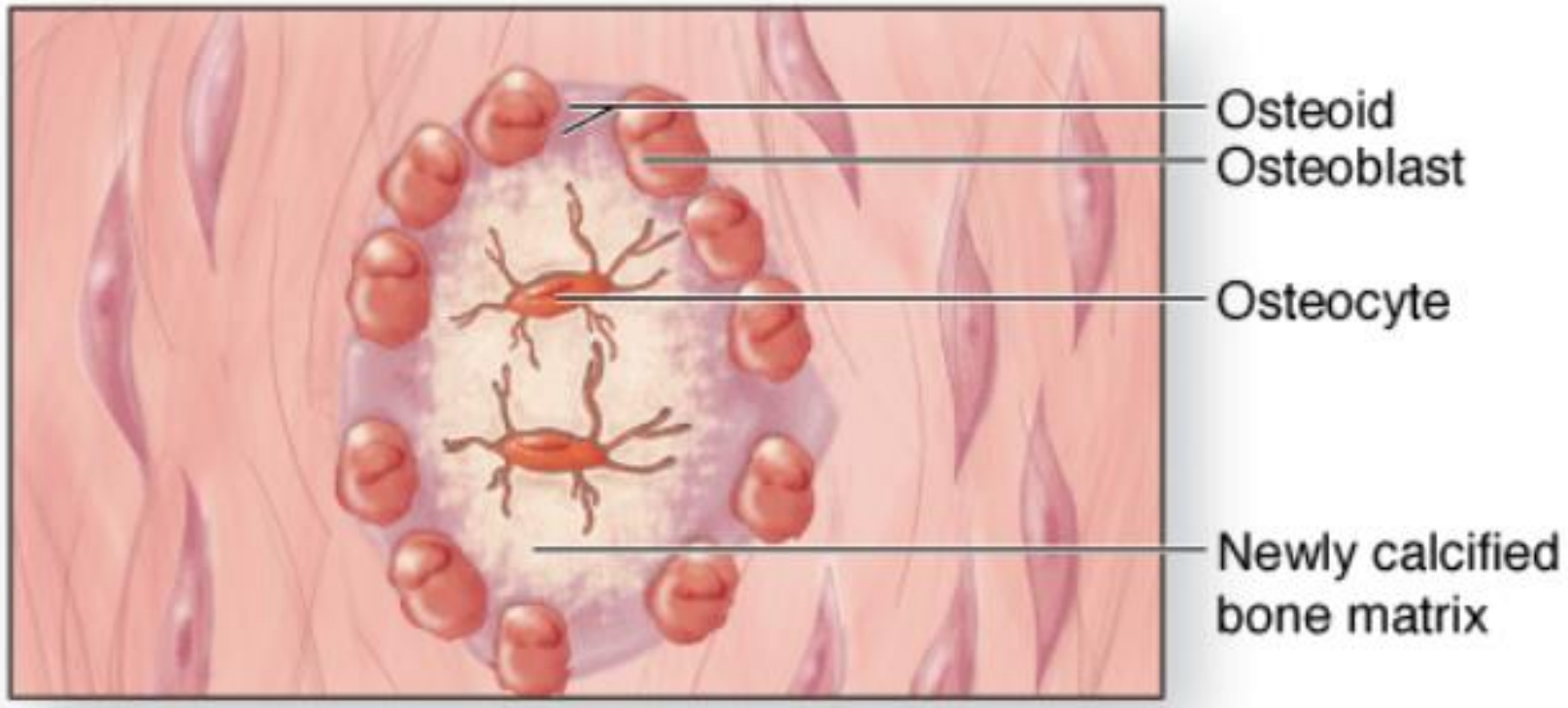
Osteogenesis

- Intramembranous ossification
- Endochondral ossification

