

# *MUSCLE, BONE, CARTILAGE*

## *HISTOLOGY PRACTICAL*

*FINAL REVISION  
2024-2025*

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جامعة بنها الأهلية  
مدينة العبور



# OBJECTIVES

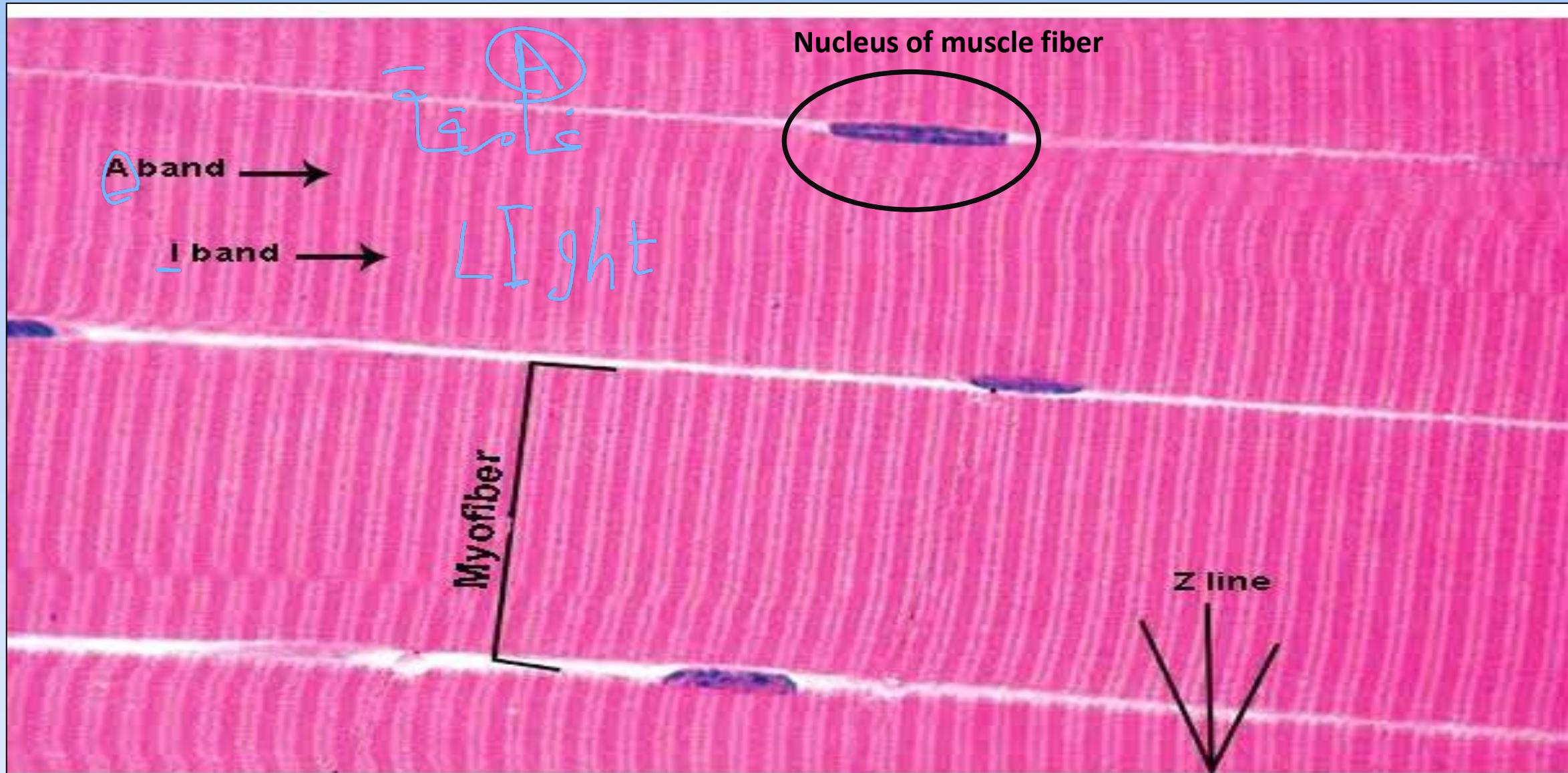


## *Students should be able to:*

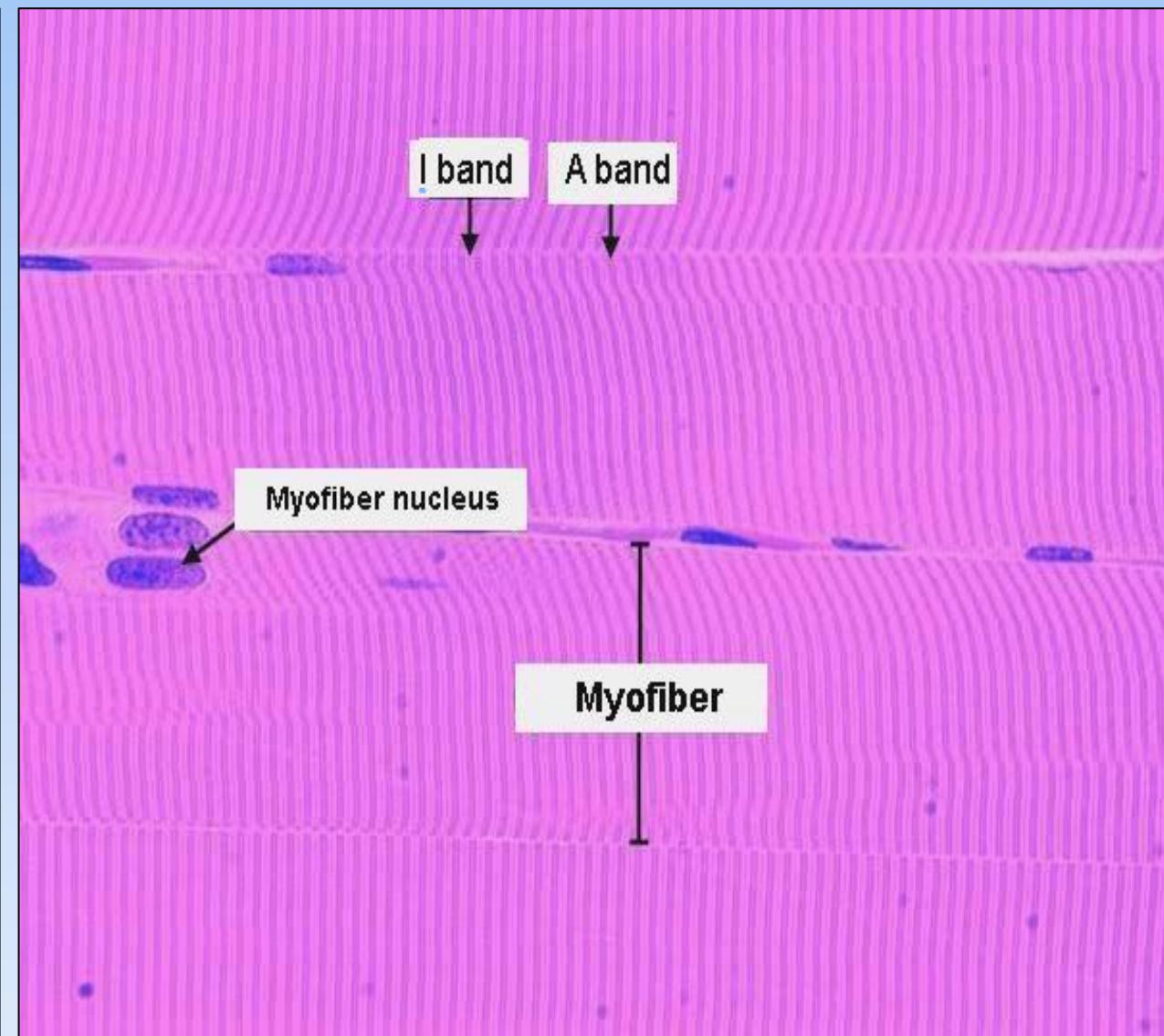
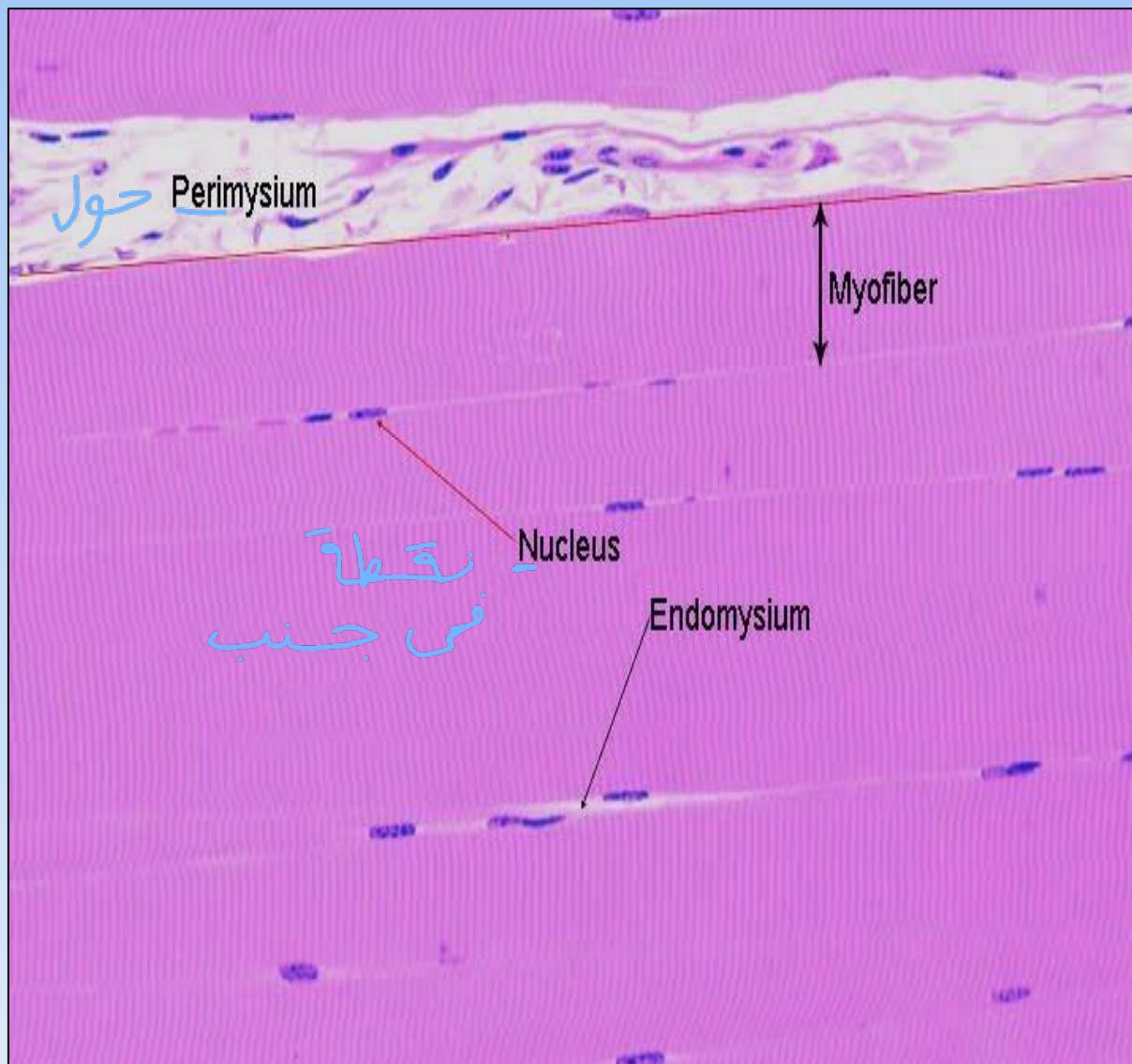
- 1- Identify the histological structure of skeletal muscle (LM&EM)
- 2- Identify and differentiate between the histological structure of different types of bone.
- 3- Identify and differentiate between the histological structure of different types of cartilage.

# Skeletal muscle

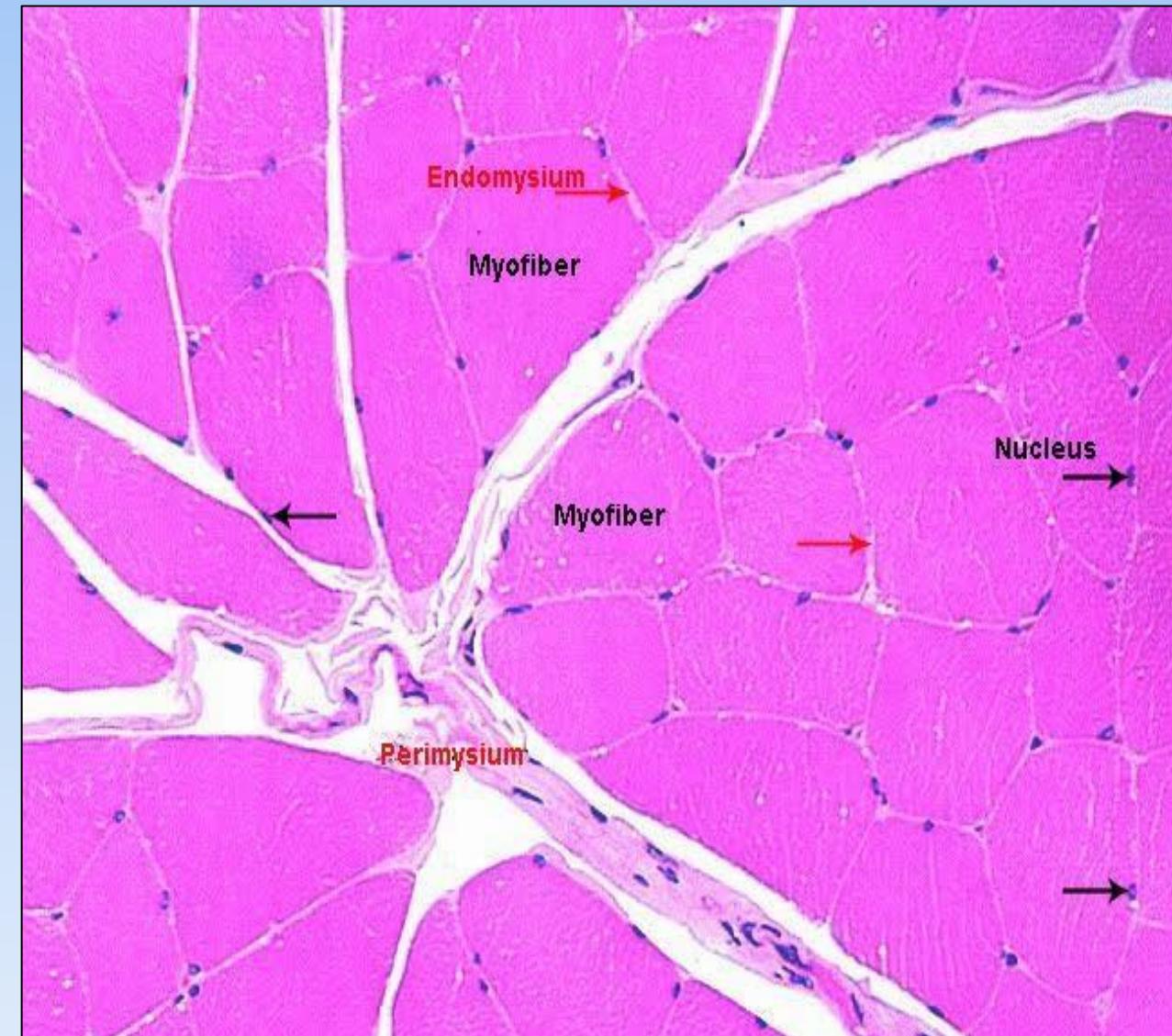
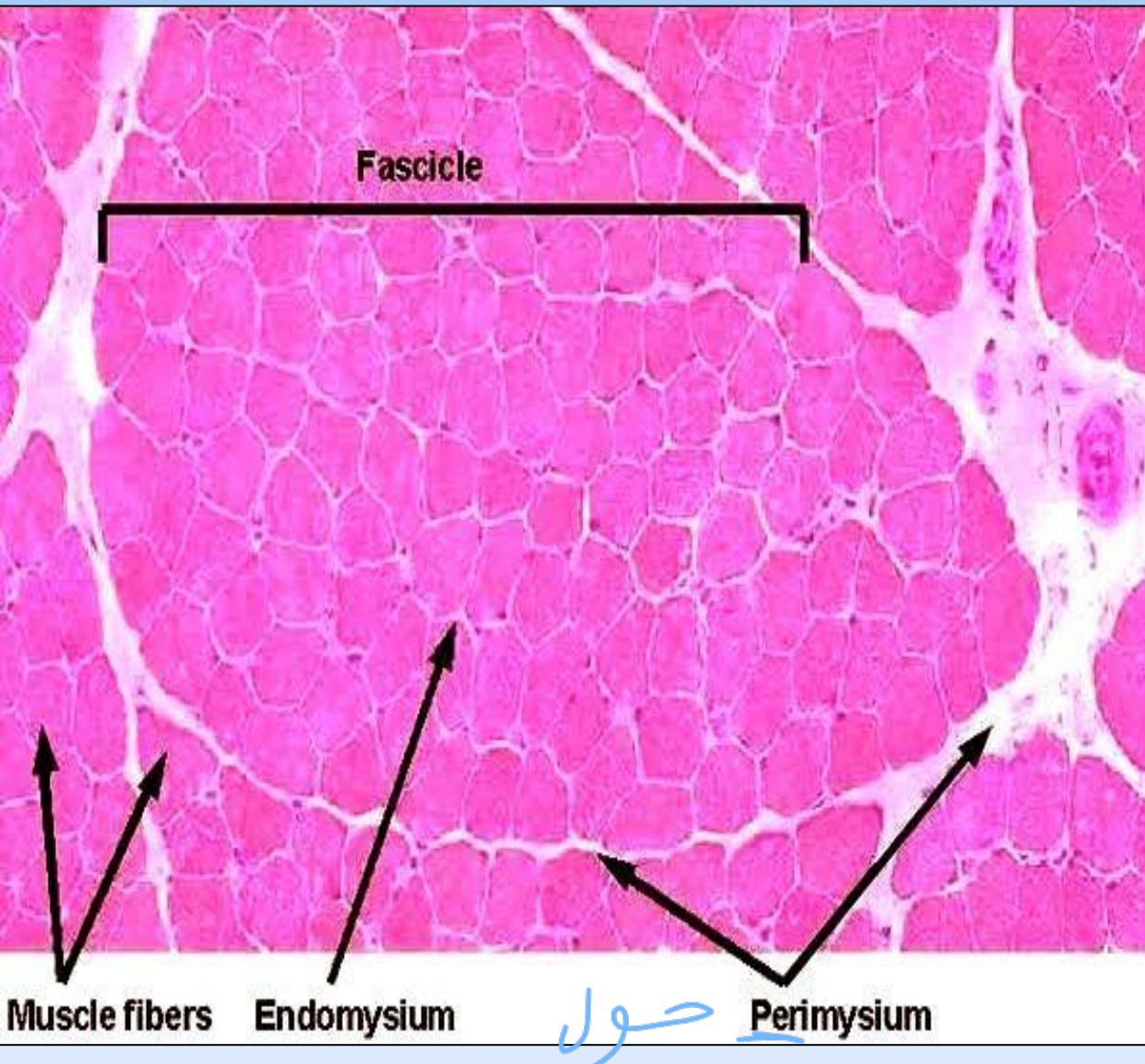
# Skeletal Muscle (LS)



