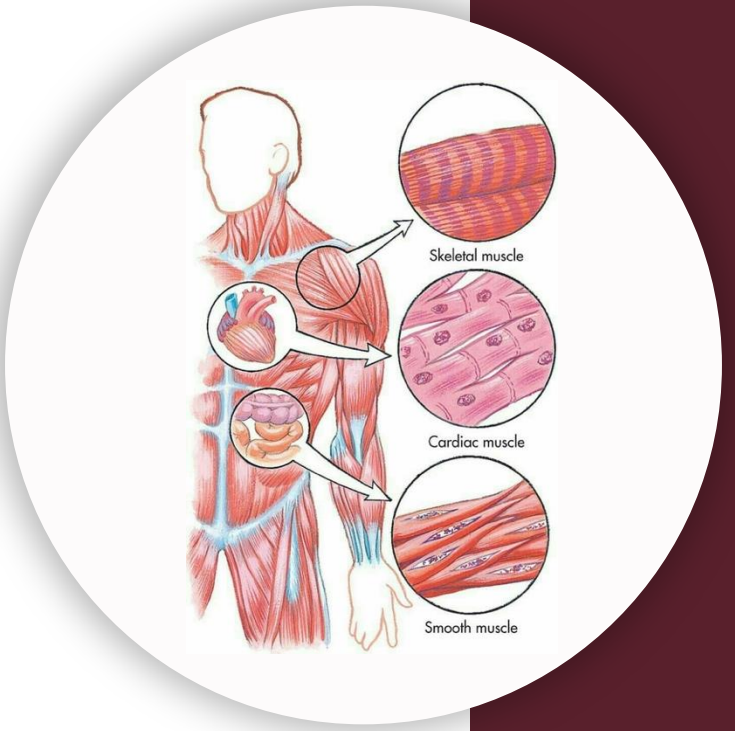
بسم الله الرحمن الرحيم

Histology – Practical

Cartilage & Bone Lab

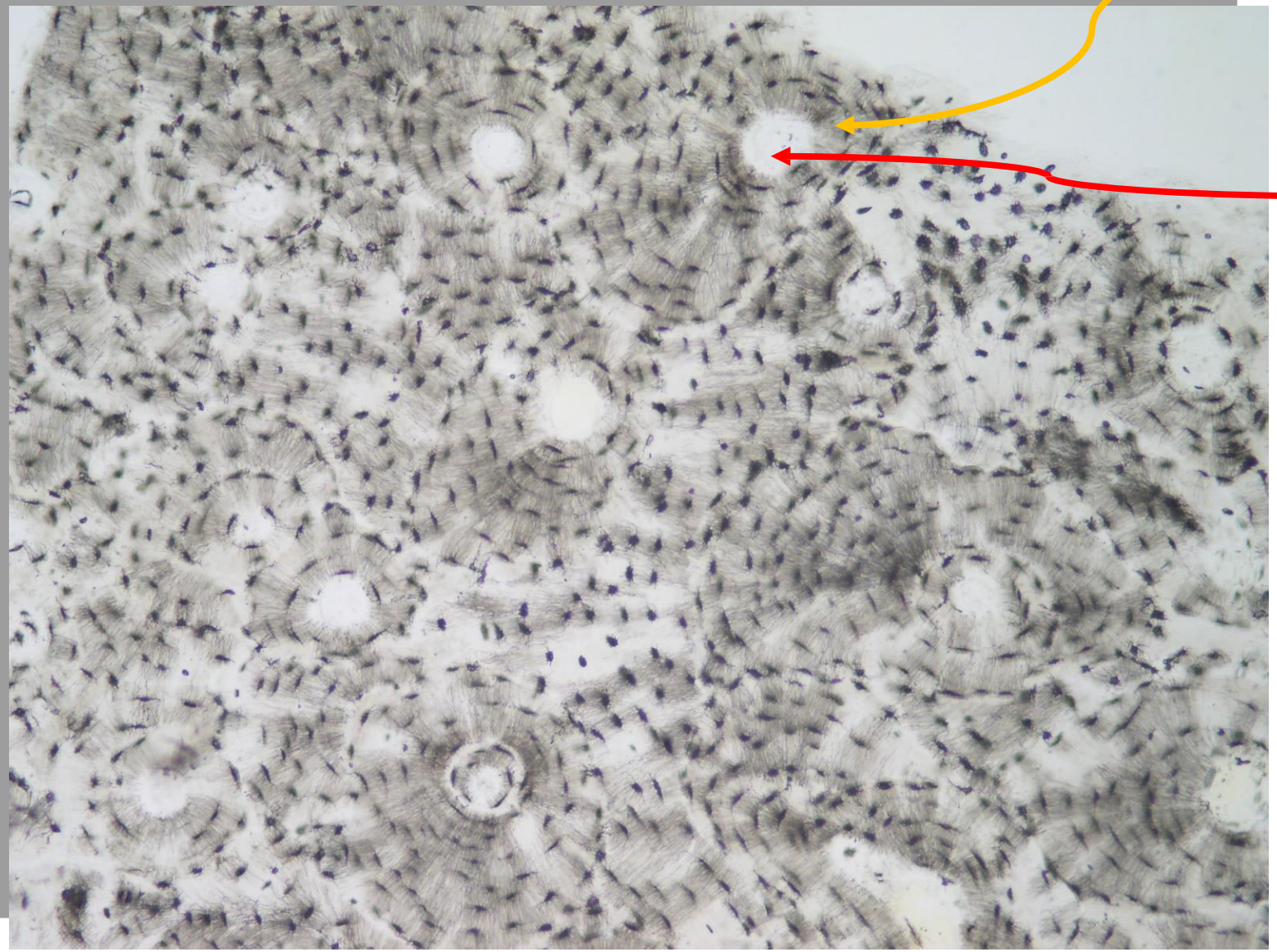


Done by : Dopamine 023

Compact Bone ground

Ground section of bone :
Sand and Trim the section as thin as possible and nothing else
+
Hard tissue that cannot be stained as it's fully impregnated by the inorganic material

An area with more concentric lamellae will be older than an area with less concentric lamellae

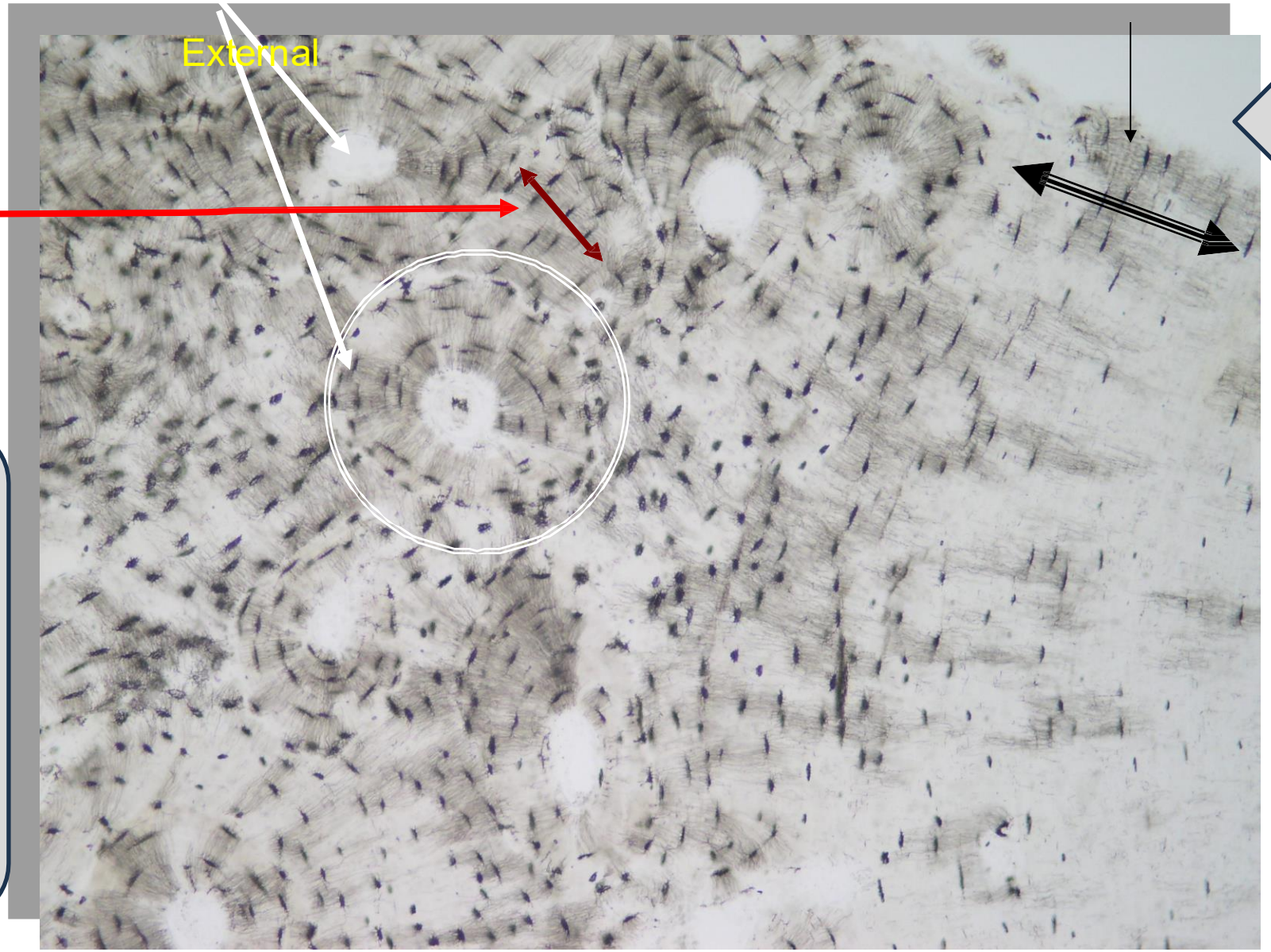


Osteons→onion rings

Central Canals→ inside there are the neurovascular bundles and sometimes osteogenic cells that give rise to osteoblasts