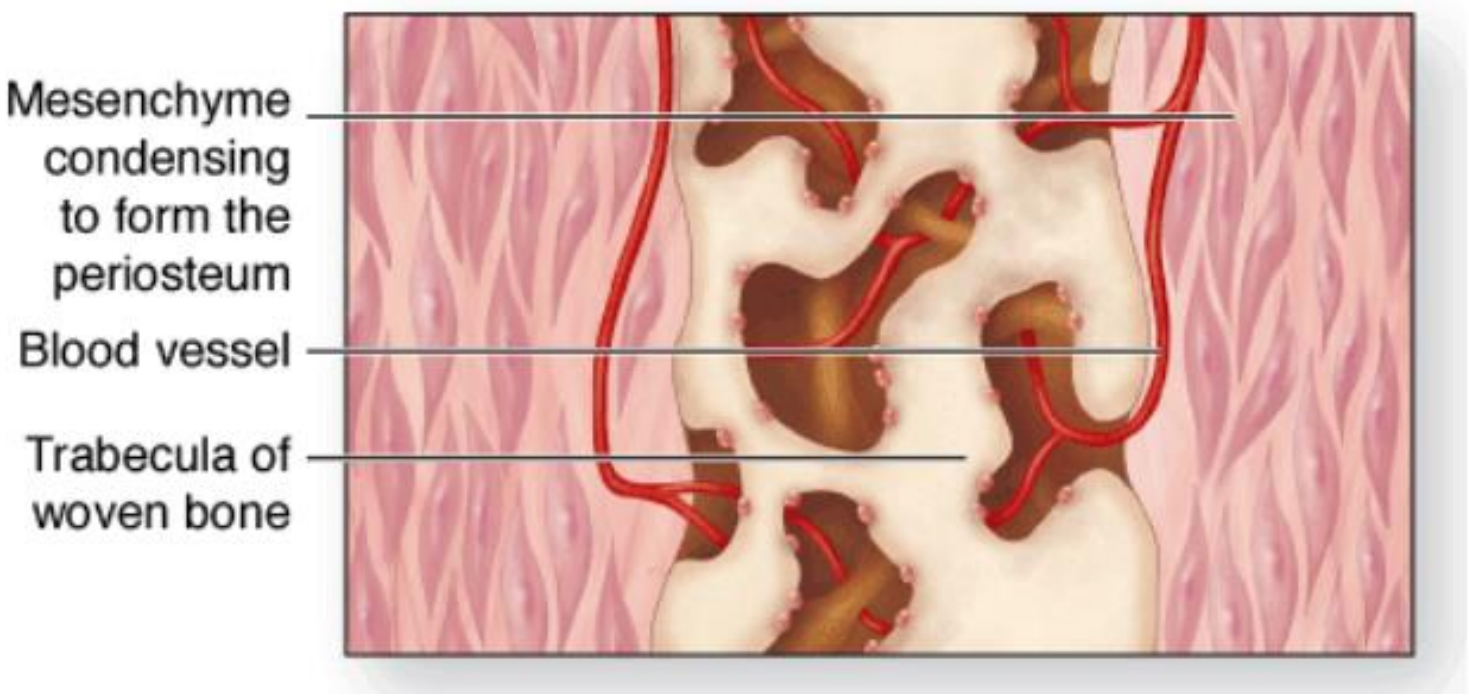
Core Concept



(b) Osteoid undergoes calcification.