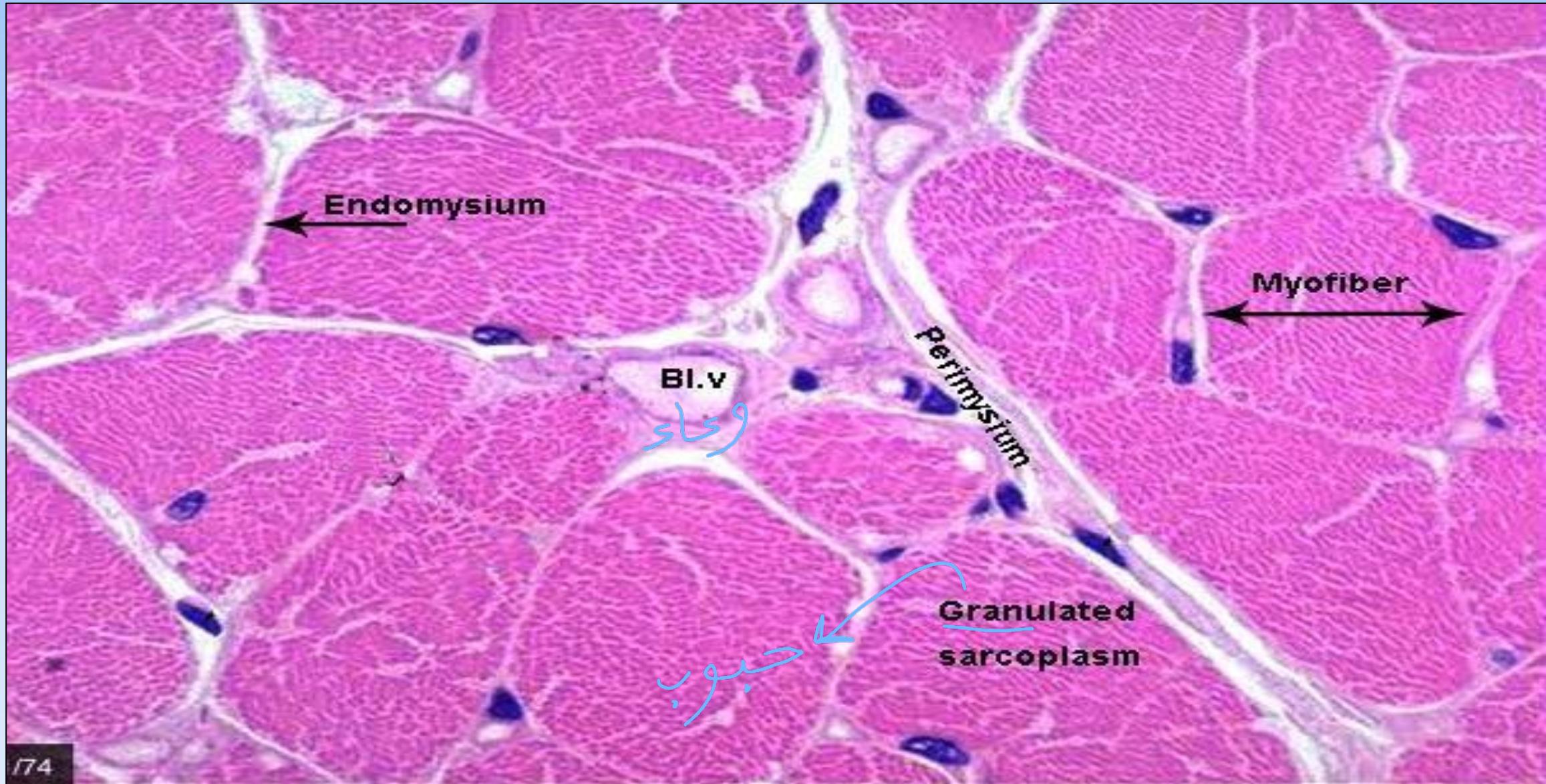
# Skeletal Muscle (LS)



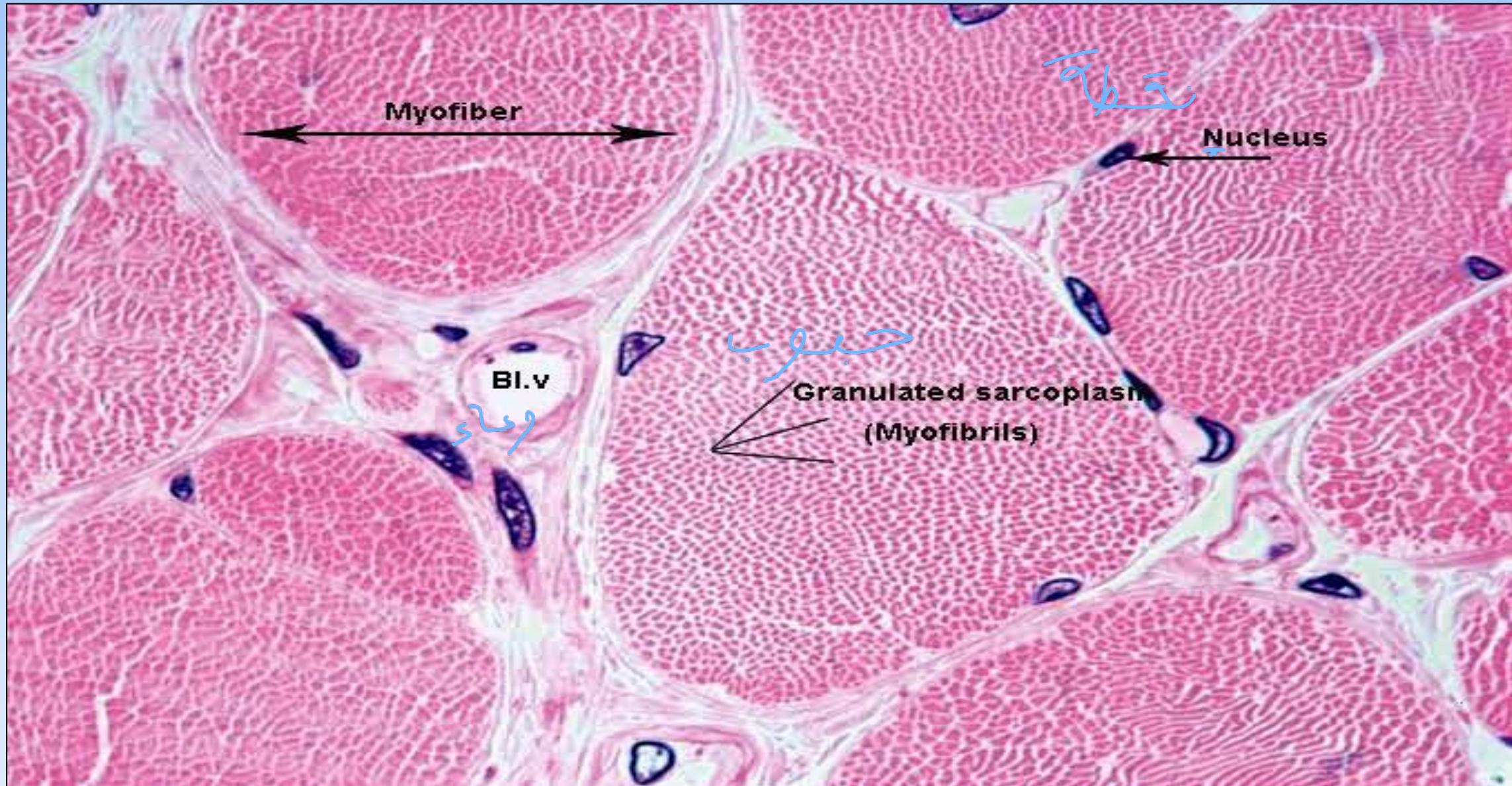
# Skeletal Muscle (TS)



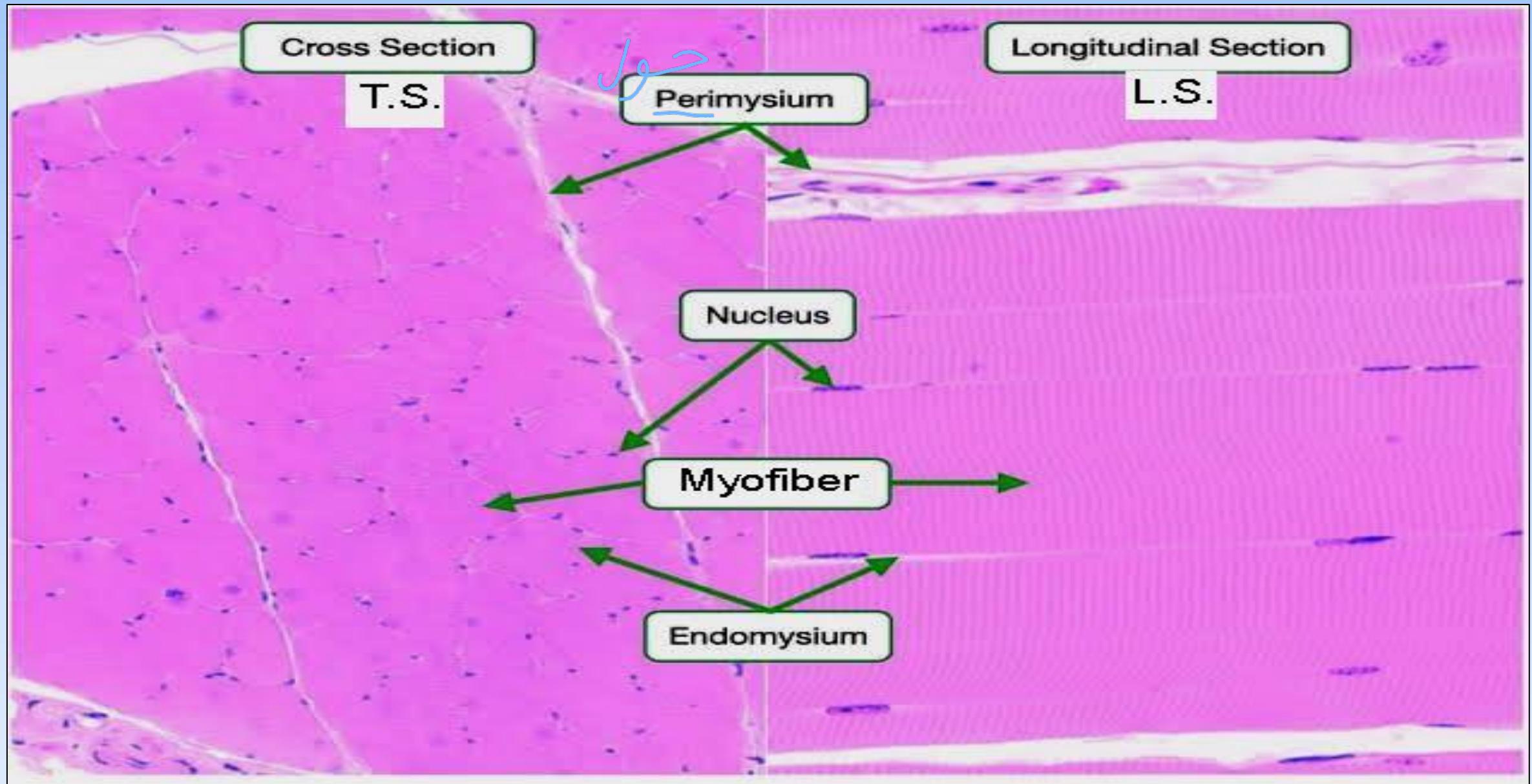
# Skeletal Muscle (TS)



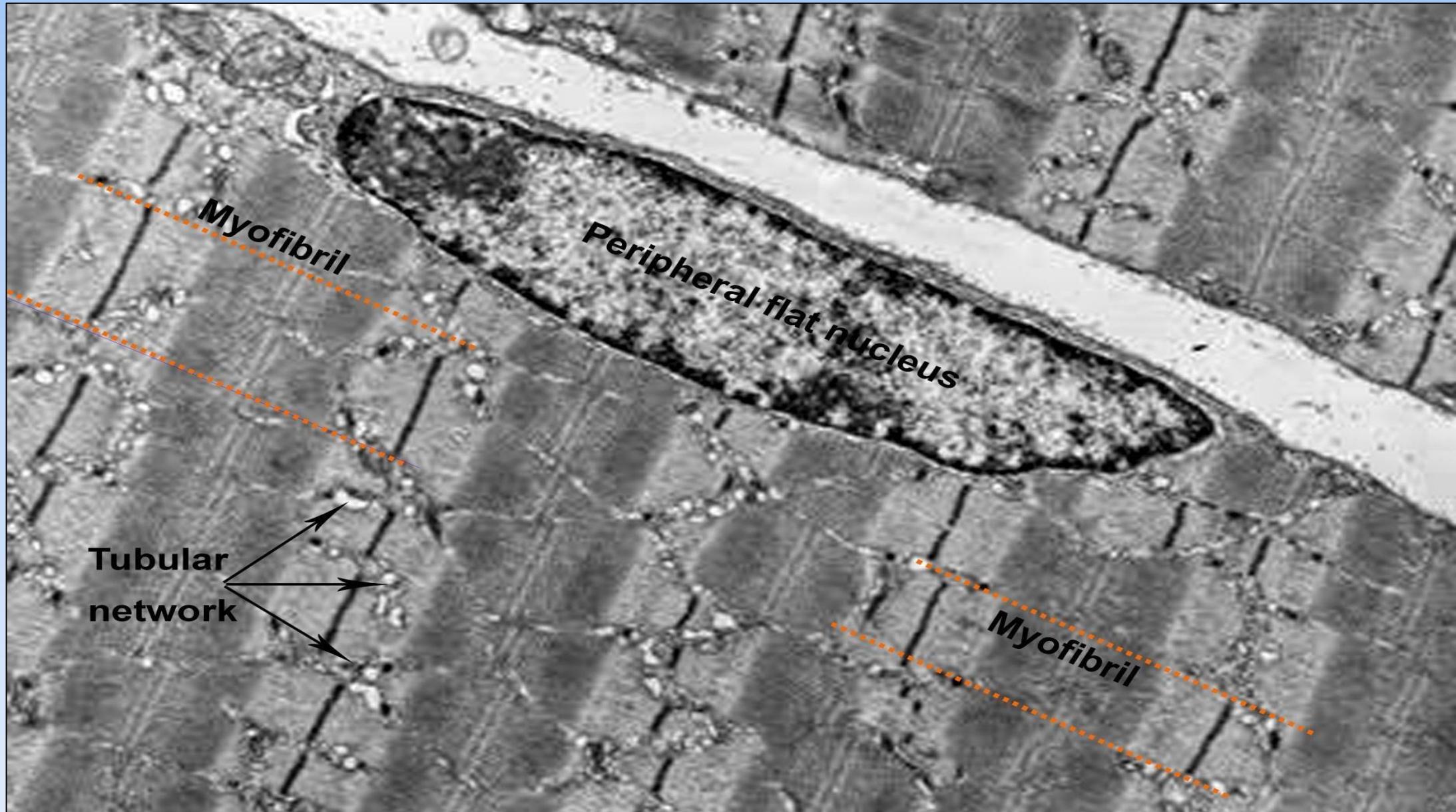
# Skeletal Muscle (TS)