You can visualize the canaliculi

Osteons outercircumferrentil lamellae



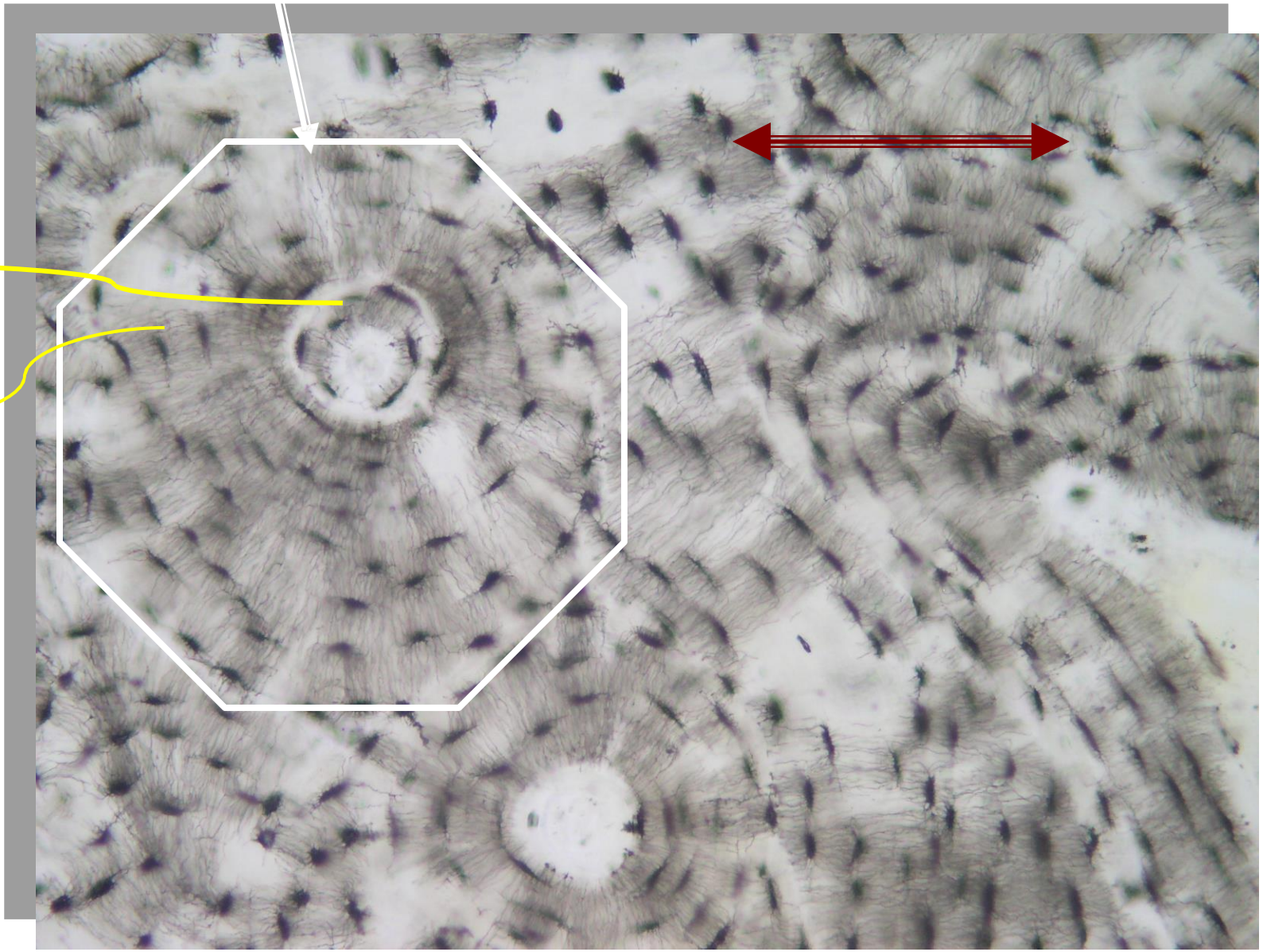
canaliculi are tiny canals in the matrix in which the osteocytes send out their processes to communicate with each other via gap junctions

Osteon

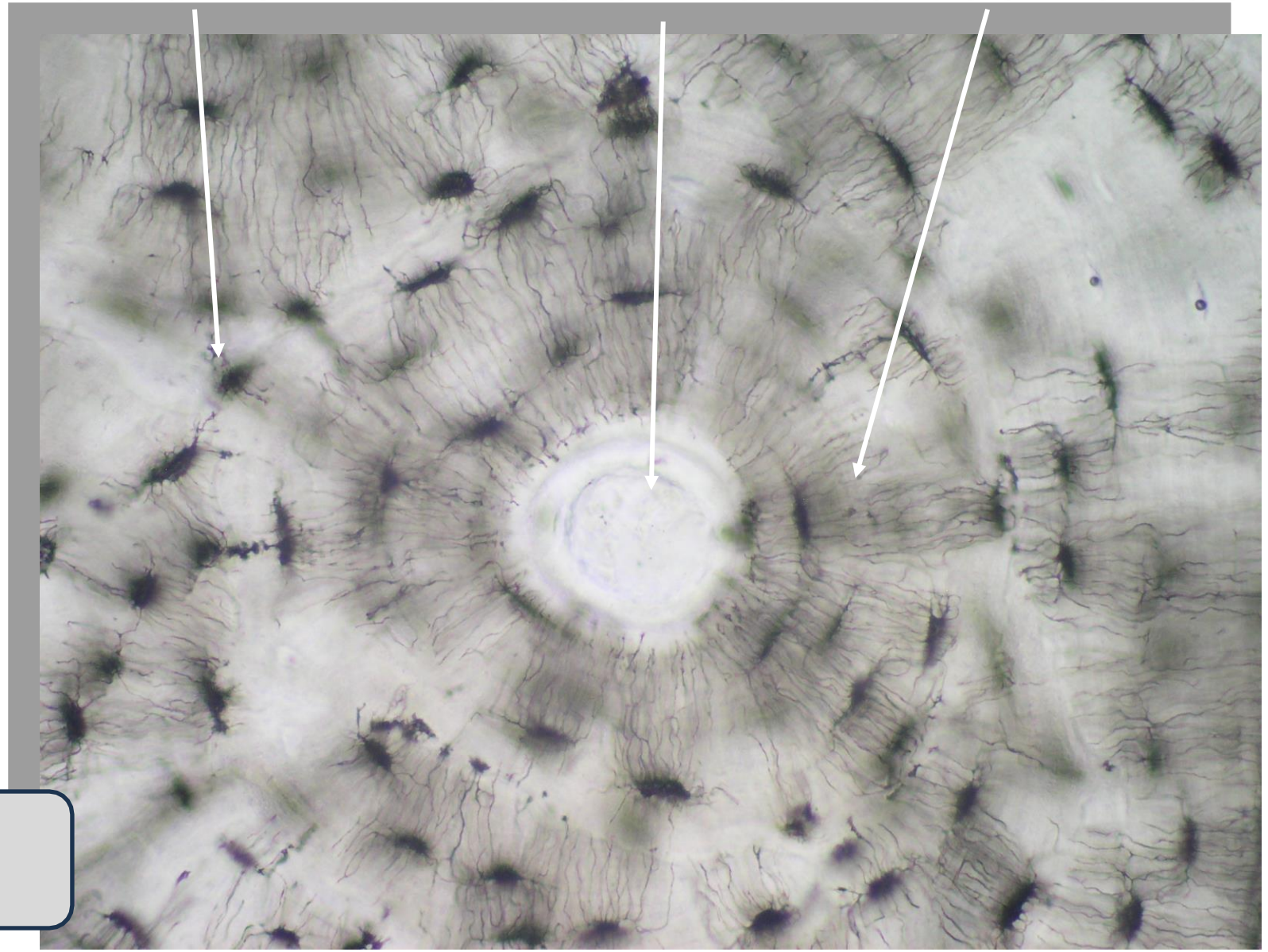
interstitial lamellae

Concentric lamellae

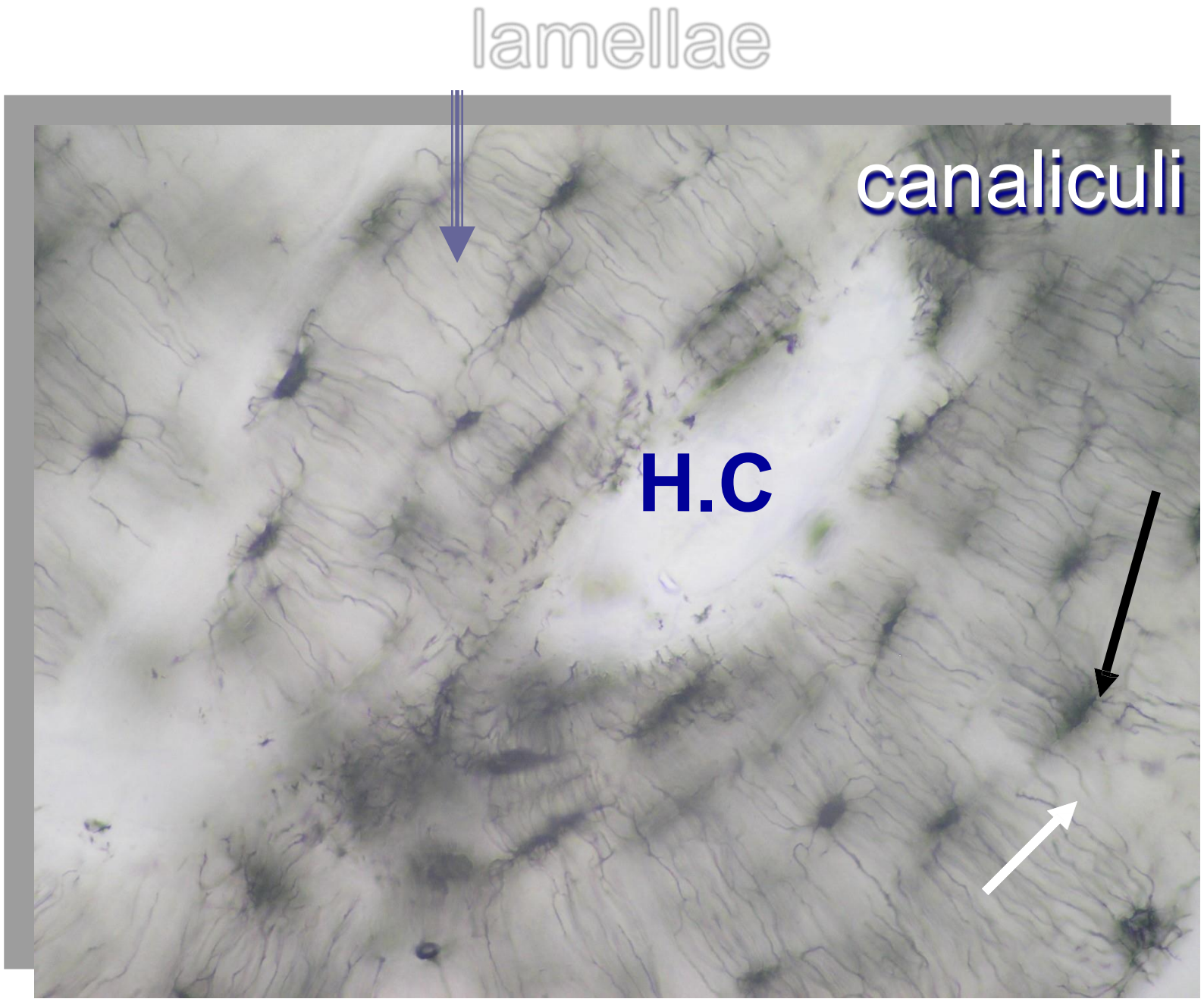
All the tiny hairy structures are the **canaliculi Where processes connect via gap junctions**