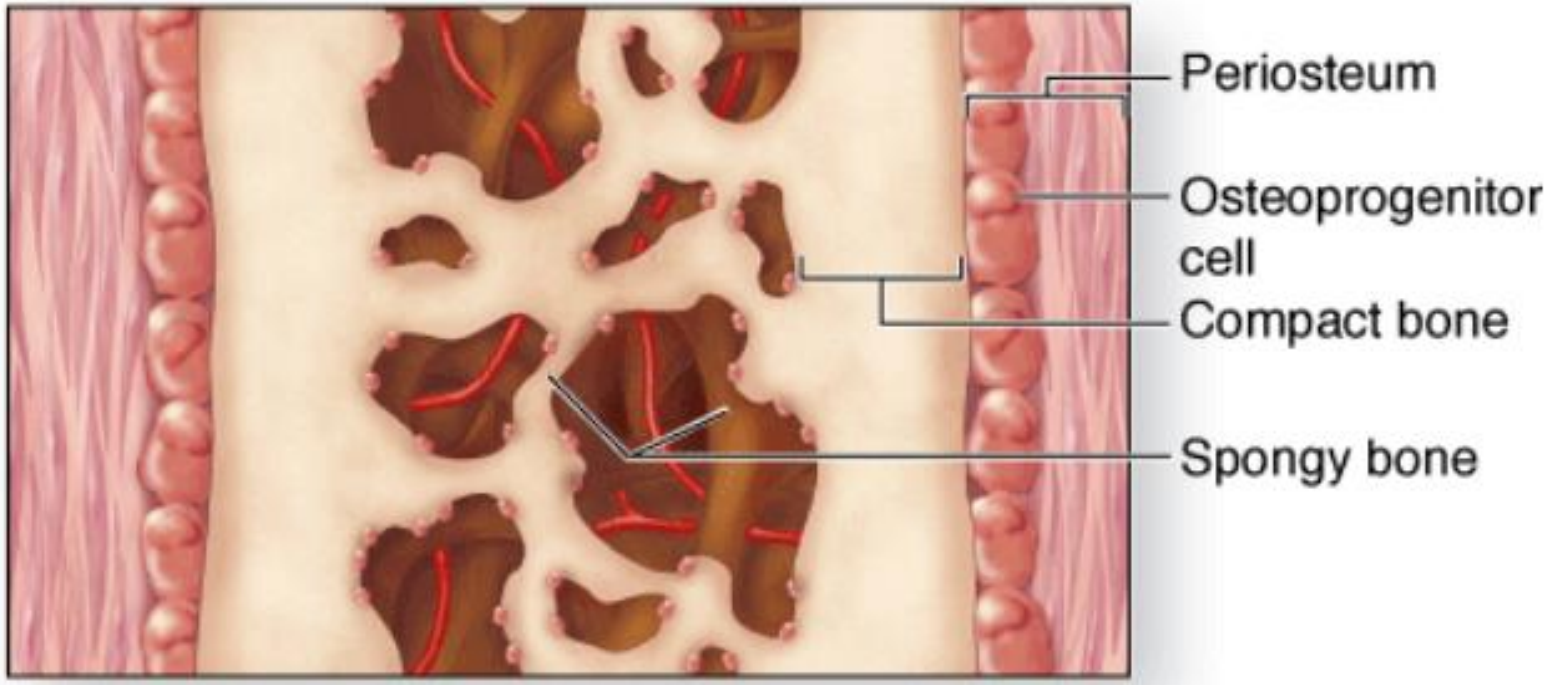


- (C) Woven bone and surrounding periosteum form.