# Skeletal Muscle (LS&TS)



# Myofiber at E.M



# Myofiber at E.M

**Z line**



**Z line**

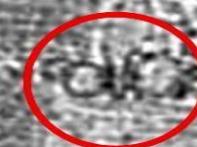
**Sarcomere**



**M line**



**A-I junction**

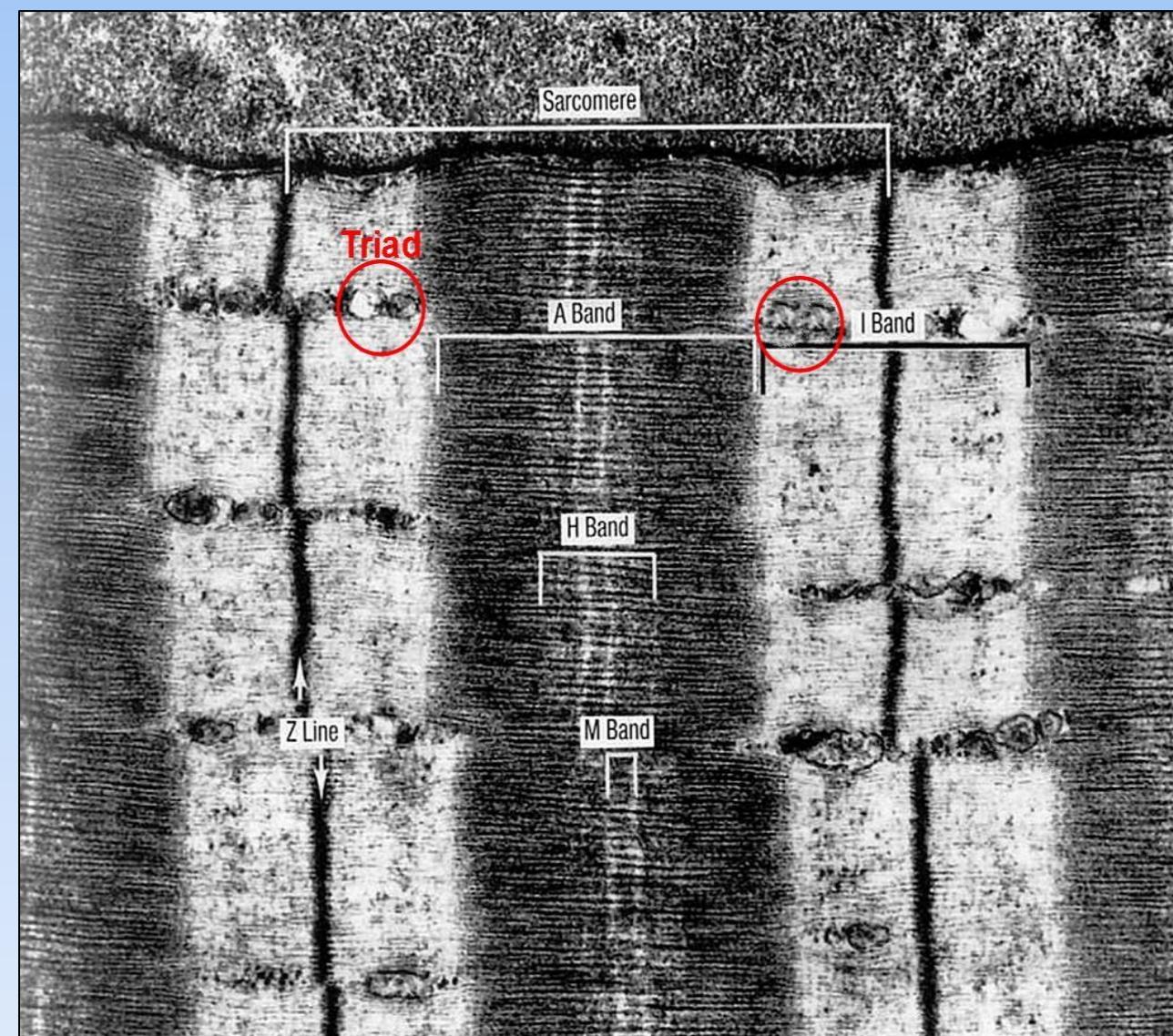
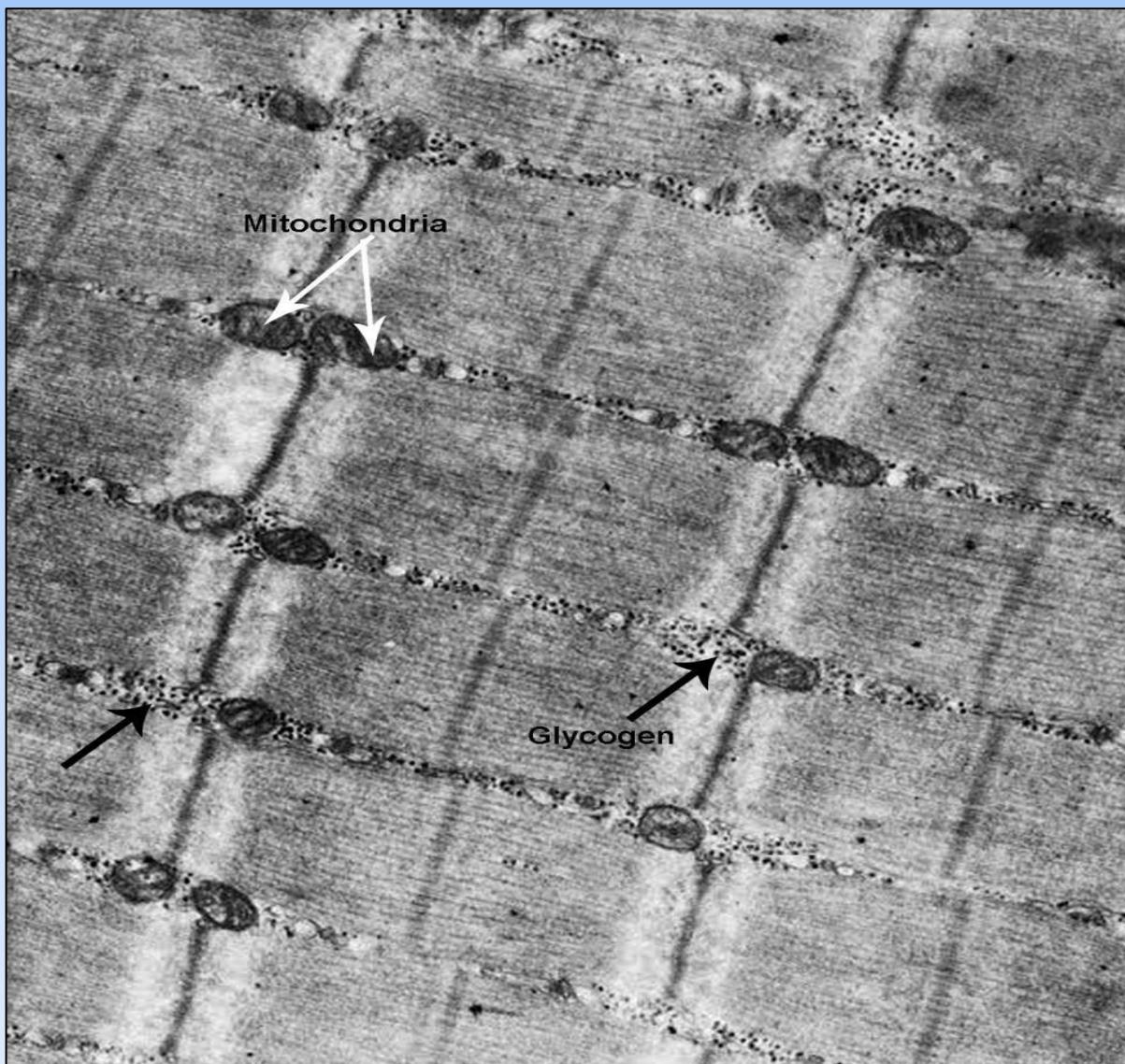


**H zone**

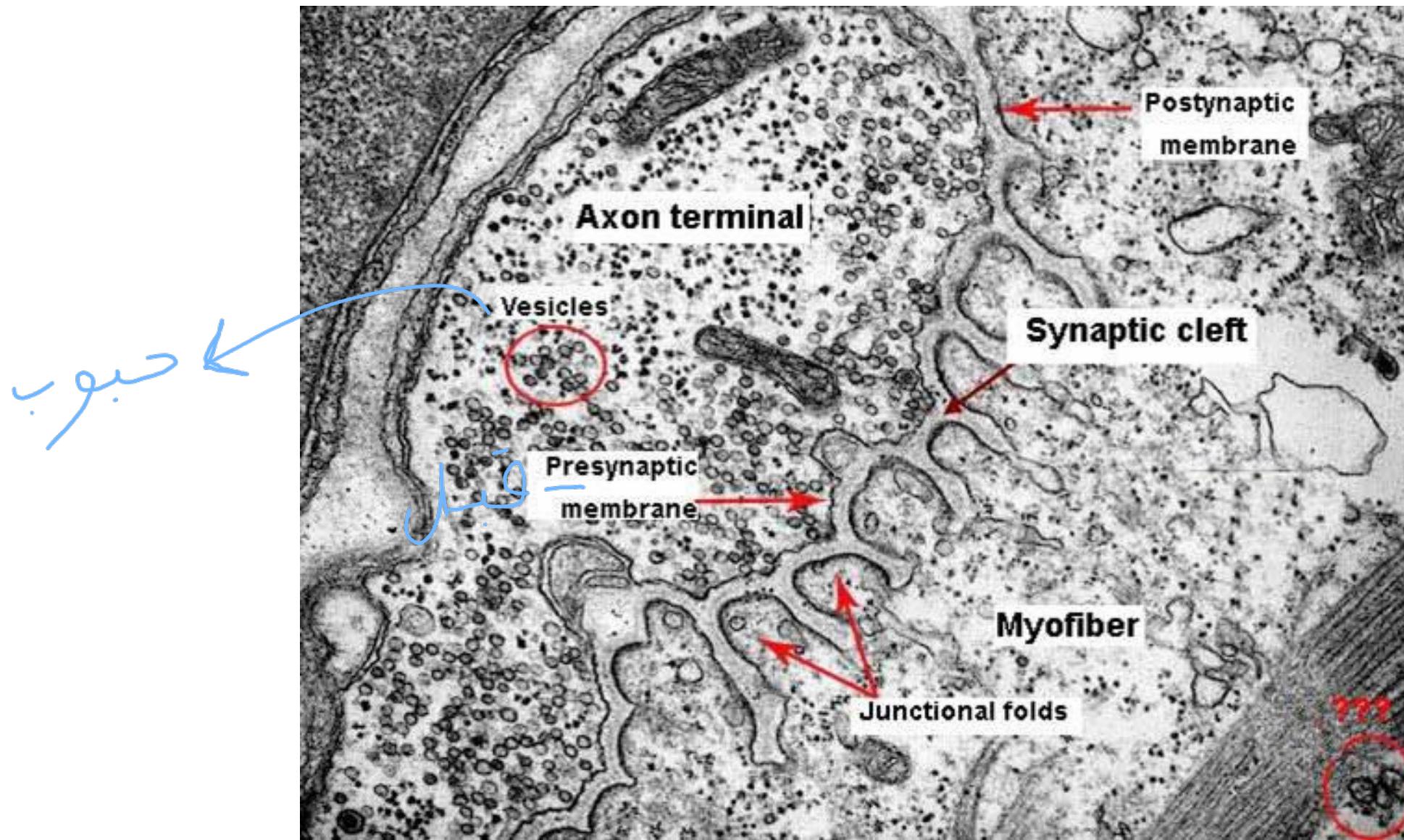
**I band**

**A band**

# Myofiber at E.M.

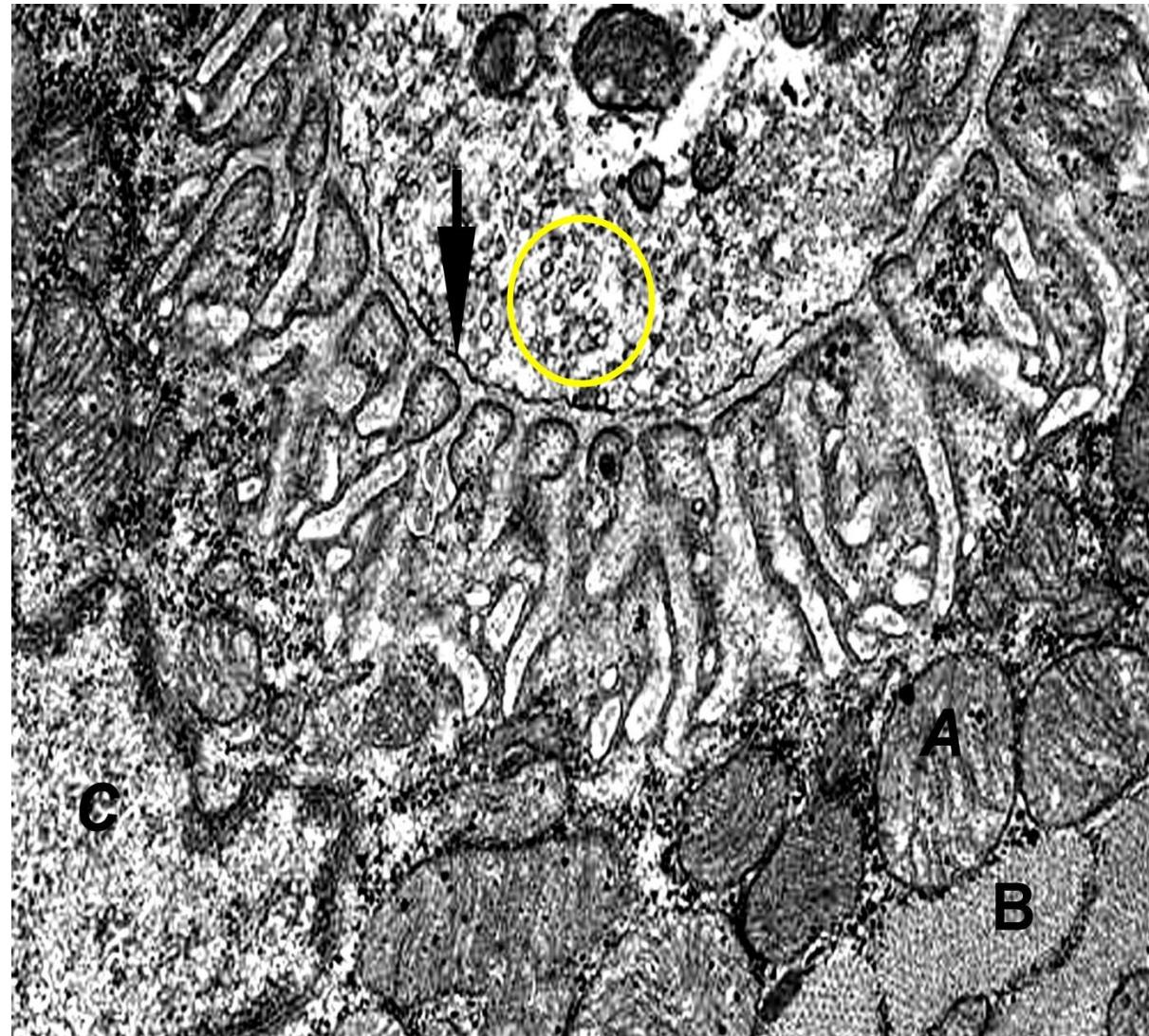


# Ultrastructures of NMJ

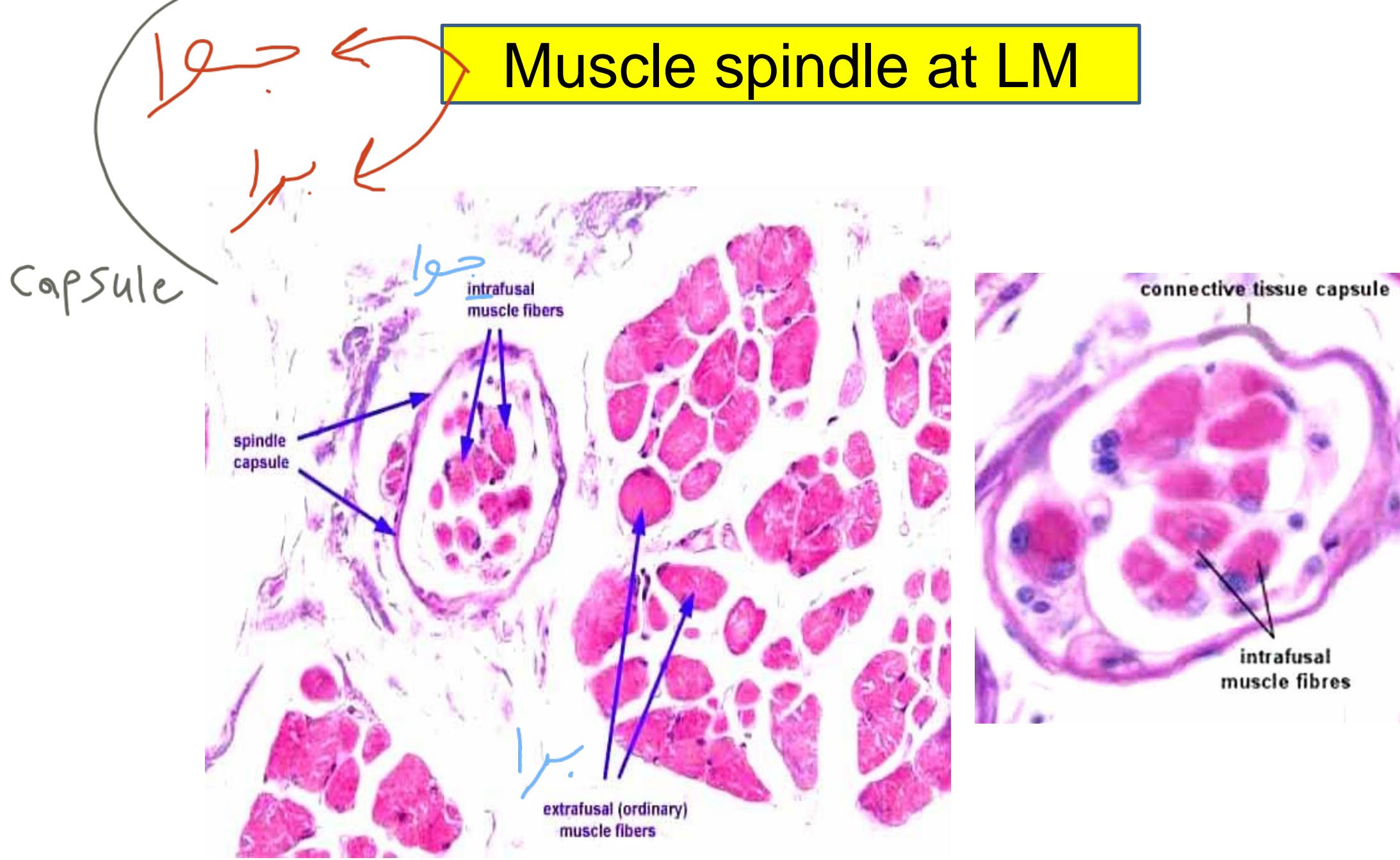


# Practical quiz

- 1- Arrow point to .....
- 2- Circle is.....
- 3- A is.....
- 4- B is .....
- 5- C is .....