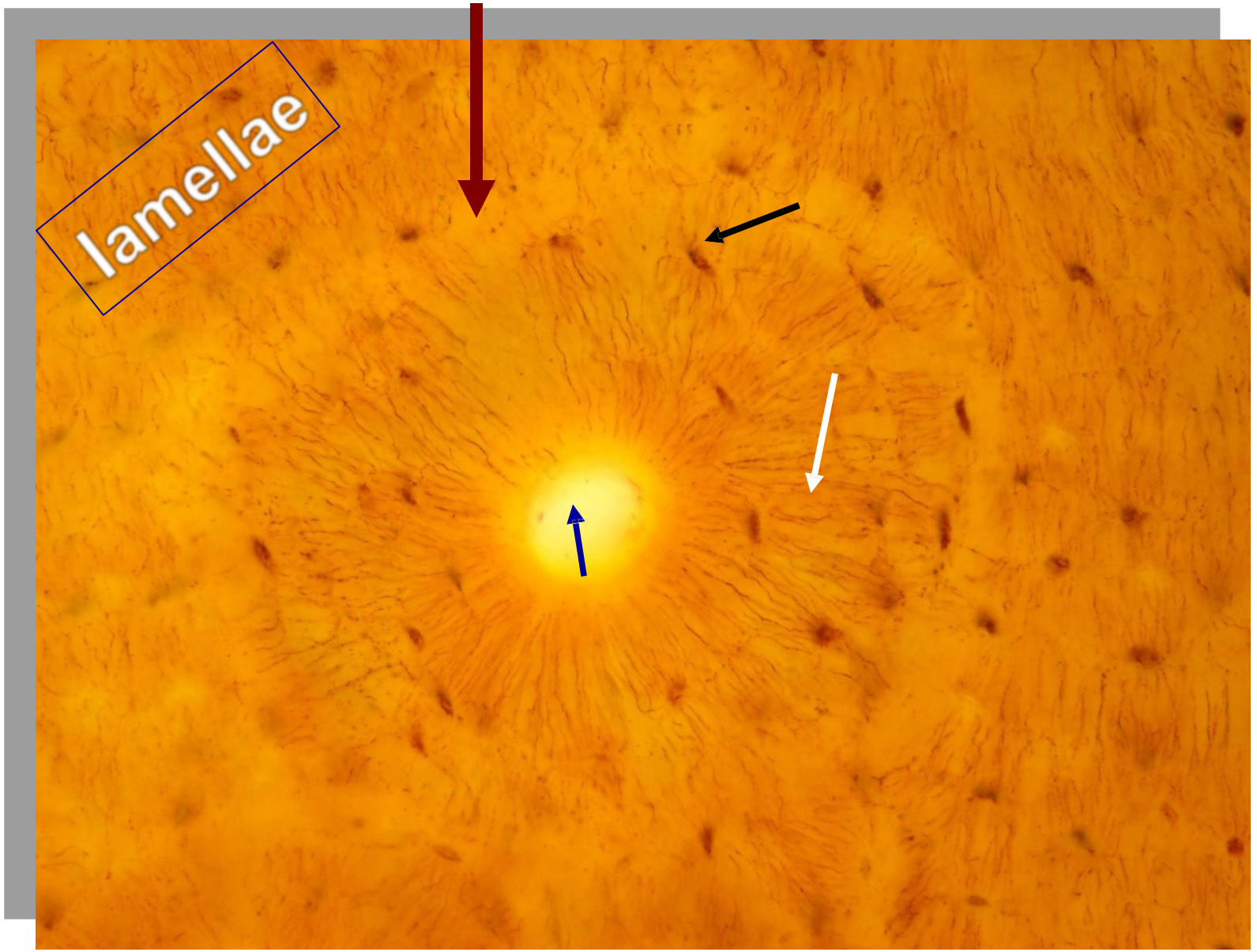
Lacuna Haversian canal canaliculi



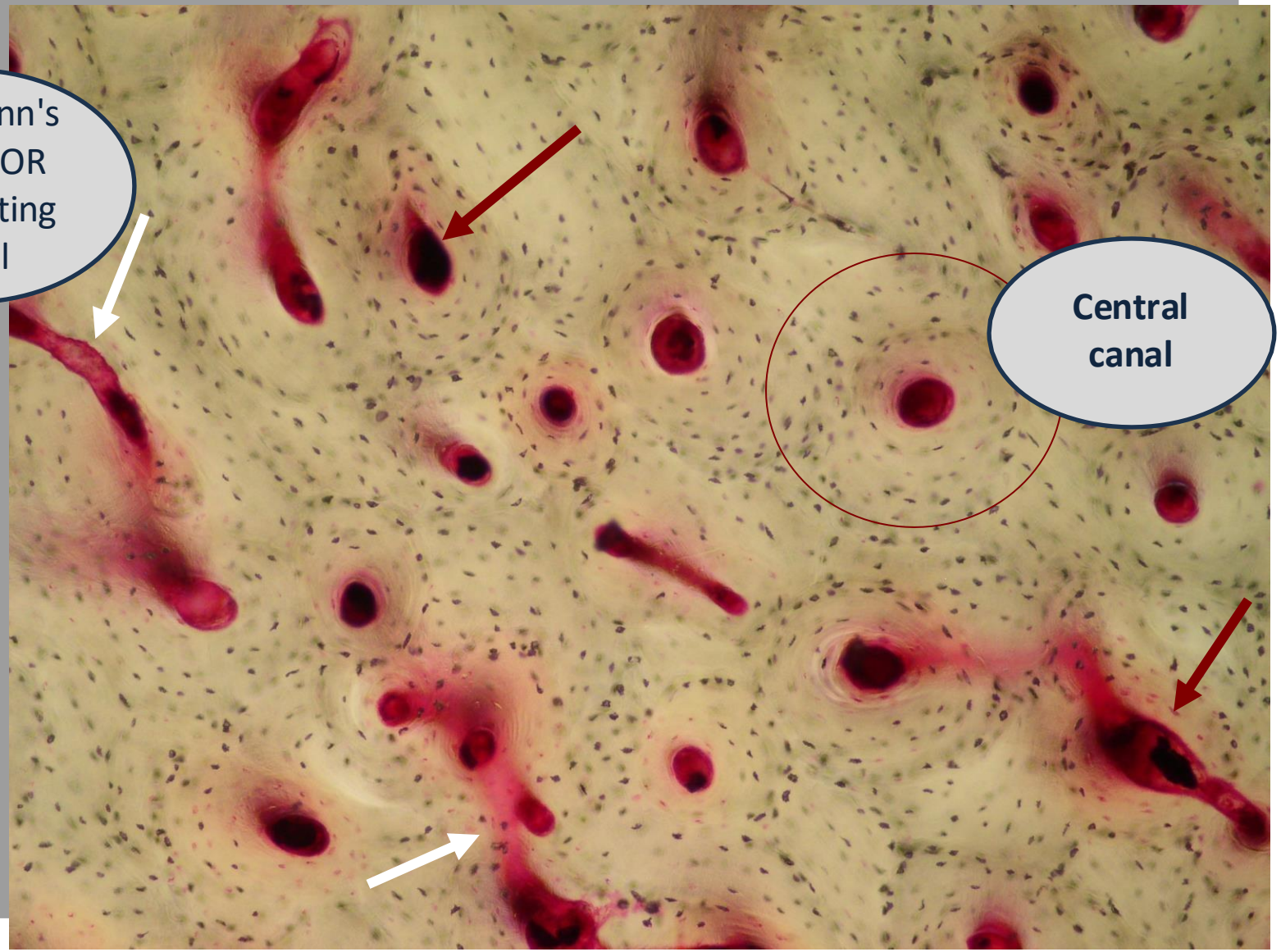
Haversian canal=Central


lamellae
canaliculi
H.C

Osteon

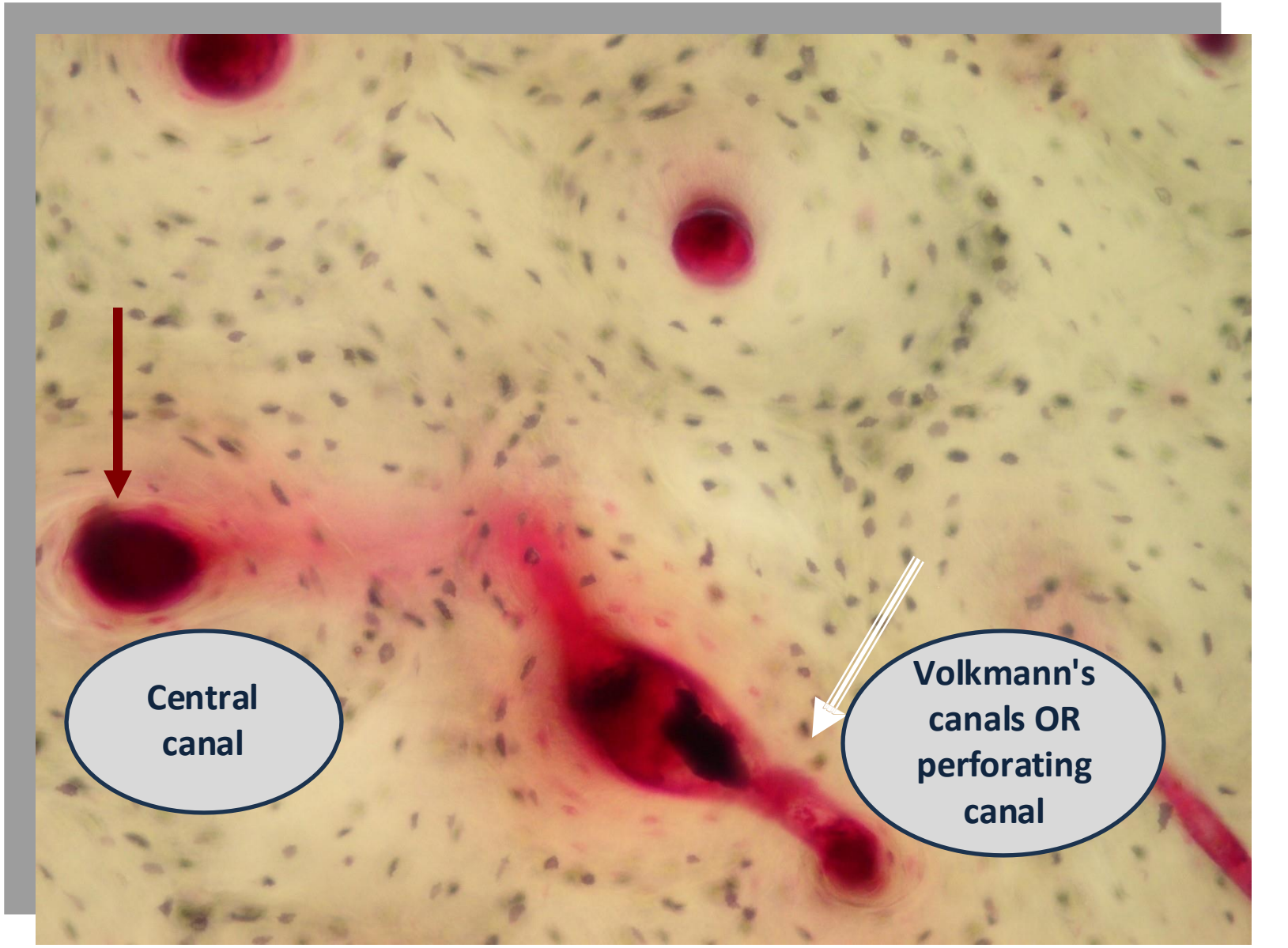


Compact bone(injected ink)