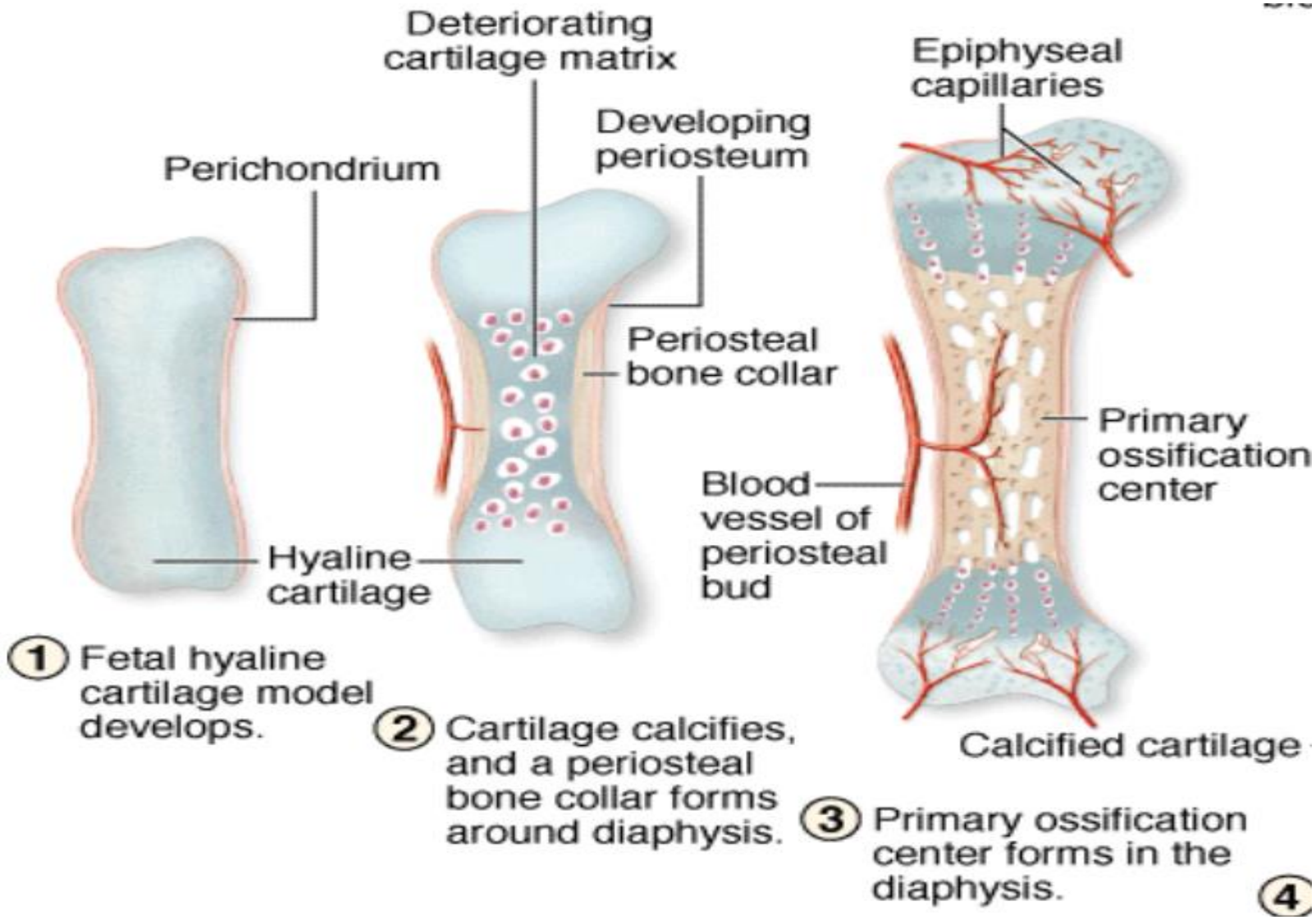


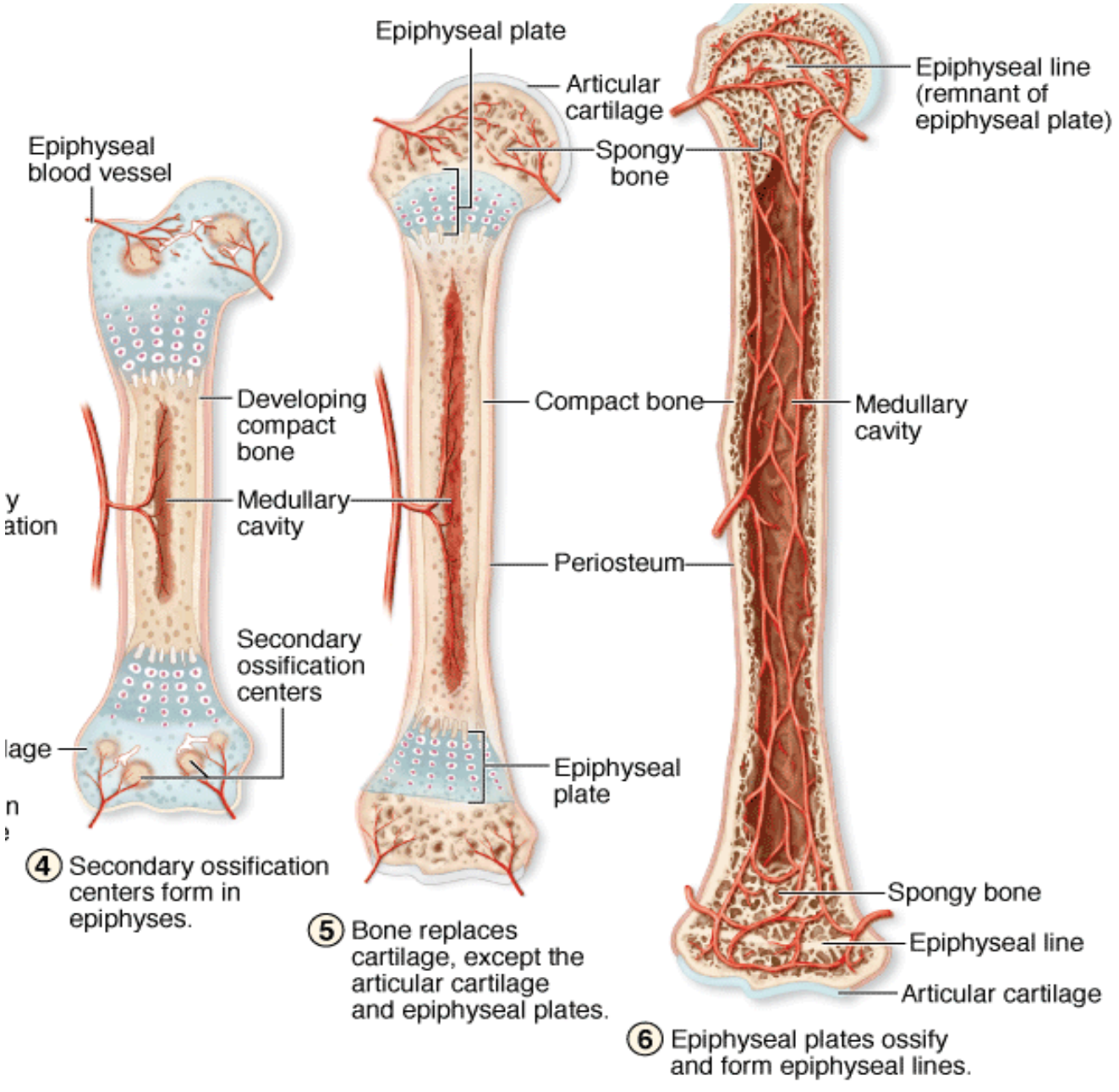