# Muscle spindle at LM





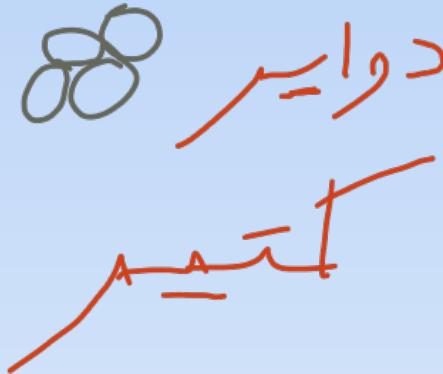
**Cartilage**

# Types of cartilage

Hyaline

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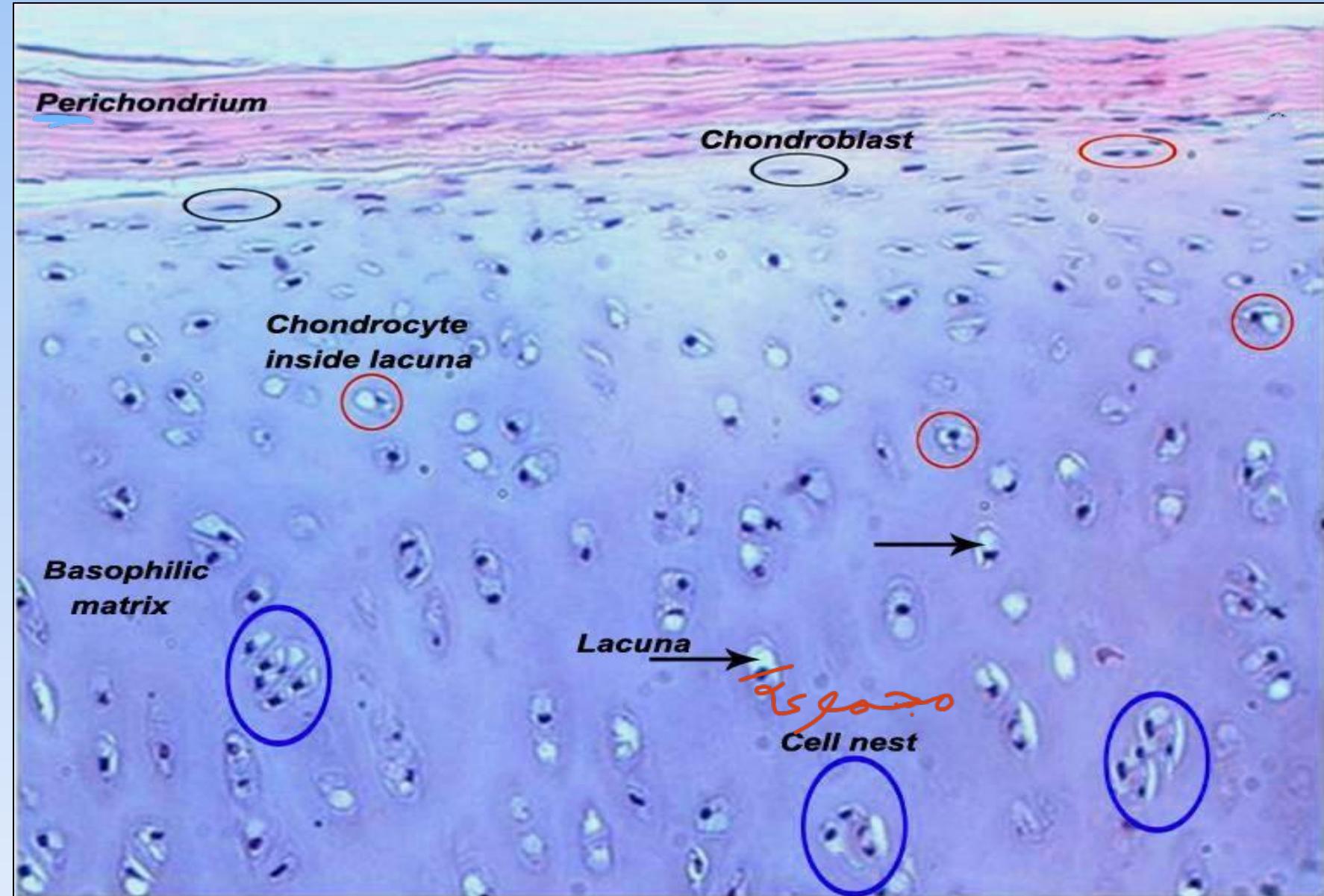
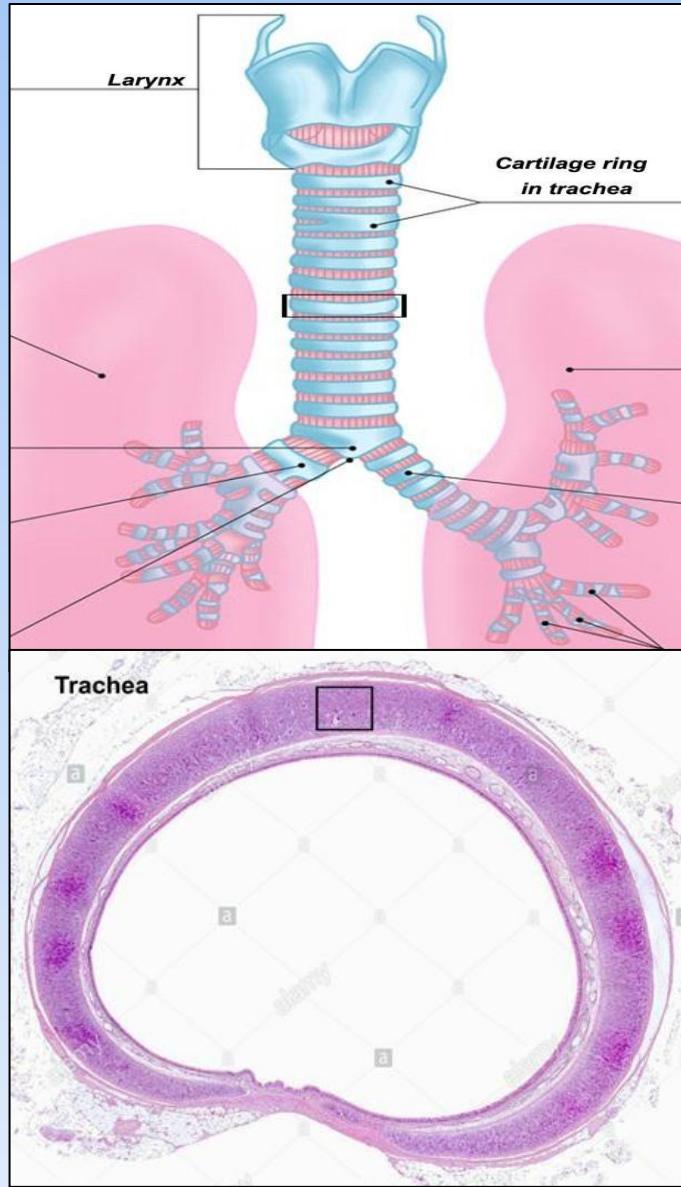
Elastic