Ink was injected→ to visualize the canal network

Haversian&Volkman's canal



Decalcified compact bone

Decalcified removing the inorganic material so the organic components can be stained

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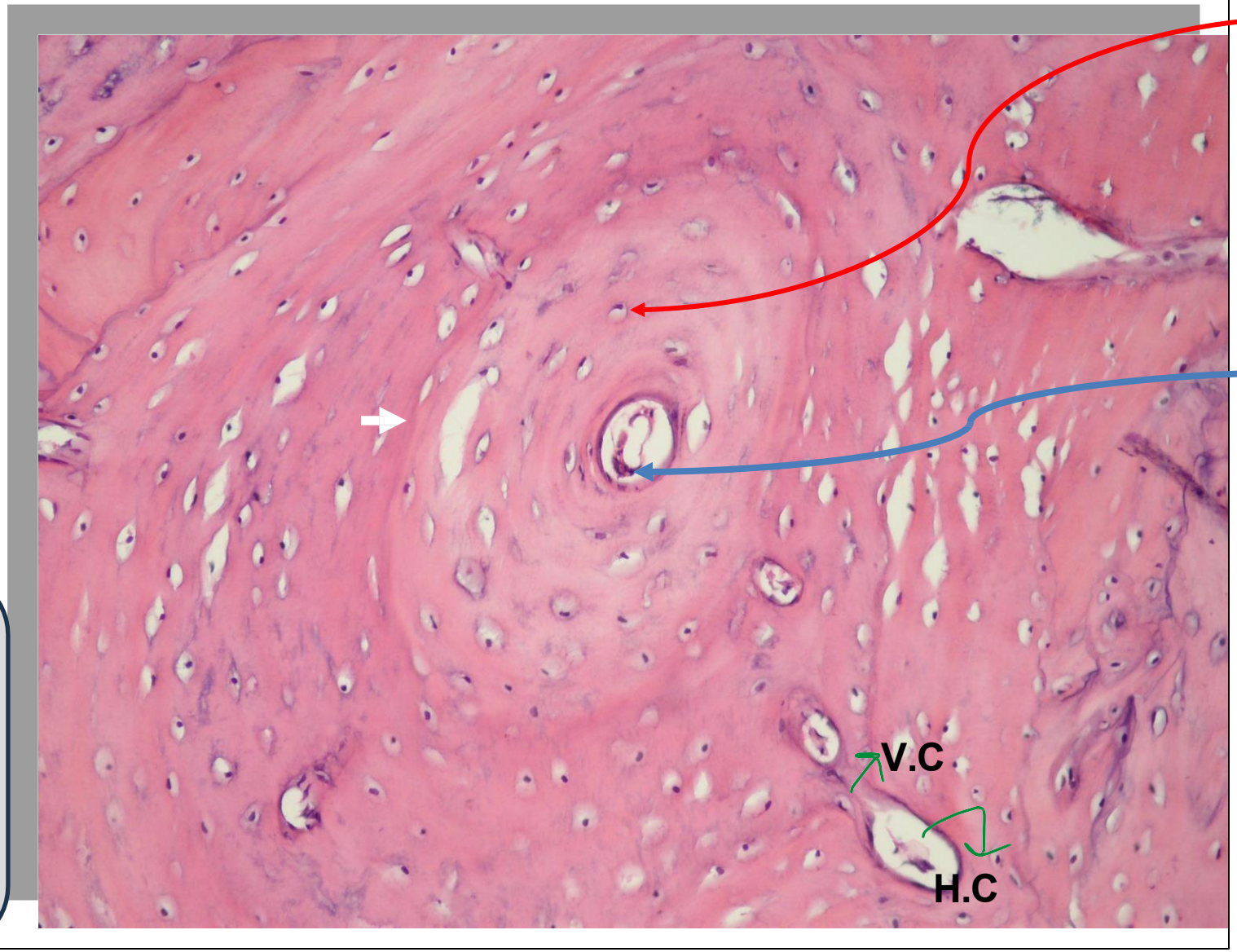
This image was taken by a bright field LM and the stains used are H&E



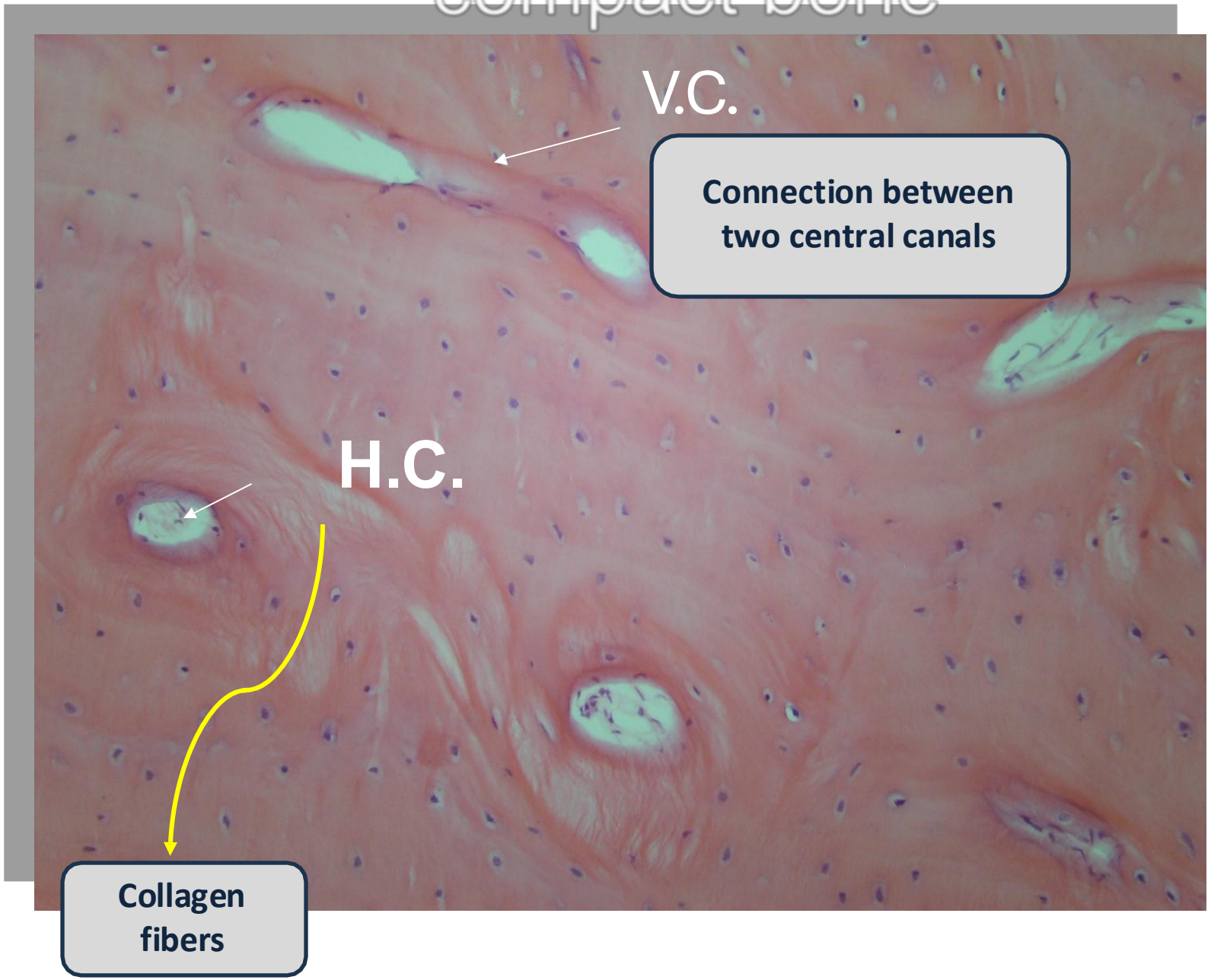
lacuna with Osteocytes inside → more rounded in decalcified due to fewer minerals
MORE RELAXED

centralmost canals

Most eosinophilic → from collagen→ more pinkish
More basophilic→ from GAGs(less than cartilage)

An osteon can be identified more clearly in the bone-ground section

Which one of the following cannot be identified in the picture:
-osteocytes
-H.C
-circumferential lamellae
-canaliculi