Core Concept

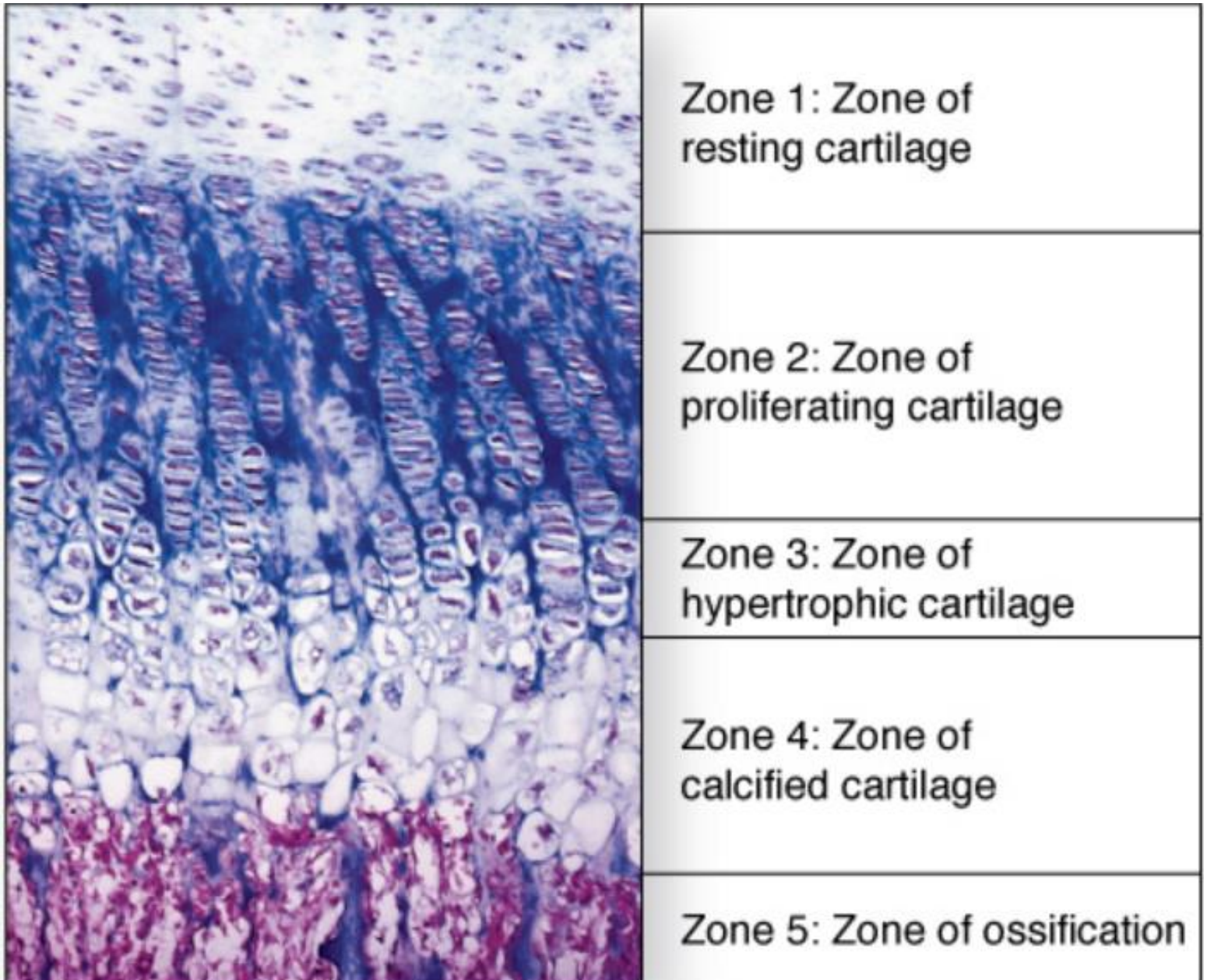
- (d) Lamellar bone replaces woven bone, as compact and spongy bone form.