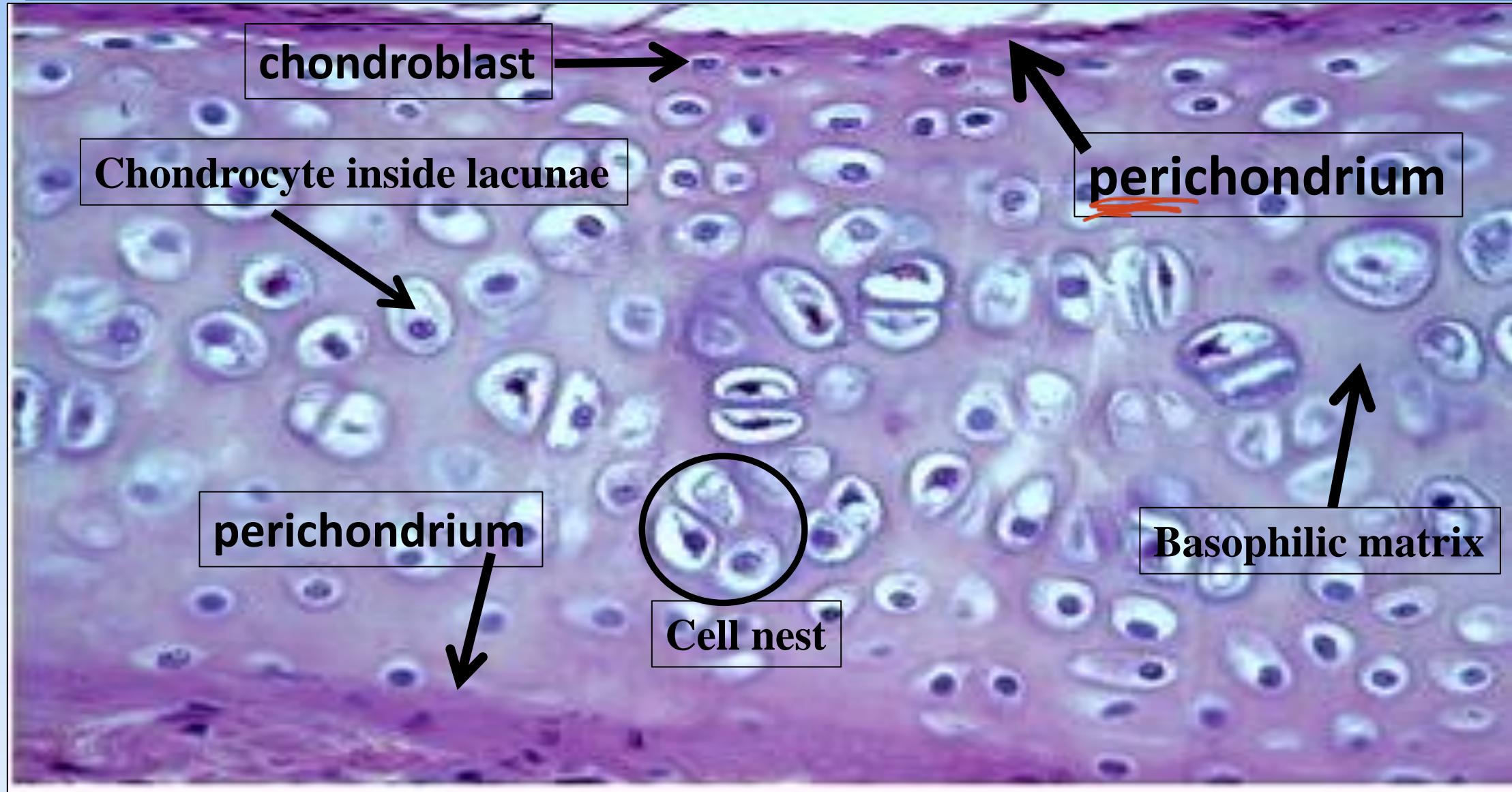
Fibrocartilage



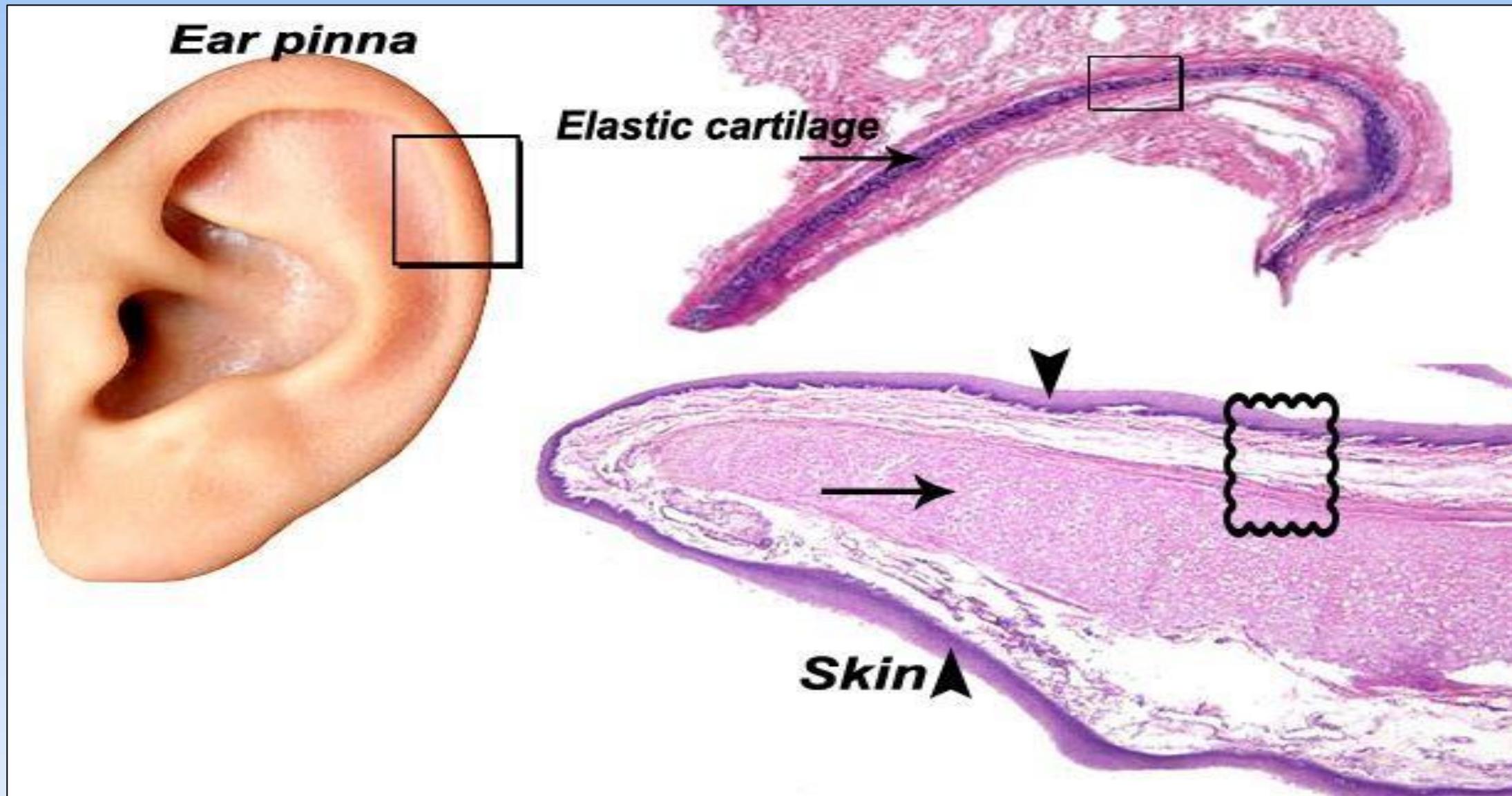
# Hyaline cartilage



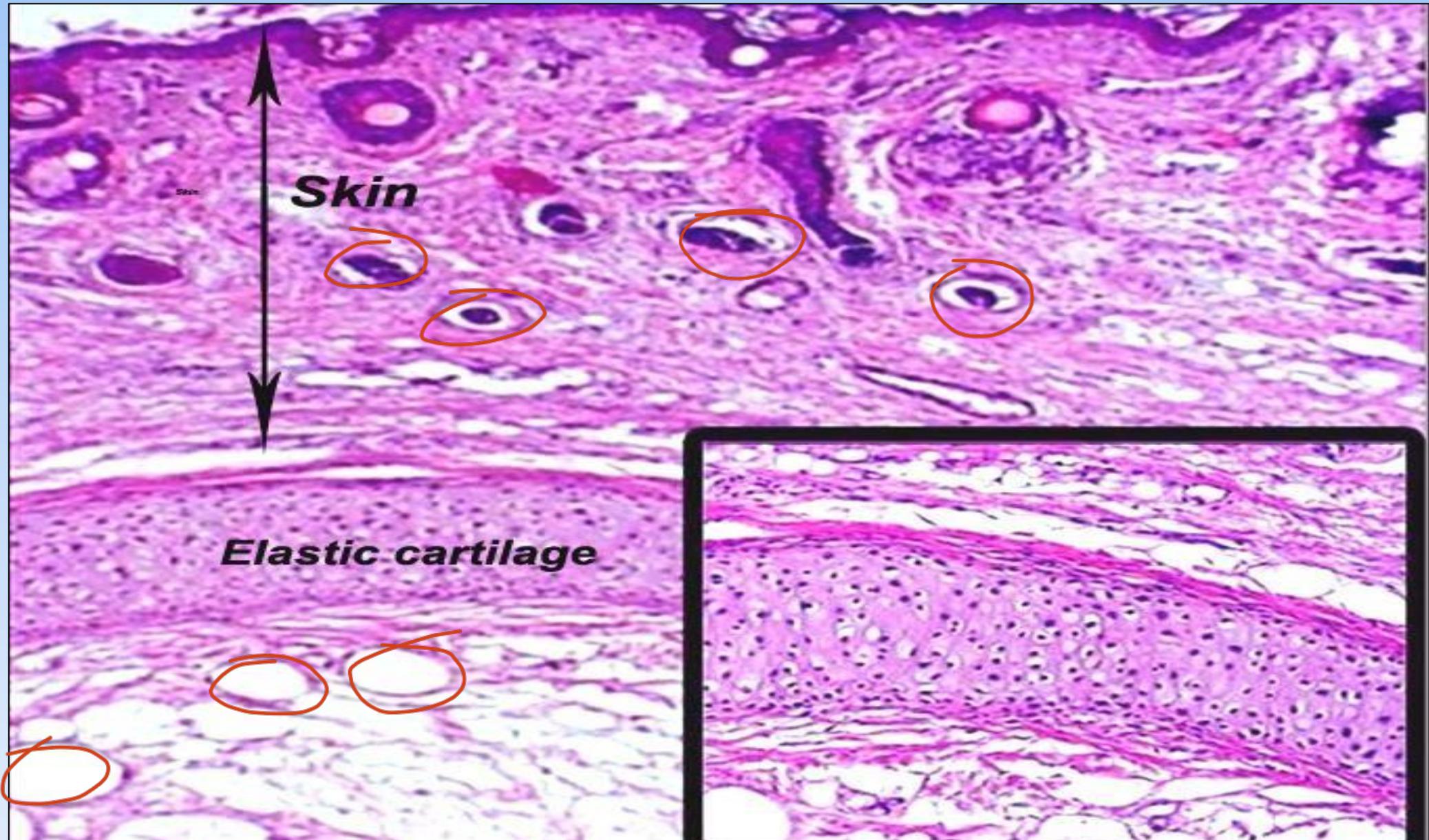
# Hyaline cartilage



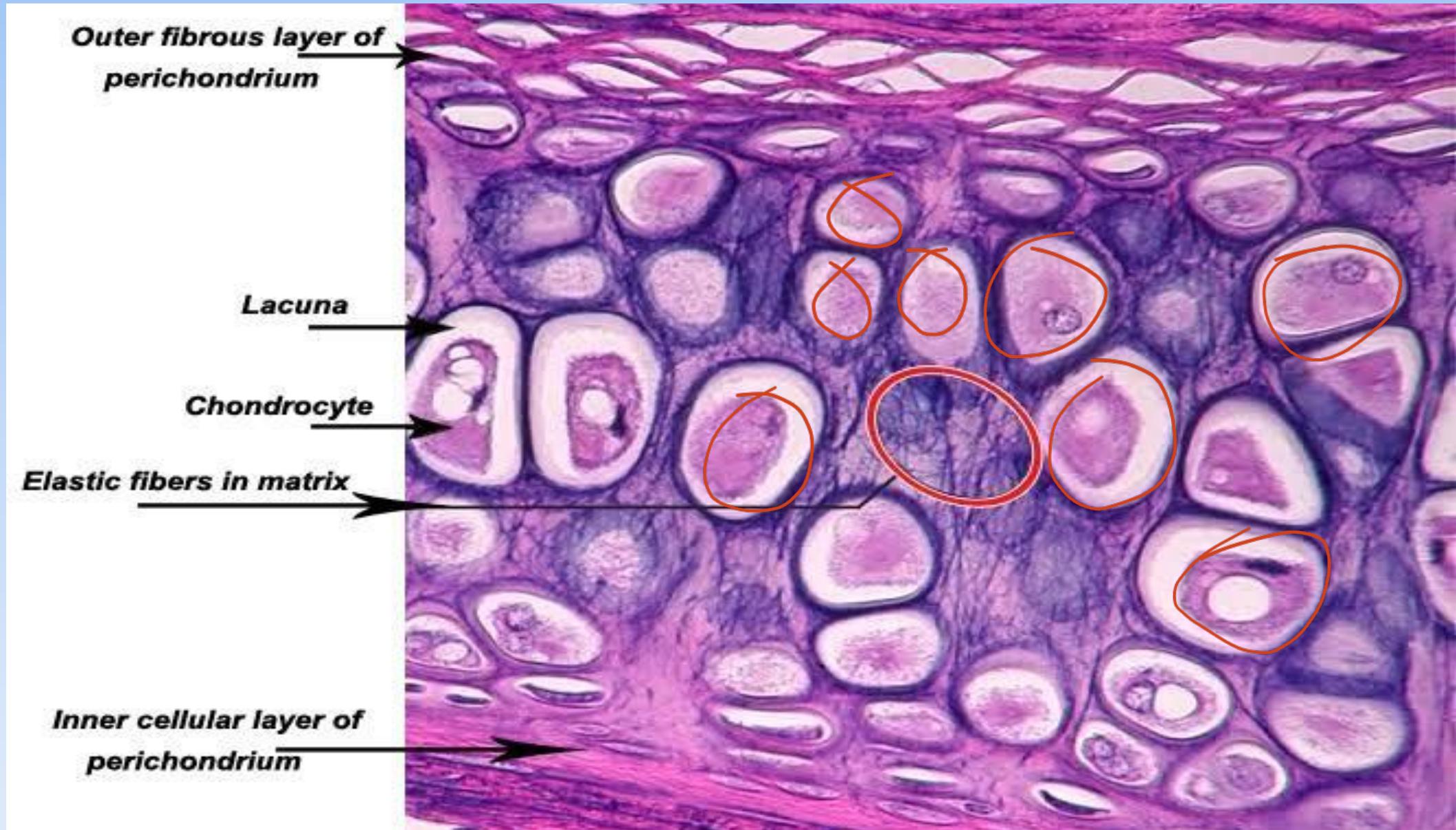
# Elastic cartilage



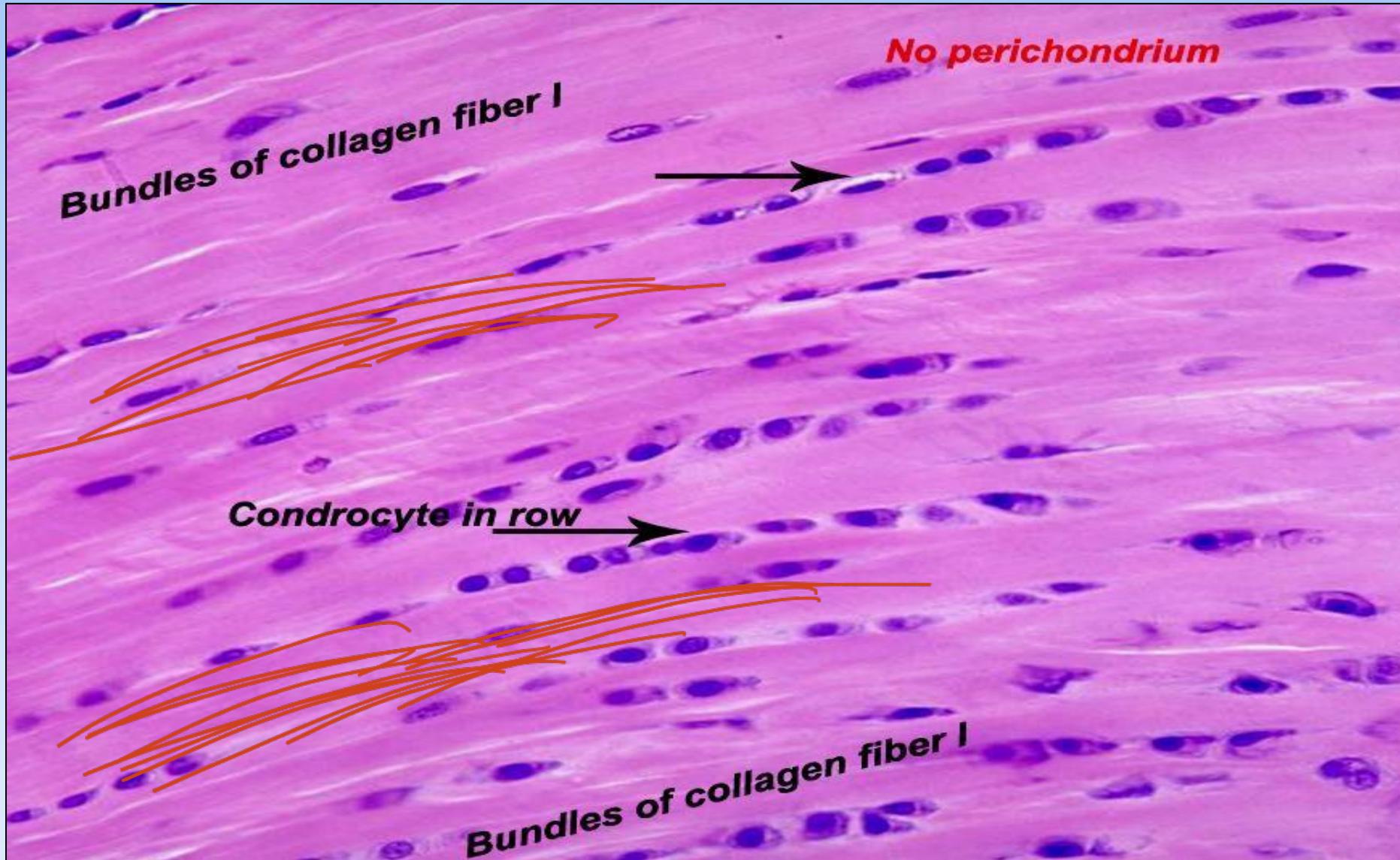
# Elastic cartilage



# Elastic cartilage



# White fibrocartilage



**BONE**

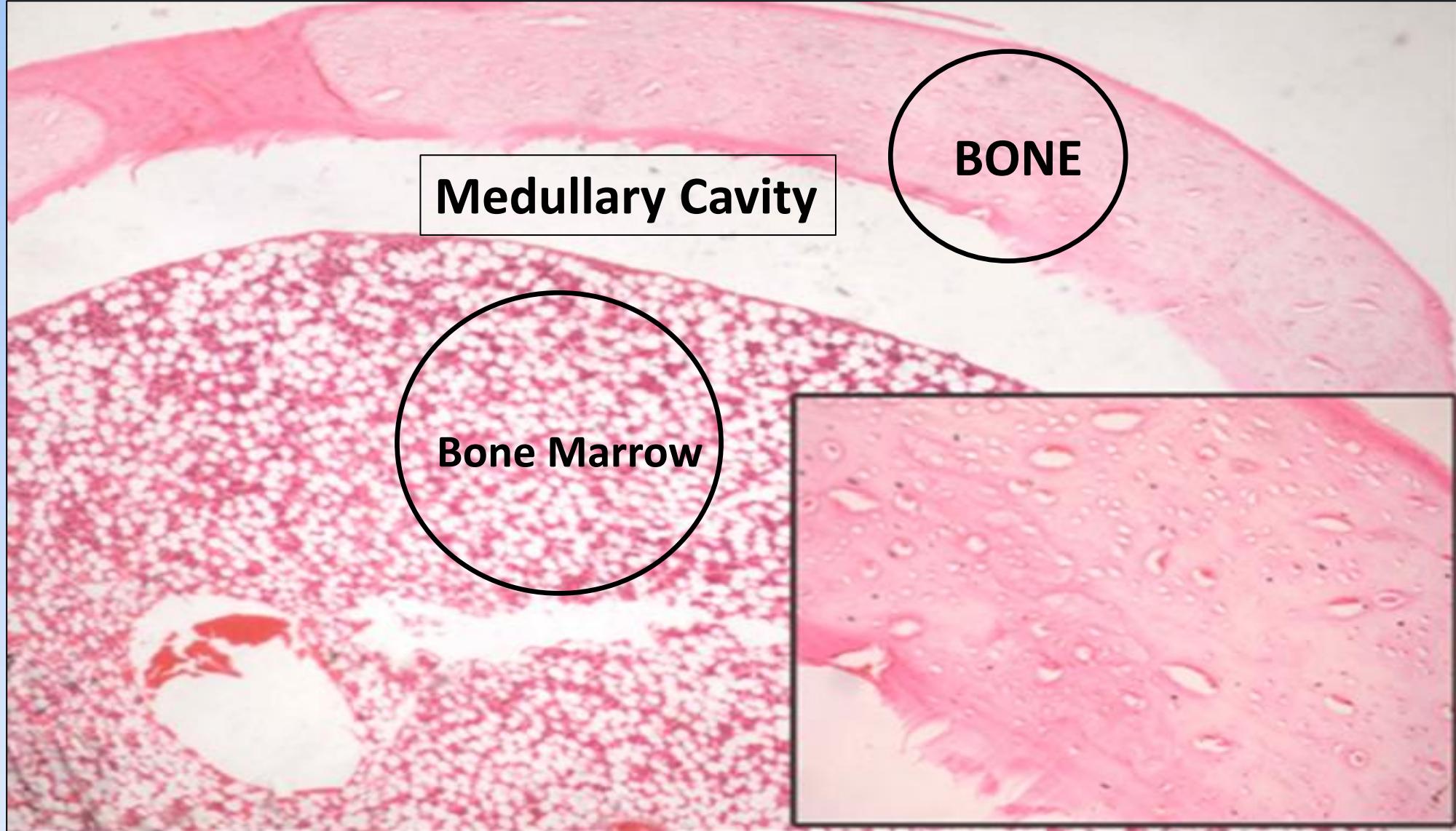
# **Types of bone**

**Compact**

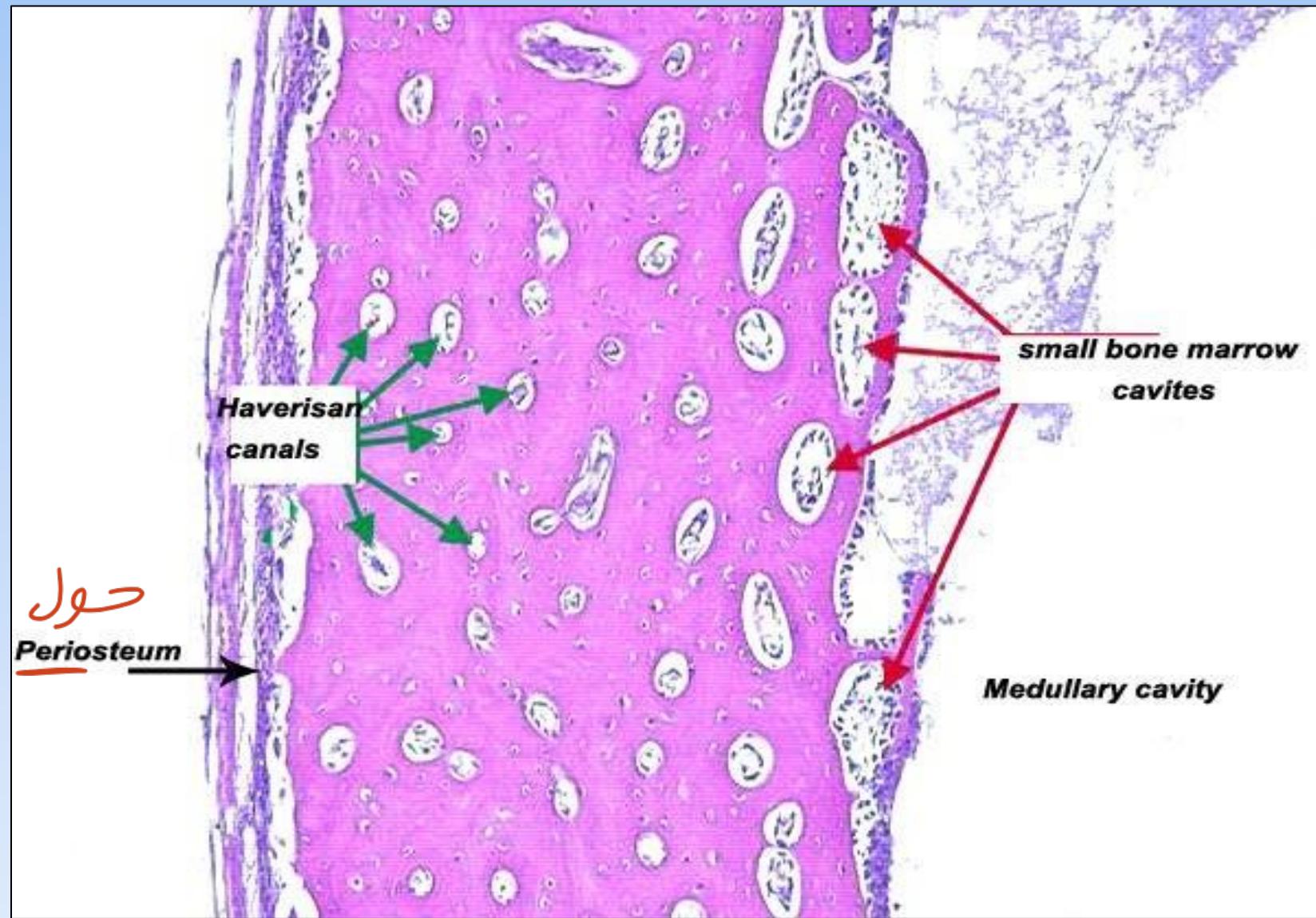
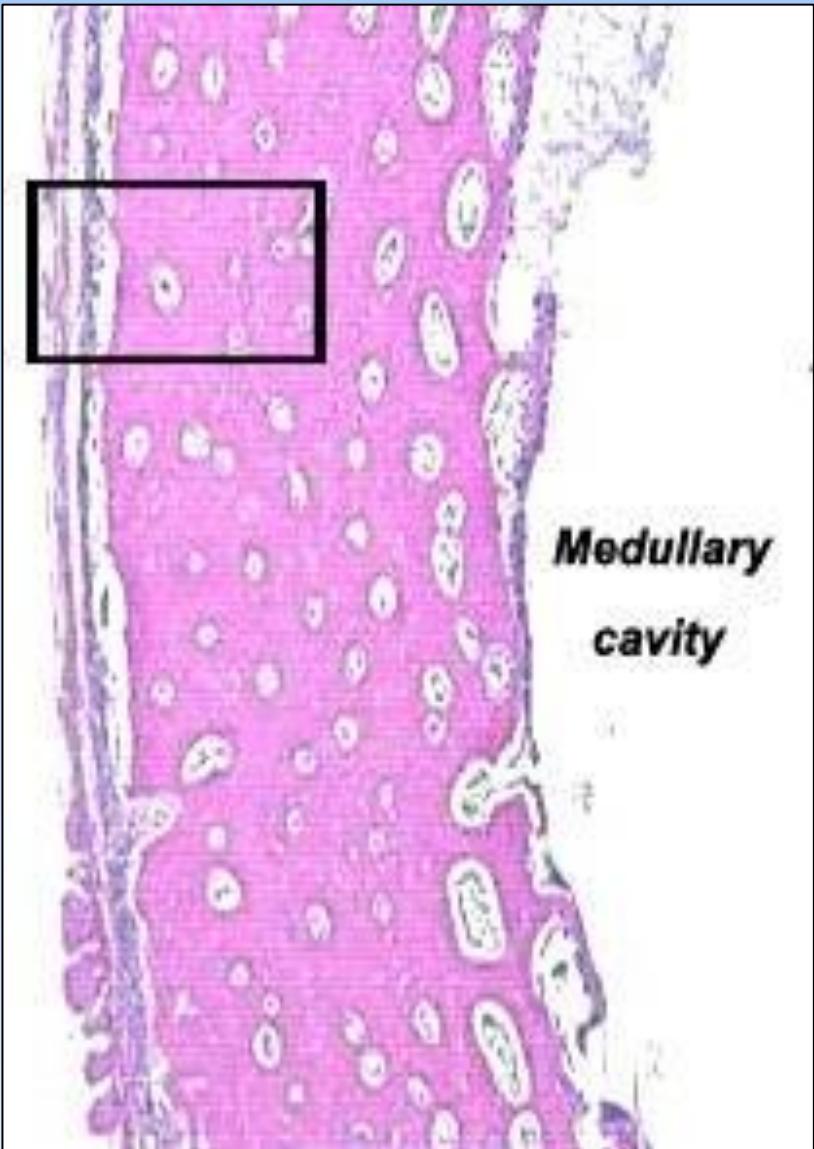
**spongy**