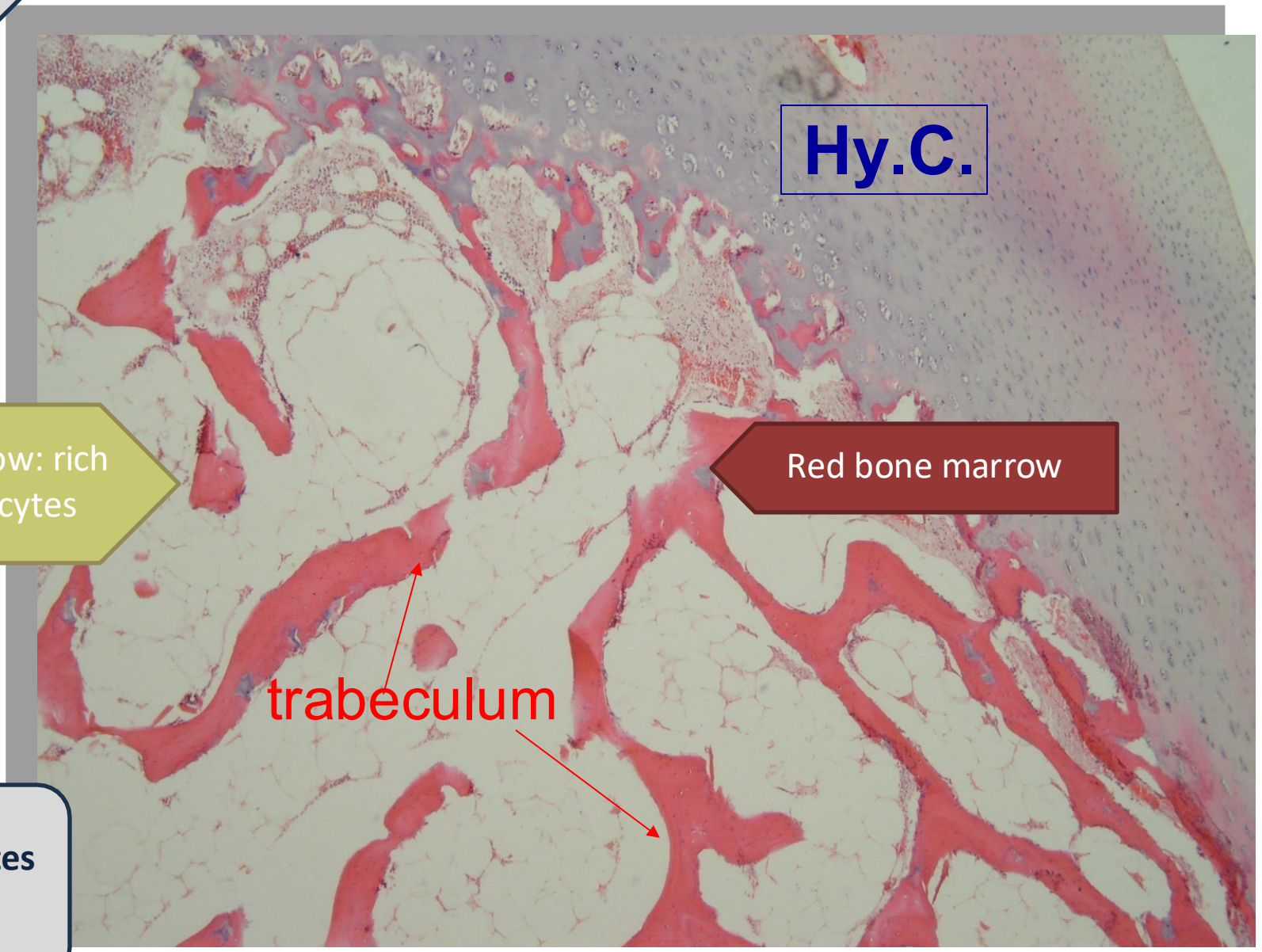


Spongy bone=cancellous bone

Spongy Bone(articular surface)

2 types of tissues

Hyaline cartilage with bone tissue



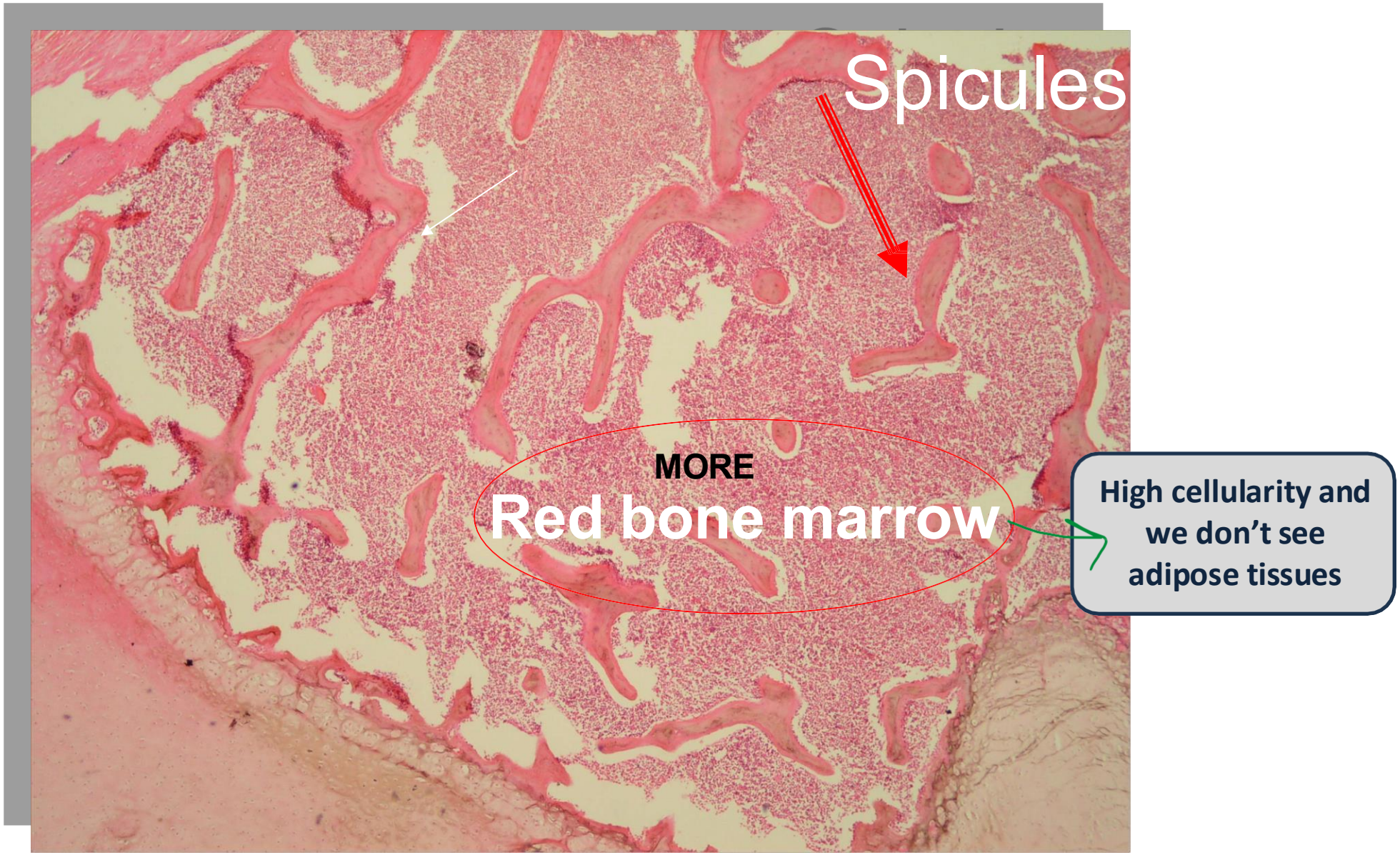
Yellow marrow: rich with adipocytes

Doesn't have osteons→ osteocytes are randomly distributed

Decalcified because we were able to stain it and identify the basophilia and eosinophilia