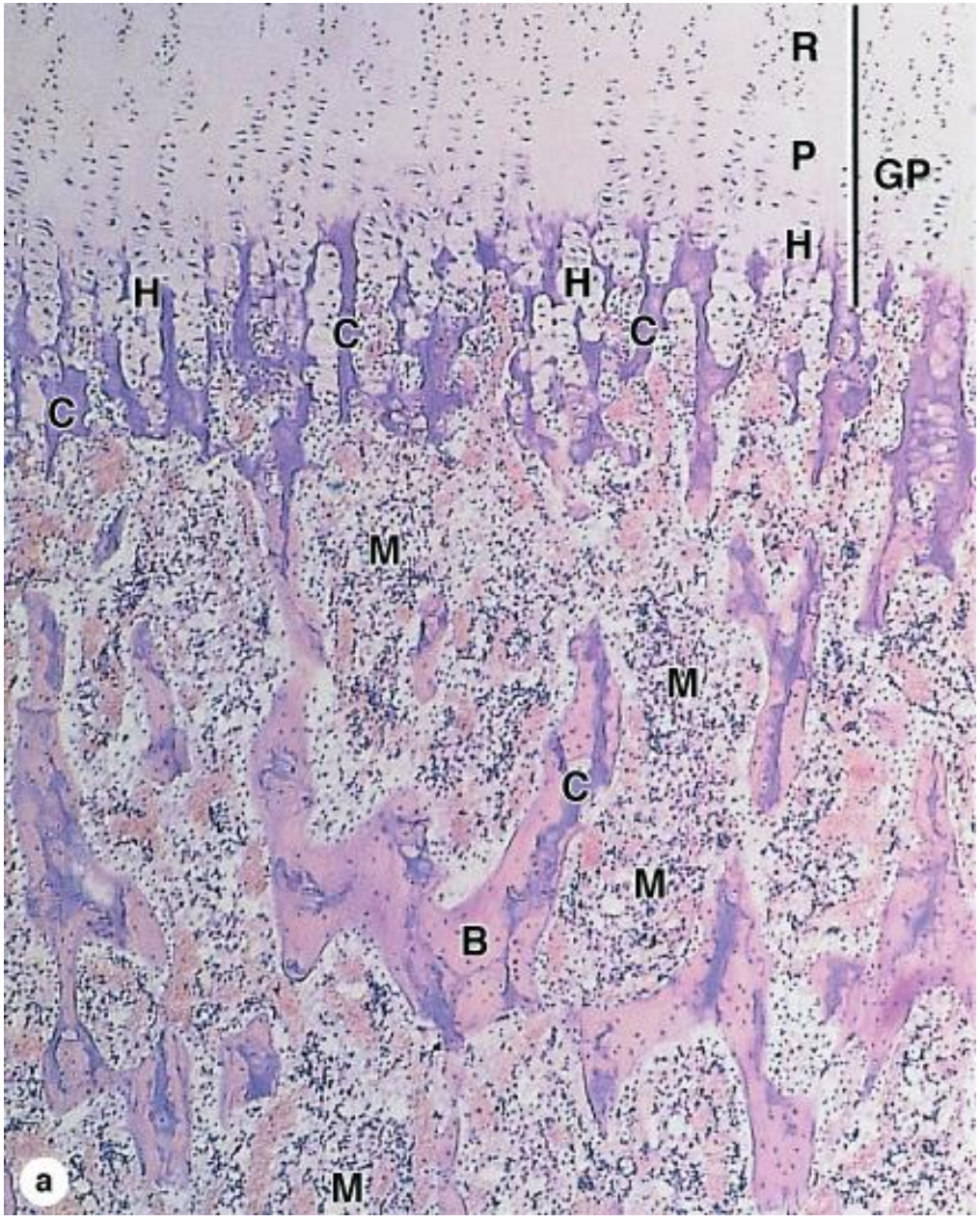
Endochondral Ossification

- 


Epiphyseal blood vessel
Developing compact bone
Medullary cavity
Secondary ossification centers
4 Secondary ossification centers form in epiphyses.
Epiphyseal plate
Articular cartilage
Spongy bone
Compact bone
Periosteum
Epiphyseal plate
5 Bone replaces cartilage, except the articular cartilage and epiphyseal plates.
Epiphyseal line (remnant of epiphyseal plate)
Medullary cavity
Spongy bone
Epiphyseal line
Articular cartilage
6 Epiphyseal plates ossify and form epiphyseal lines.


Zone 1: Zone of resting cartilage
Zone 2: Zone of proliferating cartilage
Zone 3: Zone of hypertrophic cartilage
Zone 4: Zone of calcified cartilage
Zone 5: Zone of ossification

-


R
P
GP
H
H
H
C
C
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M
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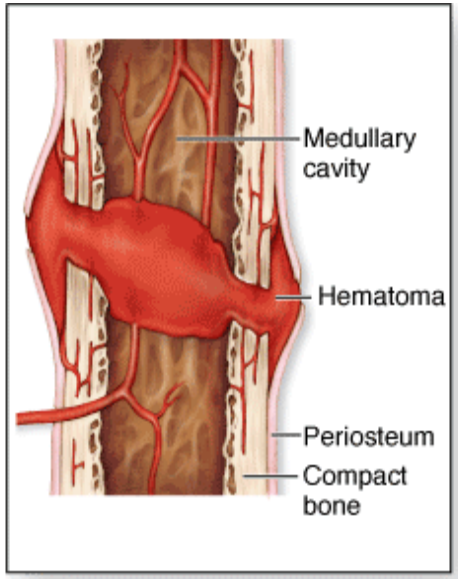
B
M
a