**COMPACT BONE**

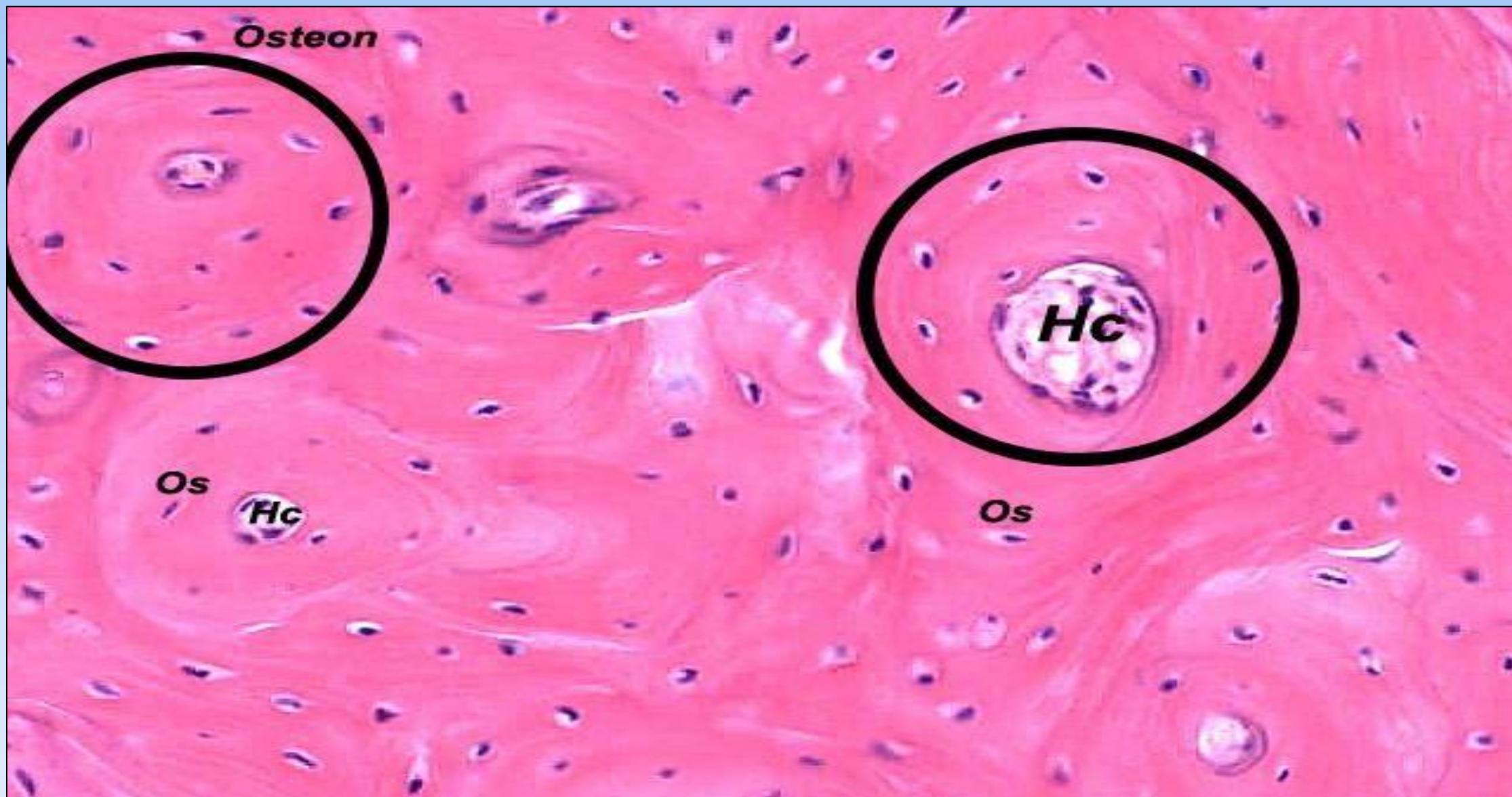
# Decalcified Compact bone



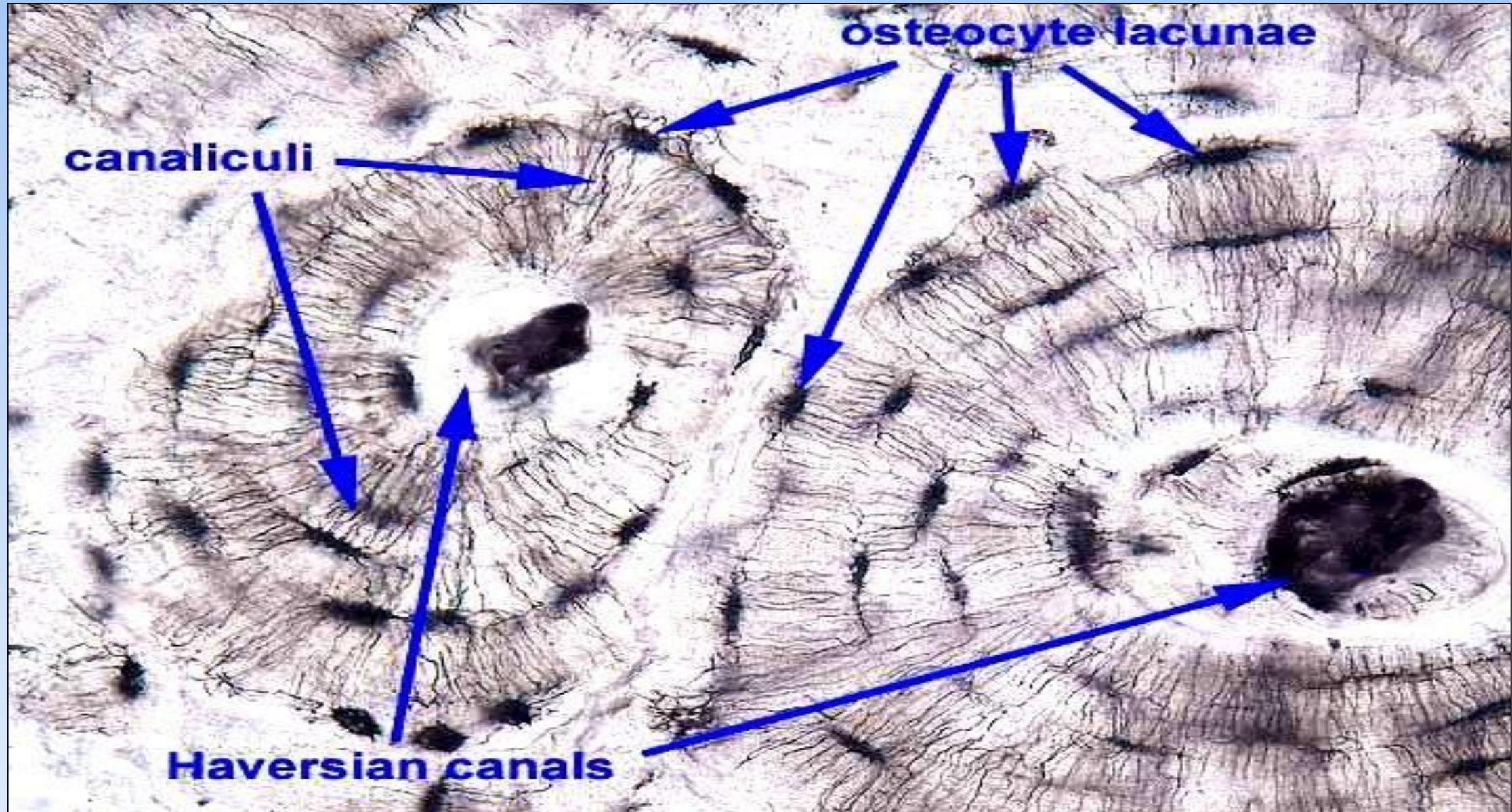
# Decalcified compact bone



# Decalcified compact bone



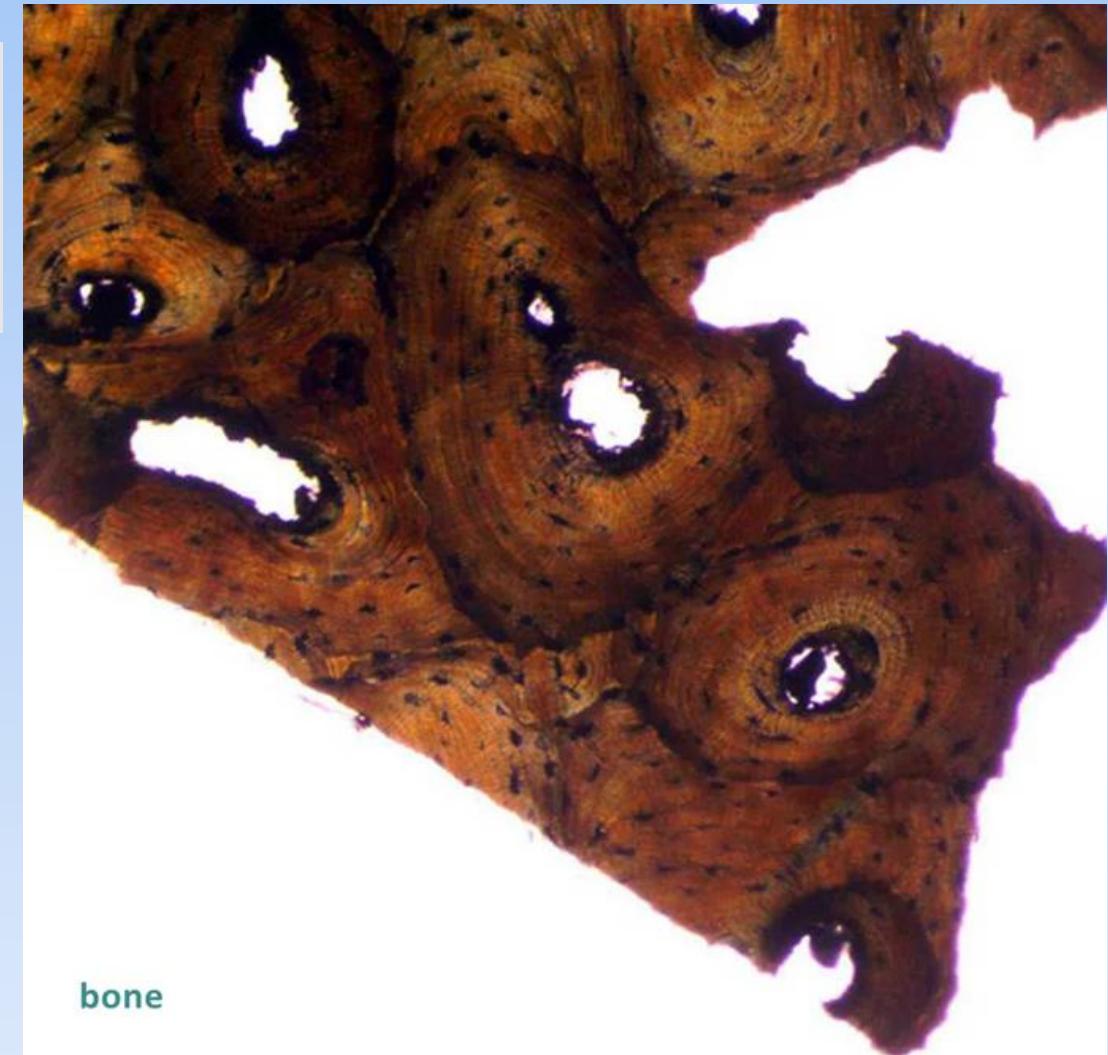
# Ground unstained compact bone



# Ground compact bone

- Ground section of bone stained with Schmorl's stain to reveal small, open spaces in the bone.