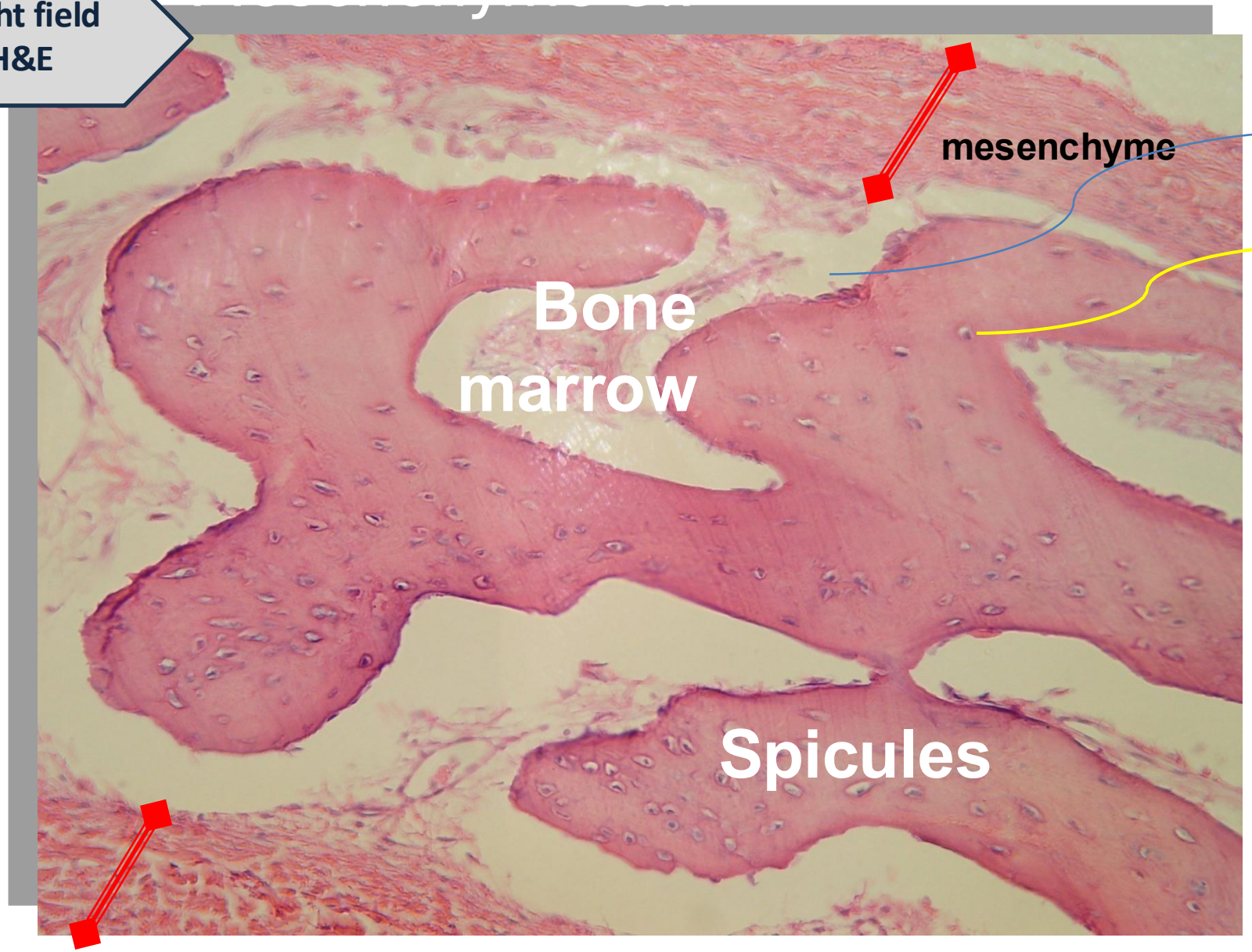
Low magnification

vertebrae



Decalcified → bright field microscopy → H&E

Can recognize osteocytes more prevalent than in adult bones



Synthesize and release the matrix

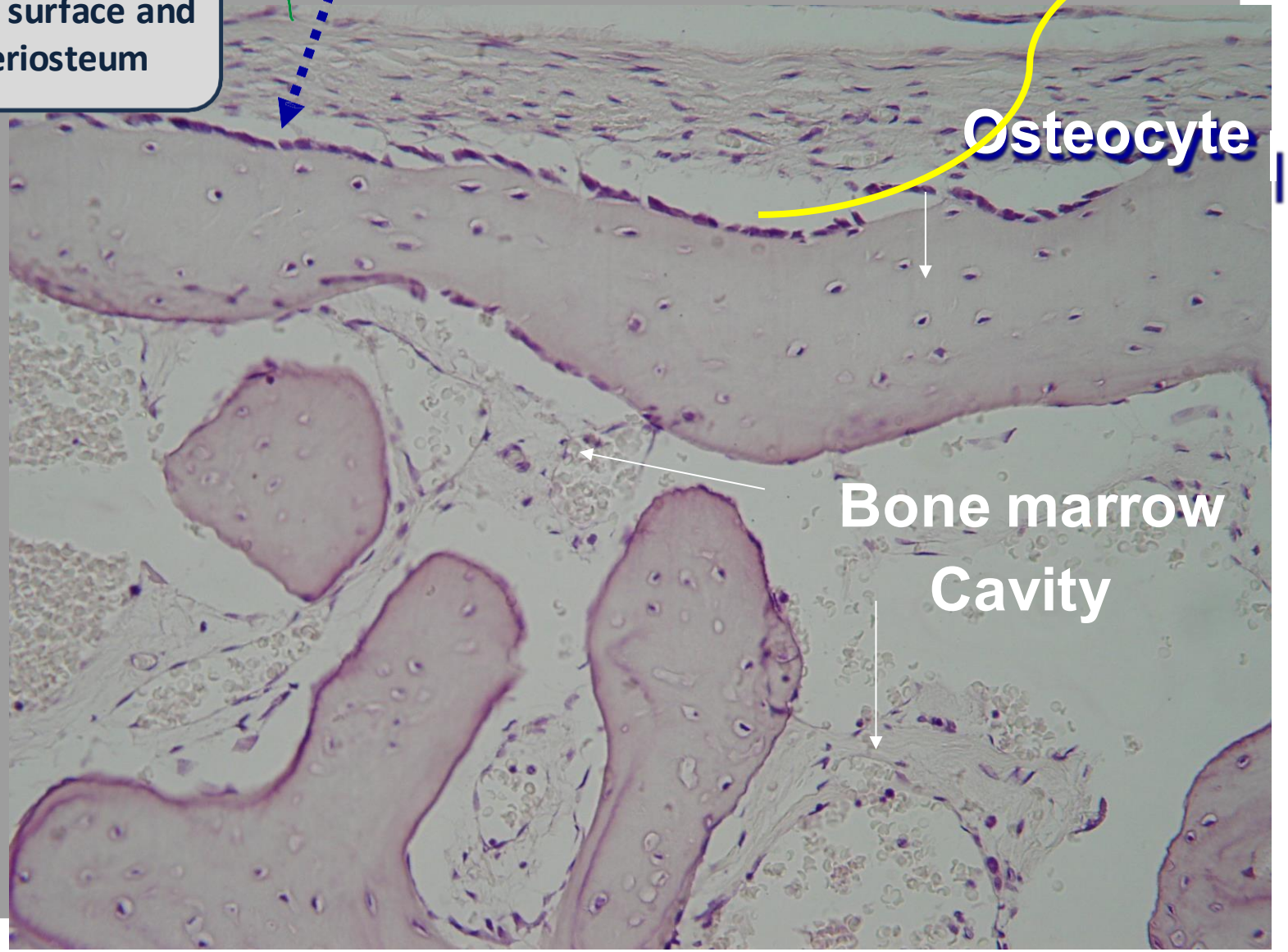
Osteocytes

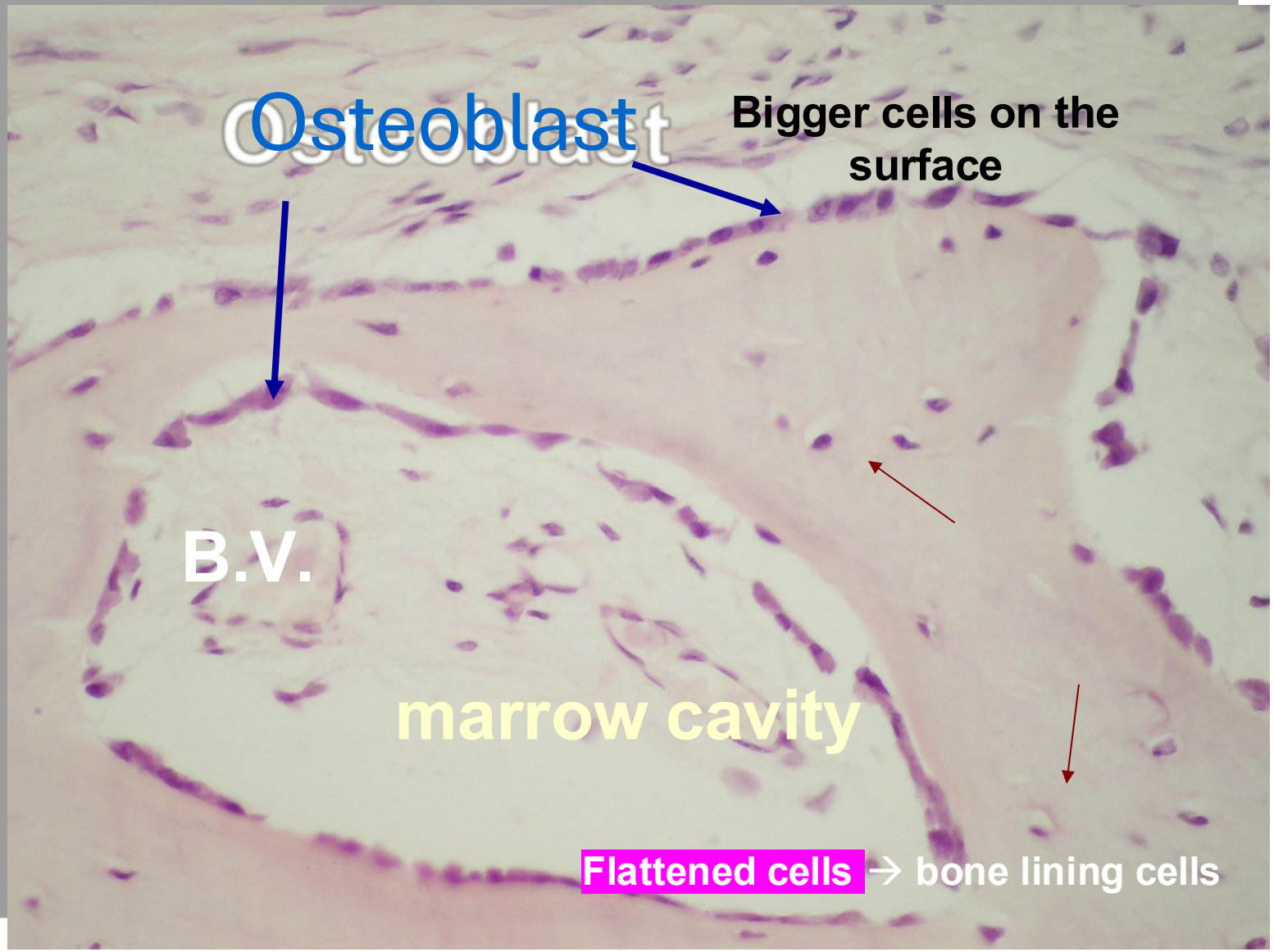
Osteoblast cell

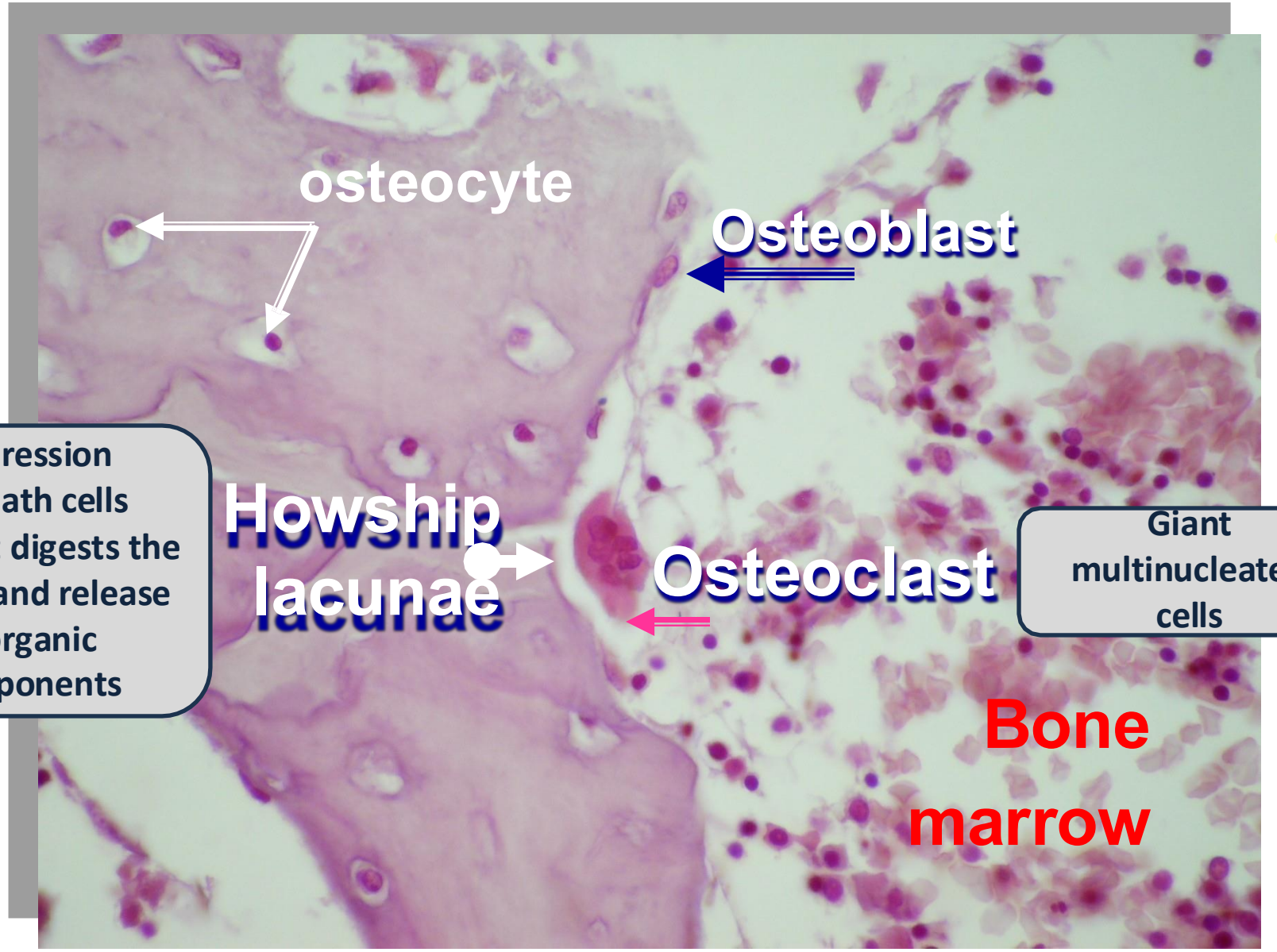
This part of the mesenchyme will remain at the surface and differentiate to periosteum