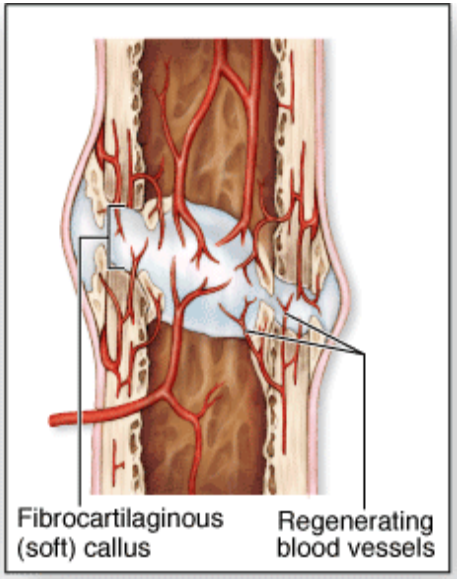
Marble bones

- Osteopetrosis

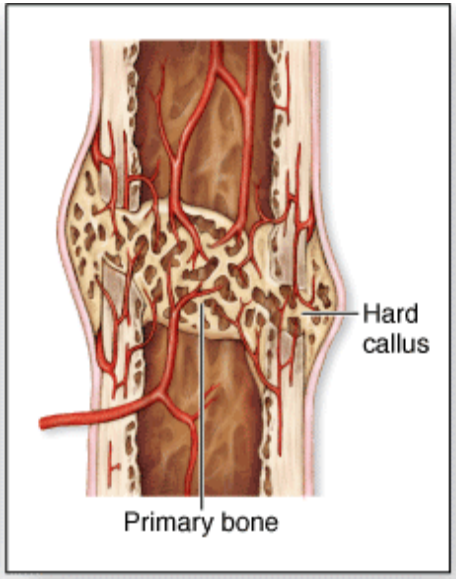
Fracture repair



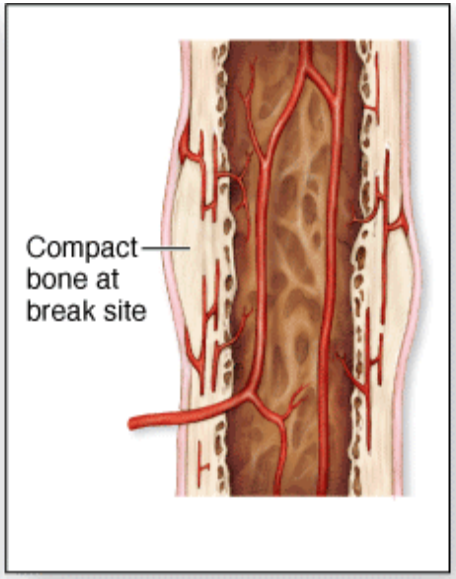
1 A fracture hematoma forms.



2 A fibrocartilaginous (soft) callus forms.



3 A hard (bony) callus forms.



4 The bone is remodeled.

Research article

- Current Trends in Research on Bone Regeneration: A Bibliometric Analysis
- https://www.hindawi.com/journals/bmri/2020/8787394/#:~:text=Xin%20Huang,and%20Gang%20Chen

Learning Resources

- Junqueira's Basic Histology 12th Edition, Chapter 8
- Histology , A text and Atlas by Michael H.Ross 6th Edition, Chapter 8
- Google scholar
- https://www.hindawi.com/journals/bmri/2020/8787394/#:~:text=Xin%20Huang,and%20Gang%20Chen