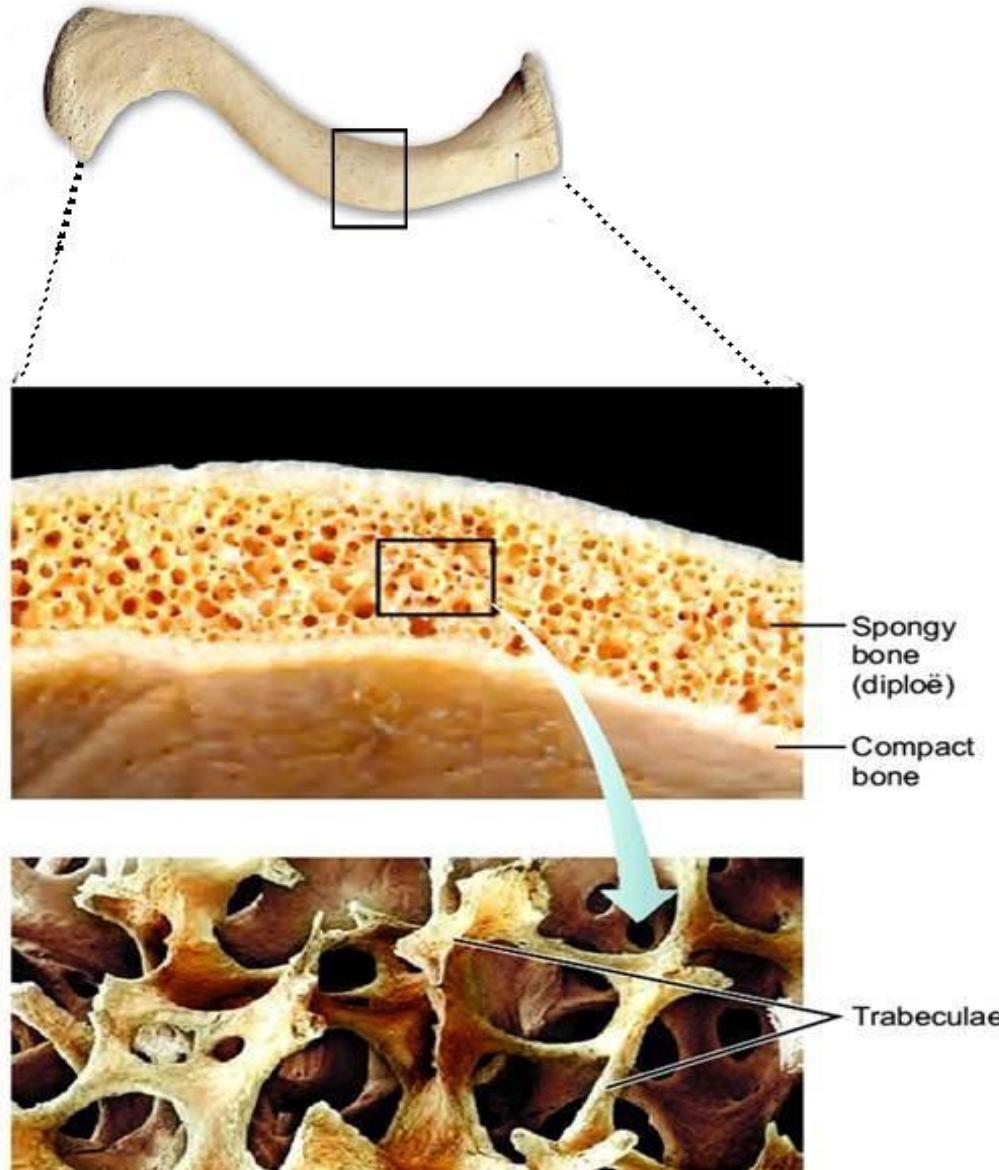
Bone  
Brown ← big  
schmorl



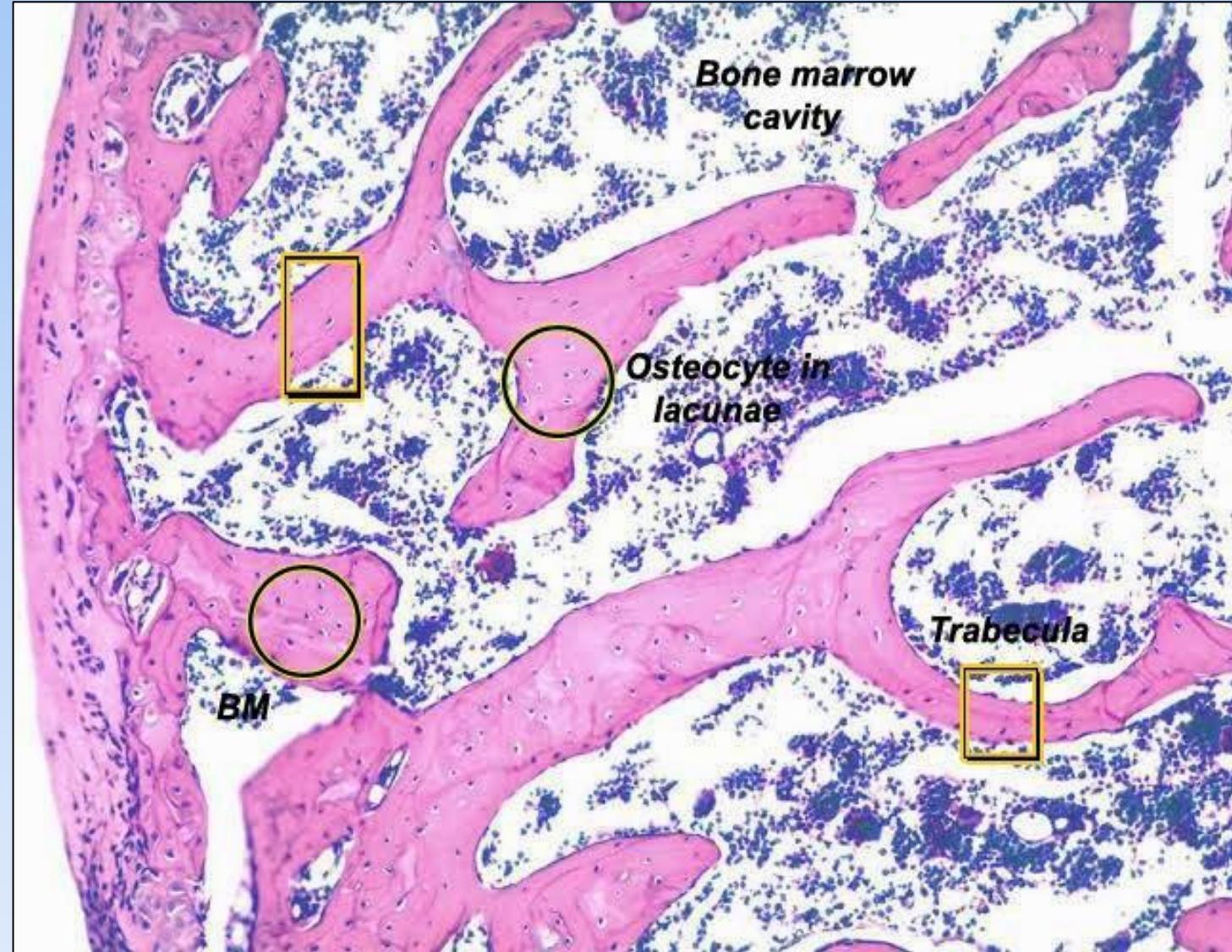
# SPONGY BONE

فَرْكَلِي

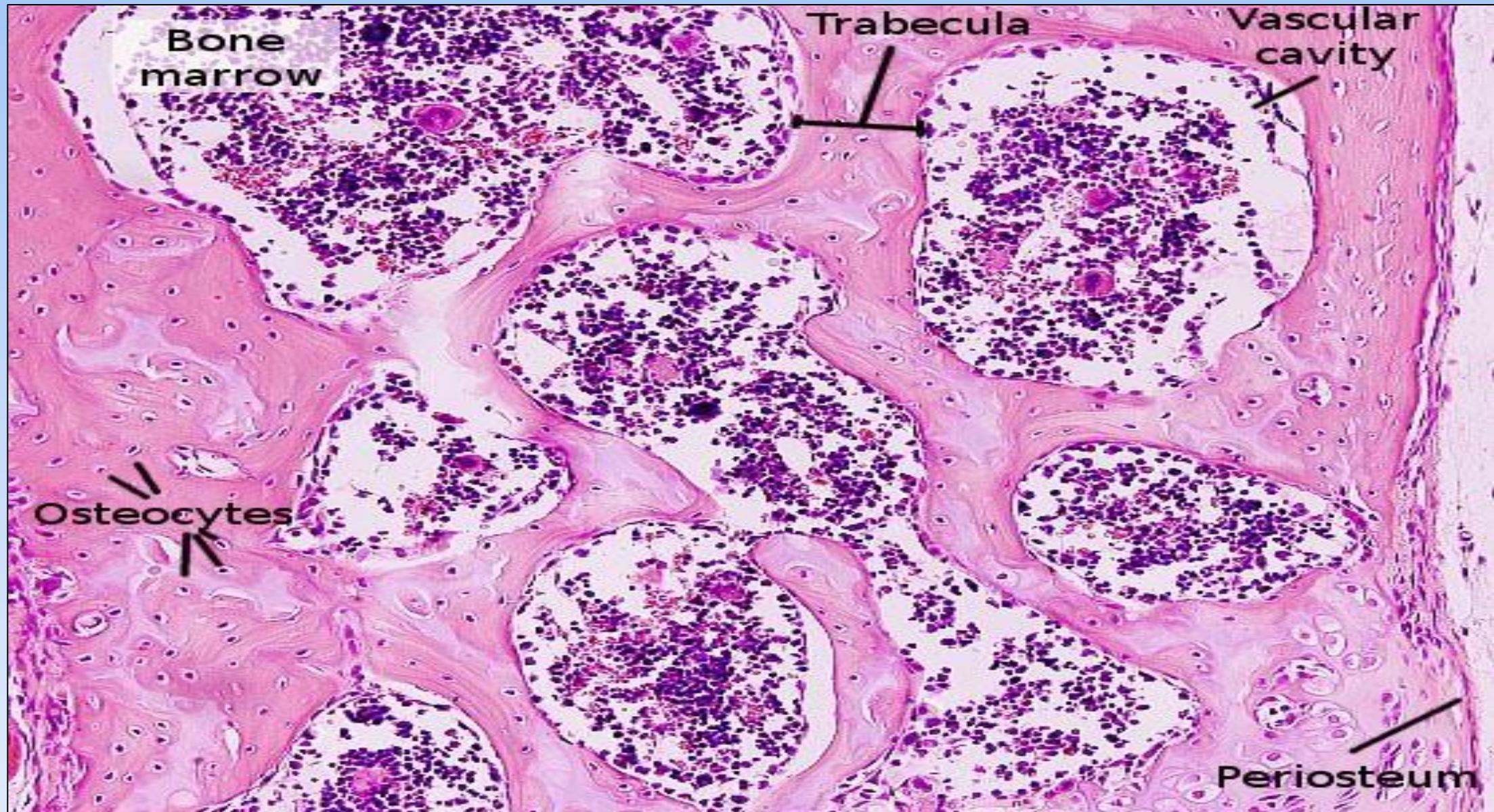
# Spongy bone



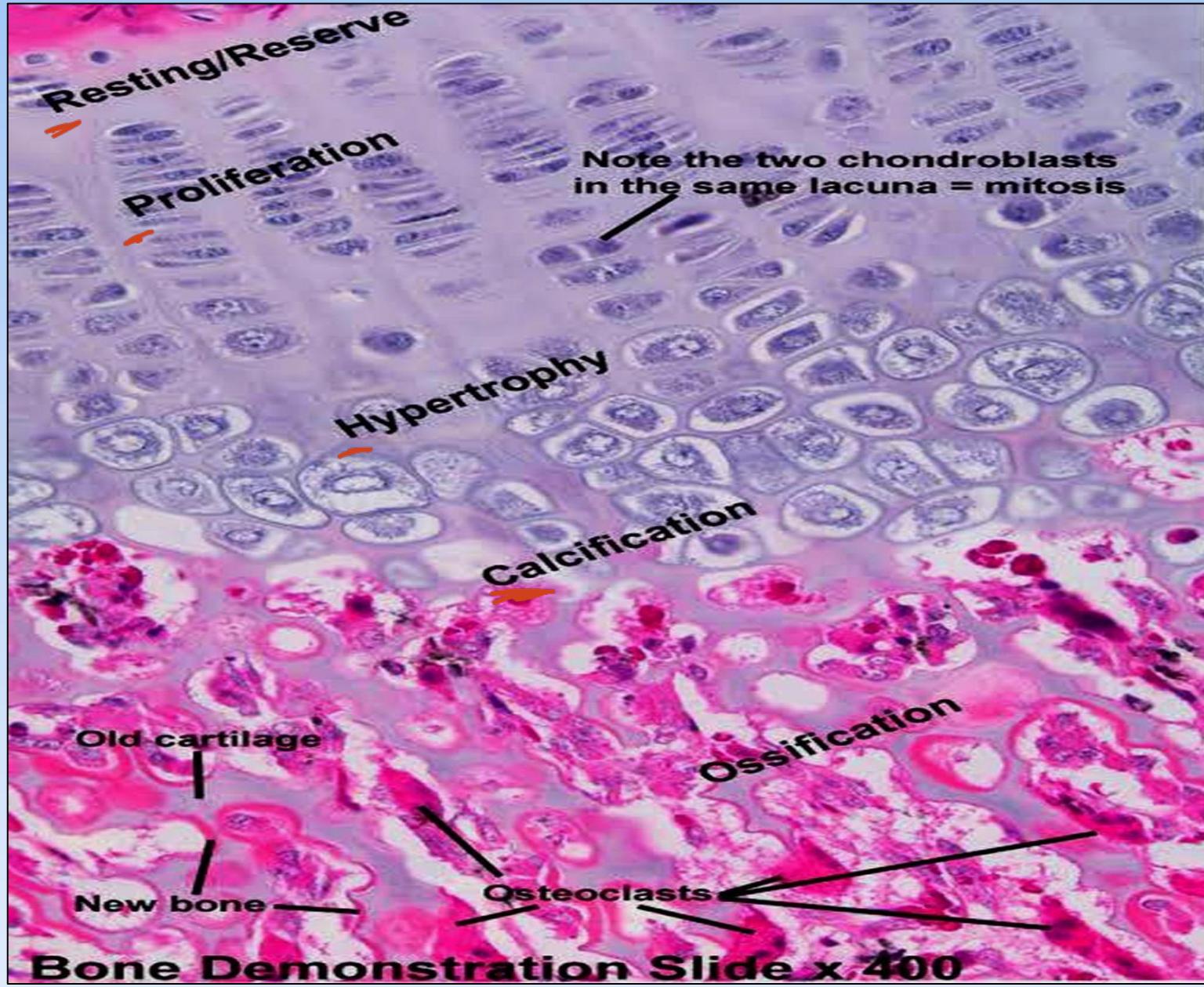
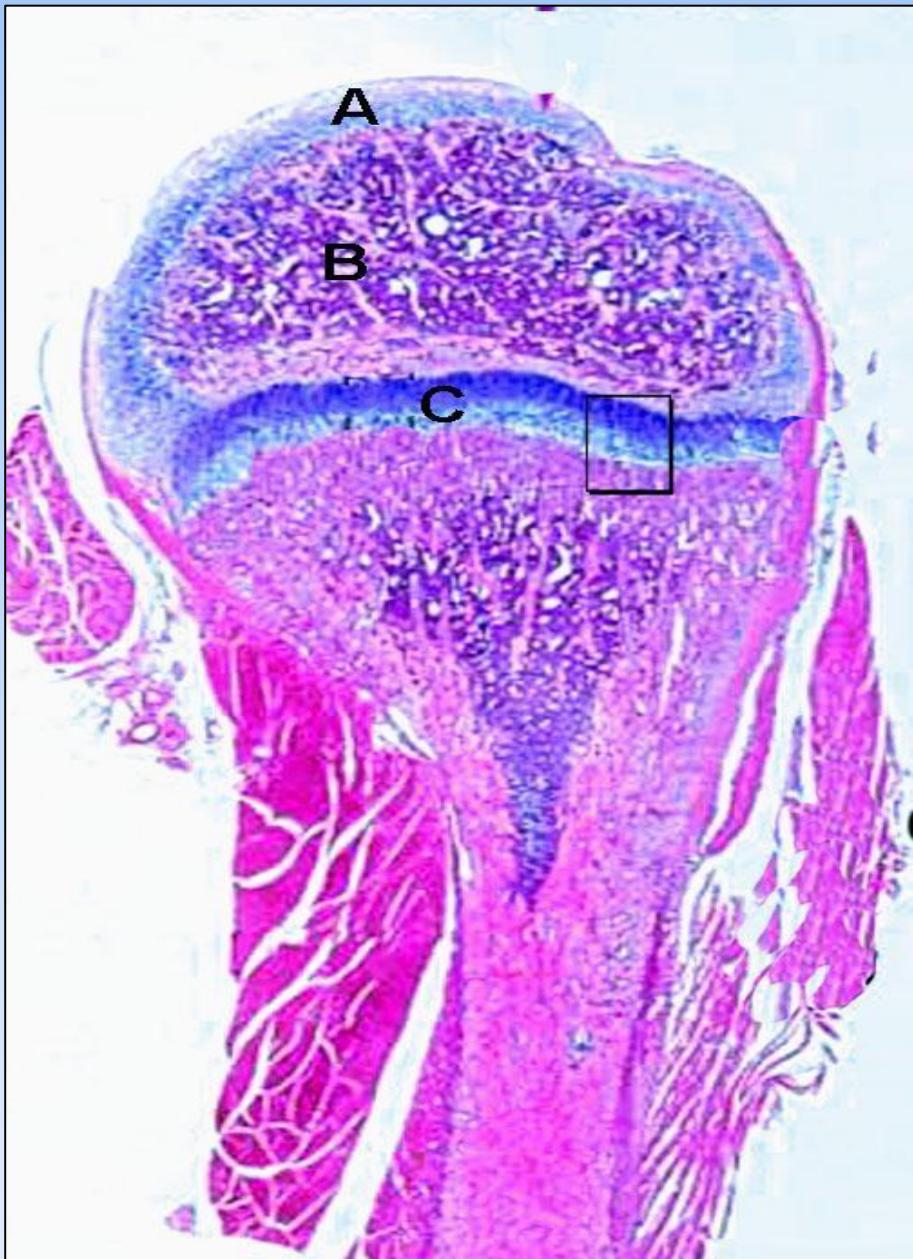
# Spongy bone