Differentiated into osteoblast

decalcified




Osteoblast
Bigger cells on the surface
B.V.
marrow cavity
Flattened cells → bone lining cells



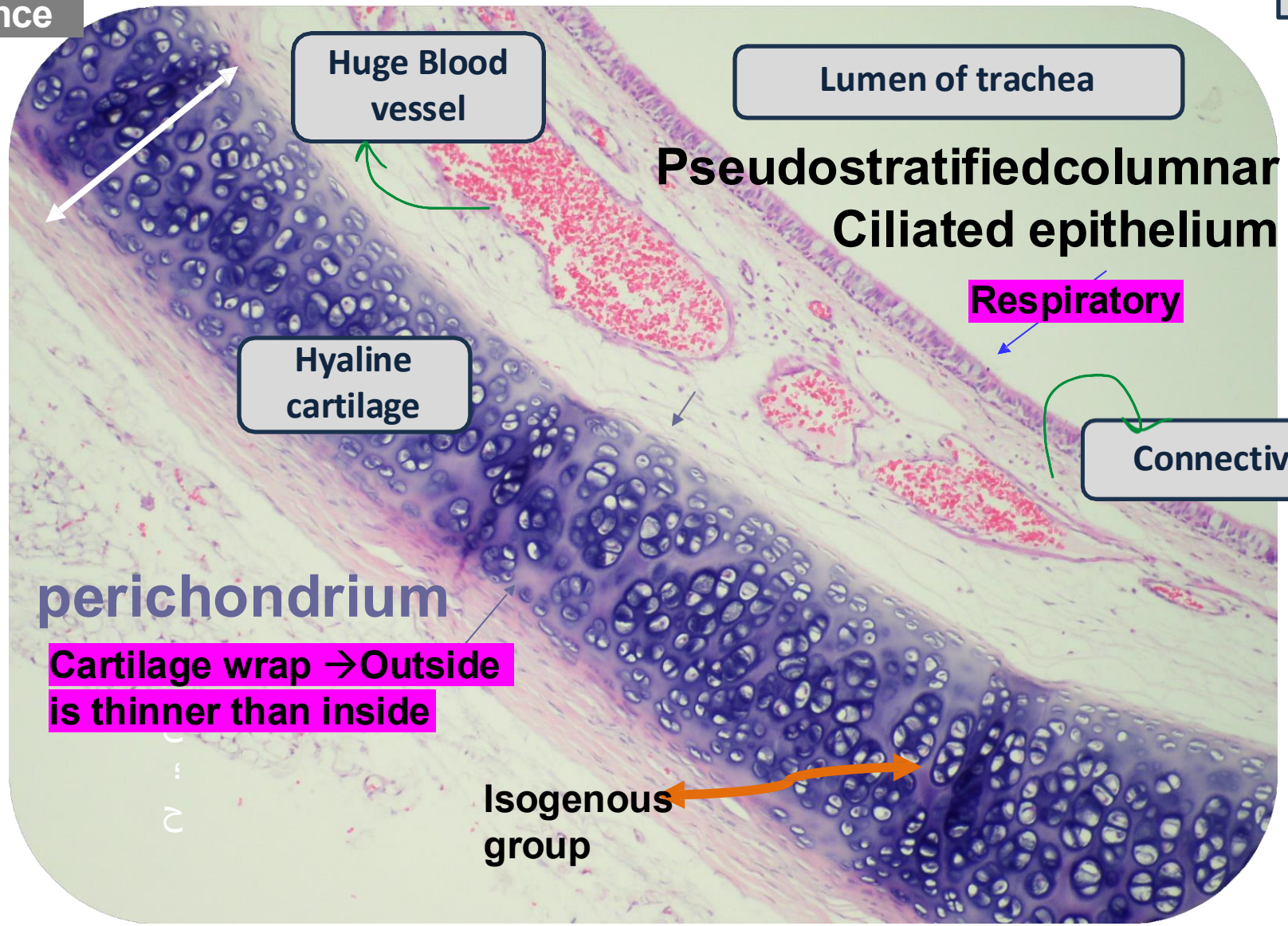
Depression beneath cells where it digests the matrix and release inorganic components

Giant multinucleated cells

Cells surrounded with--Matrix → Fibers + ground substance

Hyaline Cartilage(e.g :Trachea)

Most abundant type

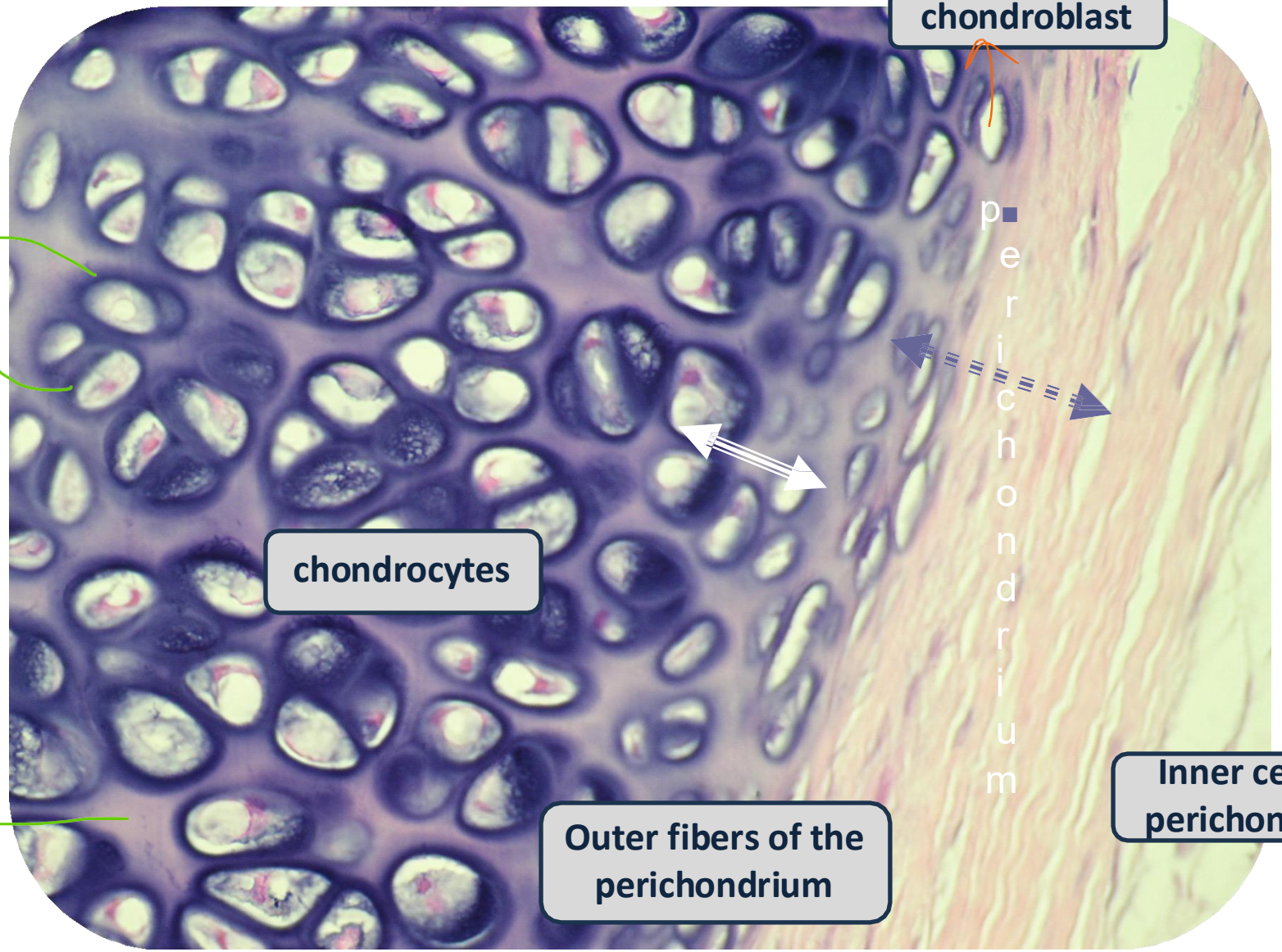


Perichondrium: fibrous + Cellular

territorial matrix : (More basophilic Rich with GAGs) Immediately surrounds the lacuna