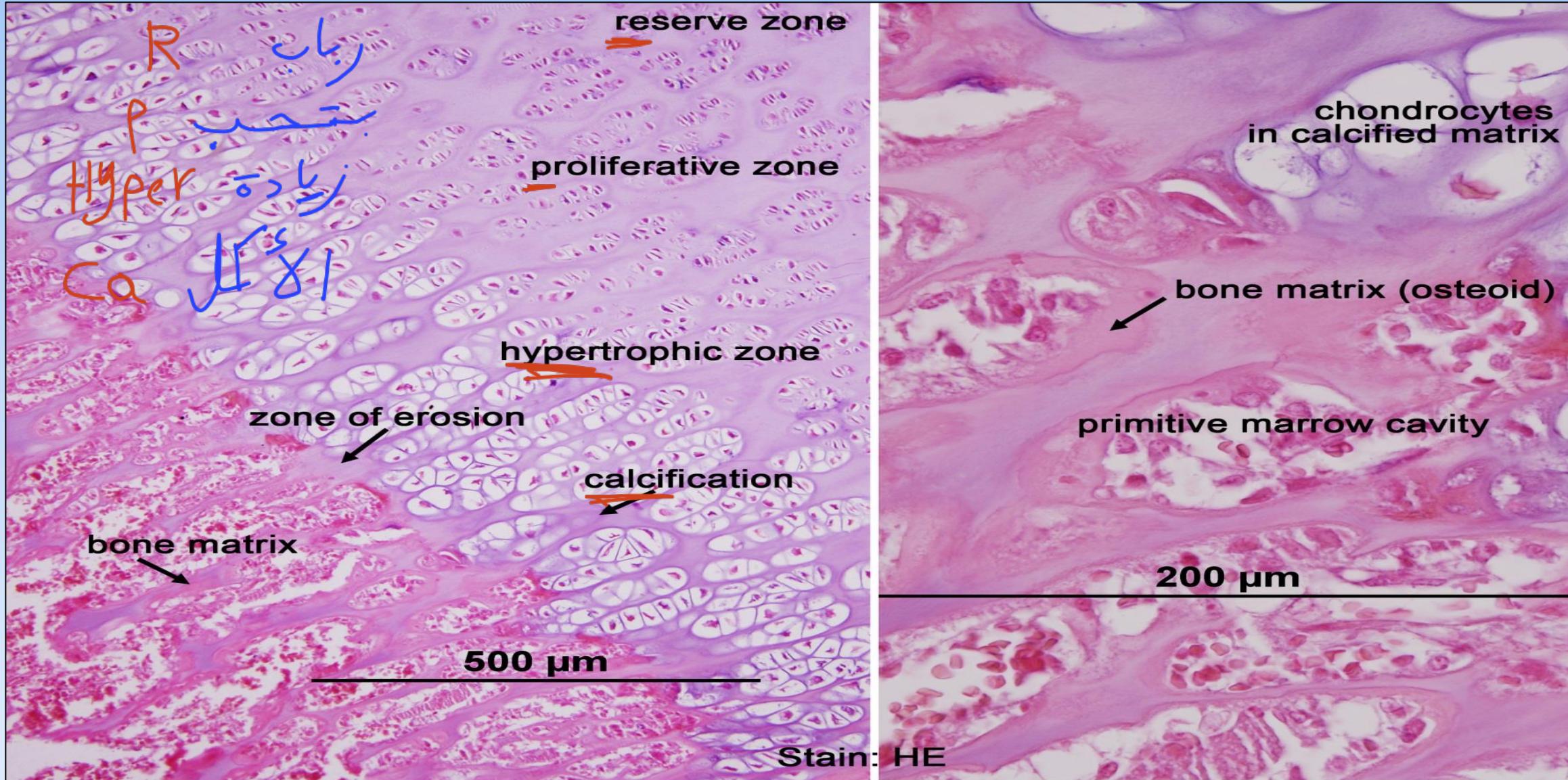
# Spongy bone



# Epiphyseal plate



# Epiphyseal plate



# Identify the following labels?

**A:** Interstitial lamellae

**B:** inner circumferential lamellae

**C:** bone marrow

**Circle:** osteons



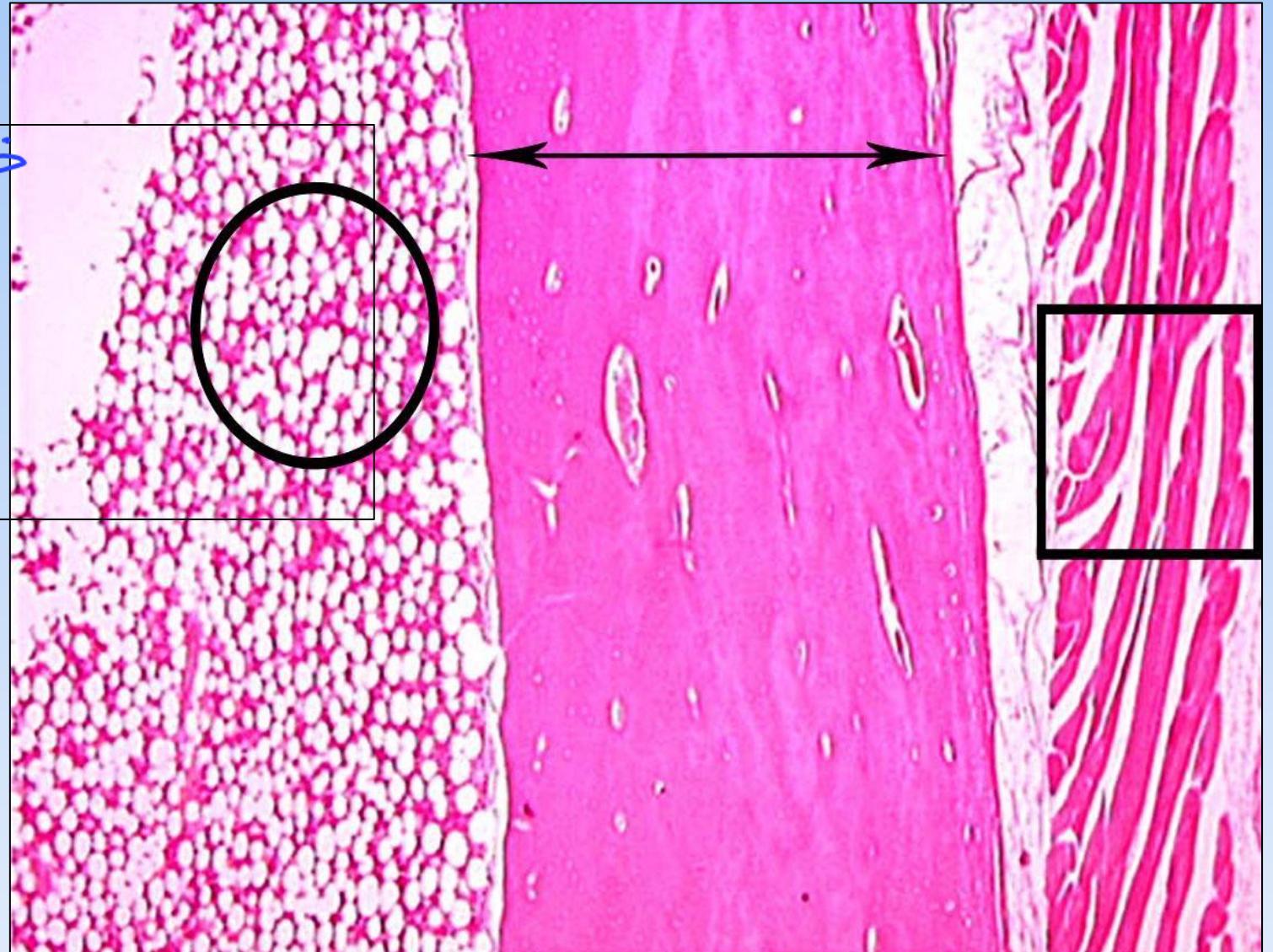
# Identify the following labels?

**Square:** skeletal muscle 

**Double head arrow:**

compact bone

**Circle:** bone marrow

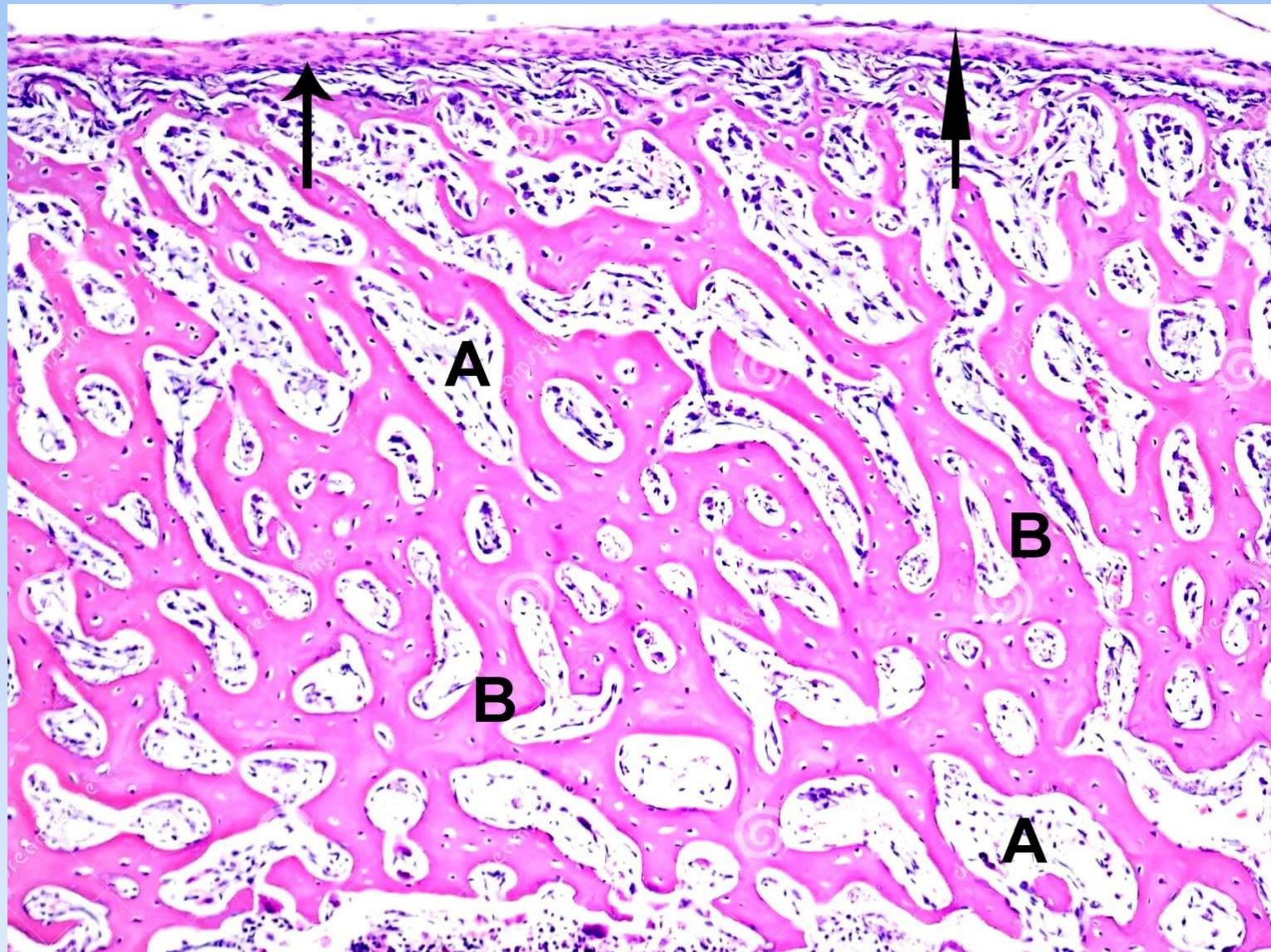


# Can you recognize this section?

**A:**bone marrow

**B:**bone trabeculae

**Arrow:**periosteum



# Can you recognize this section?

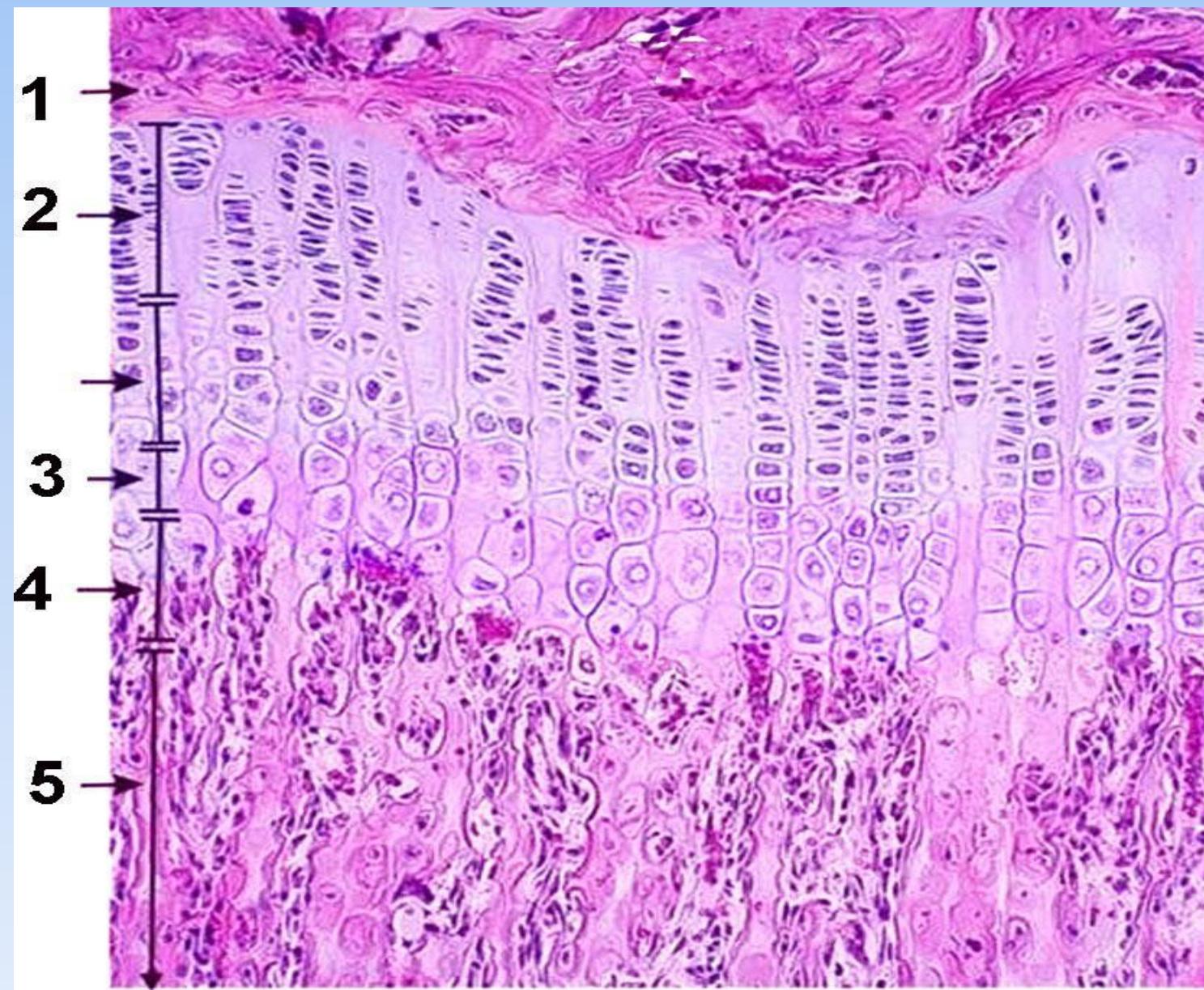
Label 1: resting cartilage

Label 2:zone of proliferation

Label 3:zone of hypertrophy

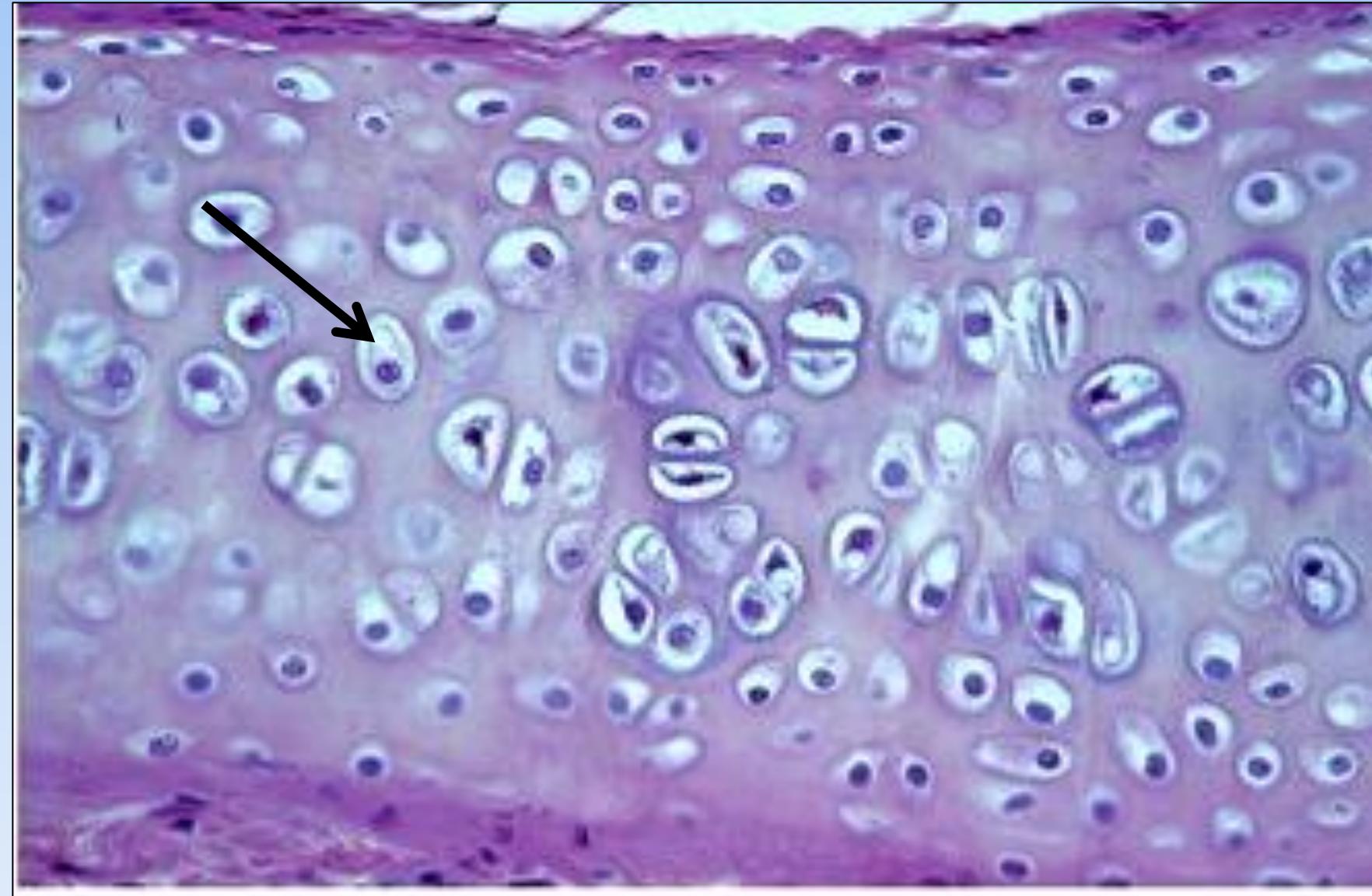
Label 4:zone of calcification

Label 5:...zone of ossification



# How can you recognize the type of this cartilage?

Perichondrium  
Matrix  
Chondrocyte  
Cell nest



# REFERENCES

- **Pawlina, W. (2016):** A text of Atlas with cell and molecular biology. 7<sup>th</sup> ed. Lippincott, Williams and Wilkins.
- **Junqueira, L.C.; Carneiro, J. and Kelly, R.O.(2014):** Basic Histology. 11<sup>th</sup> ed. Appleton and Lange. New York.
- **Gartener, L.P. and Haiat, J.L. (2011):** C.V.S. In: Colour Text Book of Histology, 4<sup>th</sup> ed. Saunders Elsevier.



**ANY  
QUESTIONS**

**THANK  
YOU**