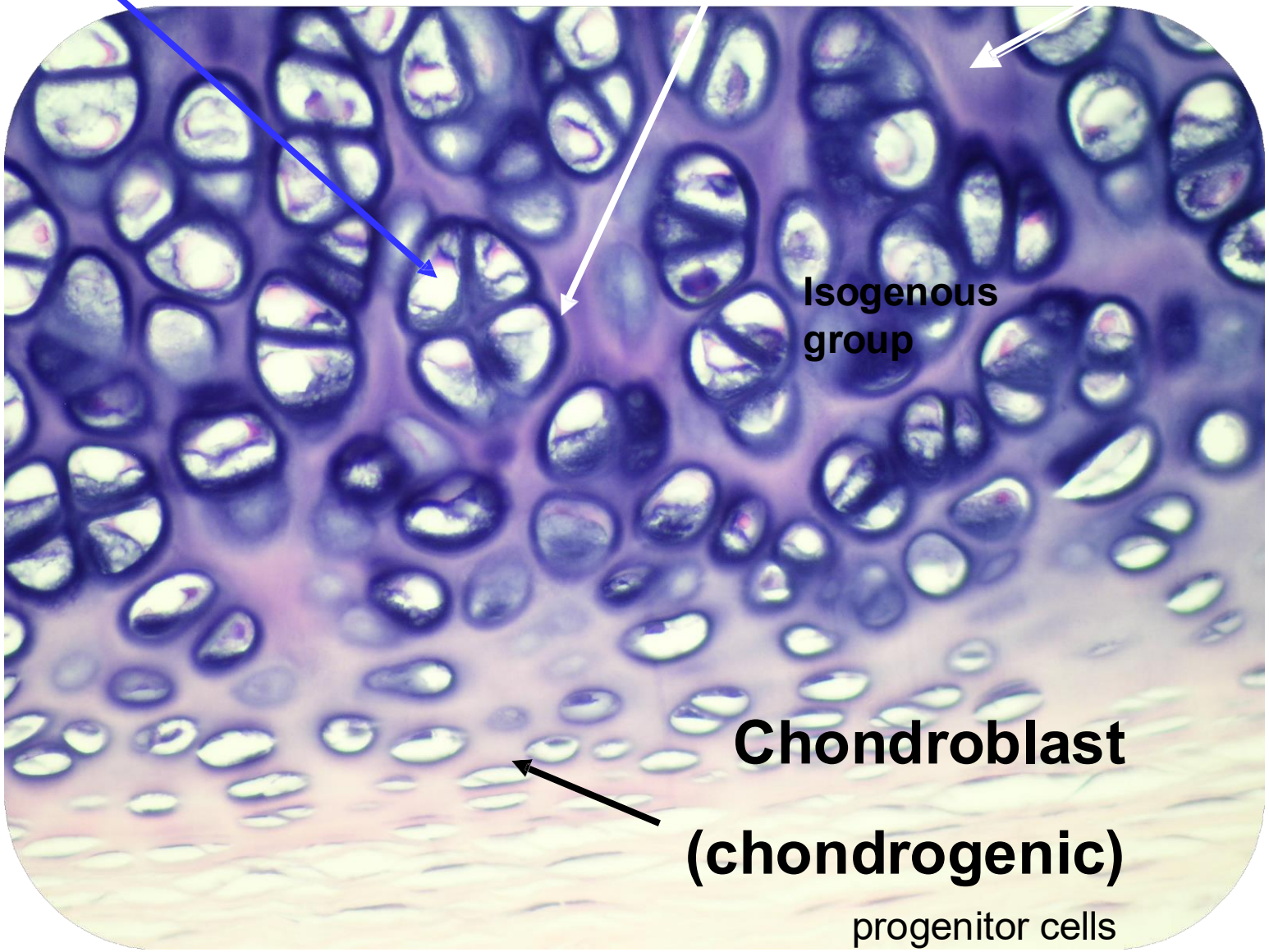
Both are in hyaline cartilage

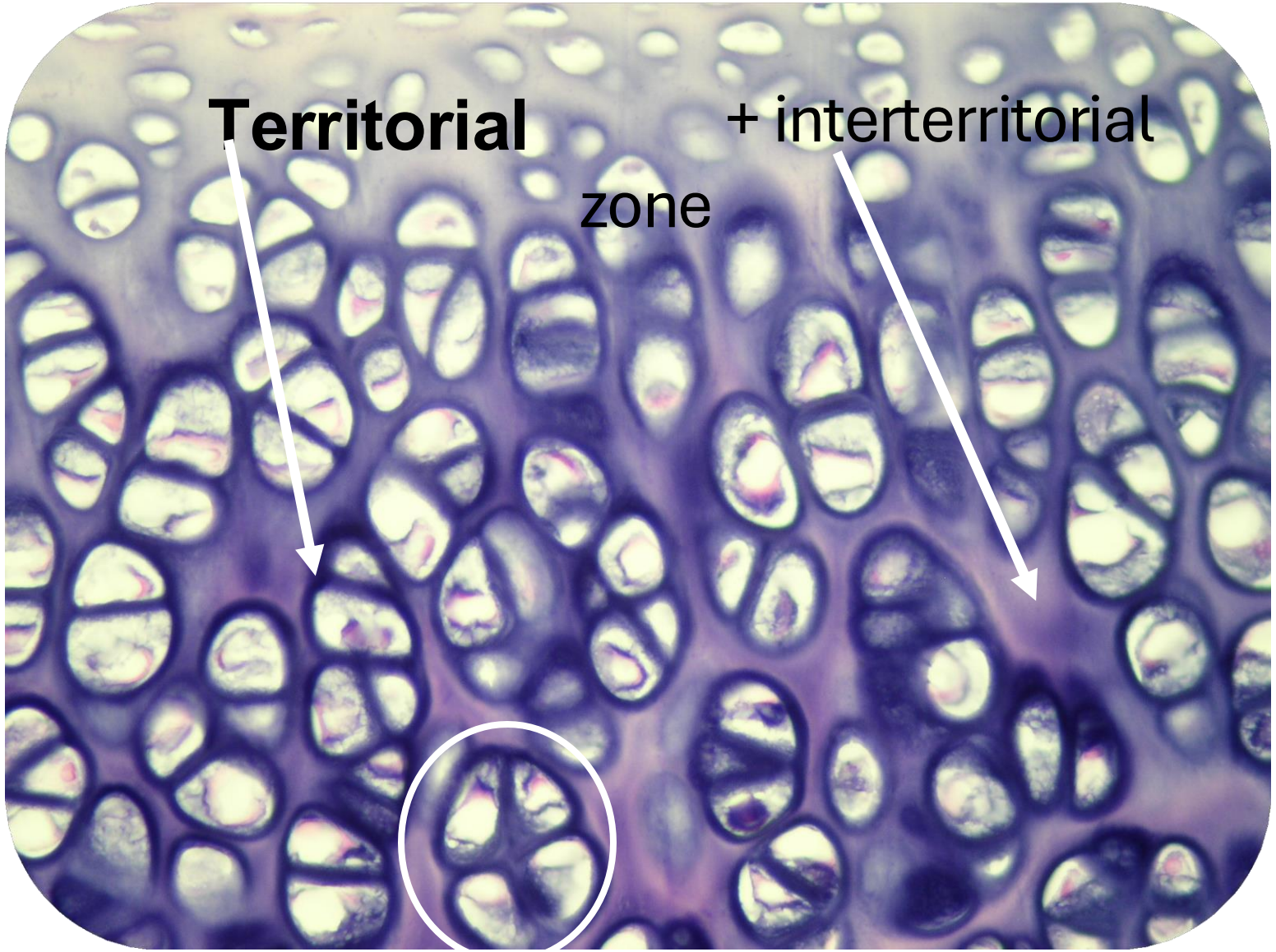
More eosinophilic matrix: rich with collagen and less GAGs → interterritorial matrix



Immunostaining can help identify chondrogenic cells from fibroblast

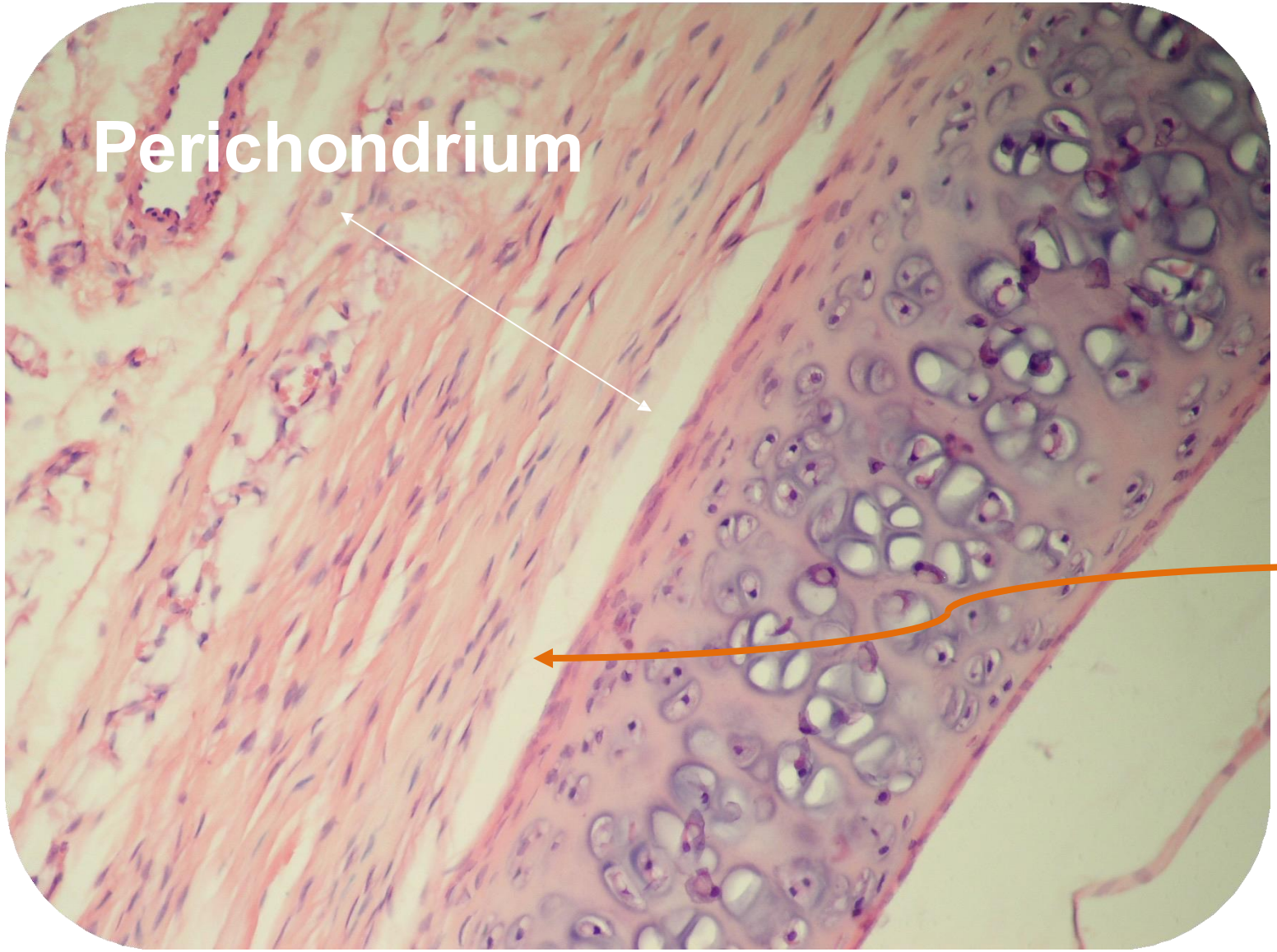
Chondrocyte in lacunae: Territorial+ interterritorial



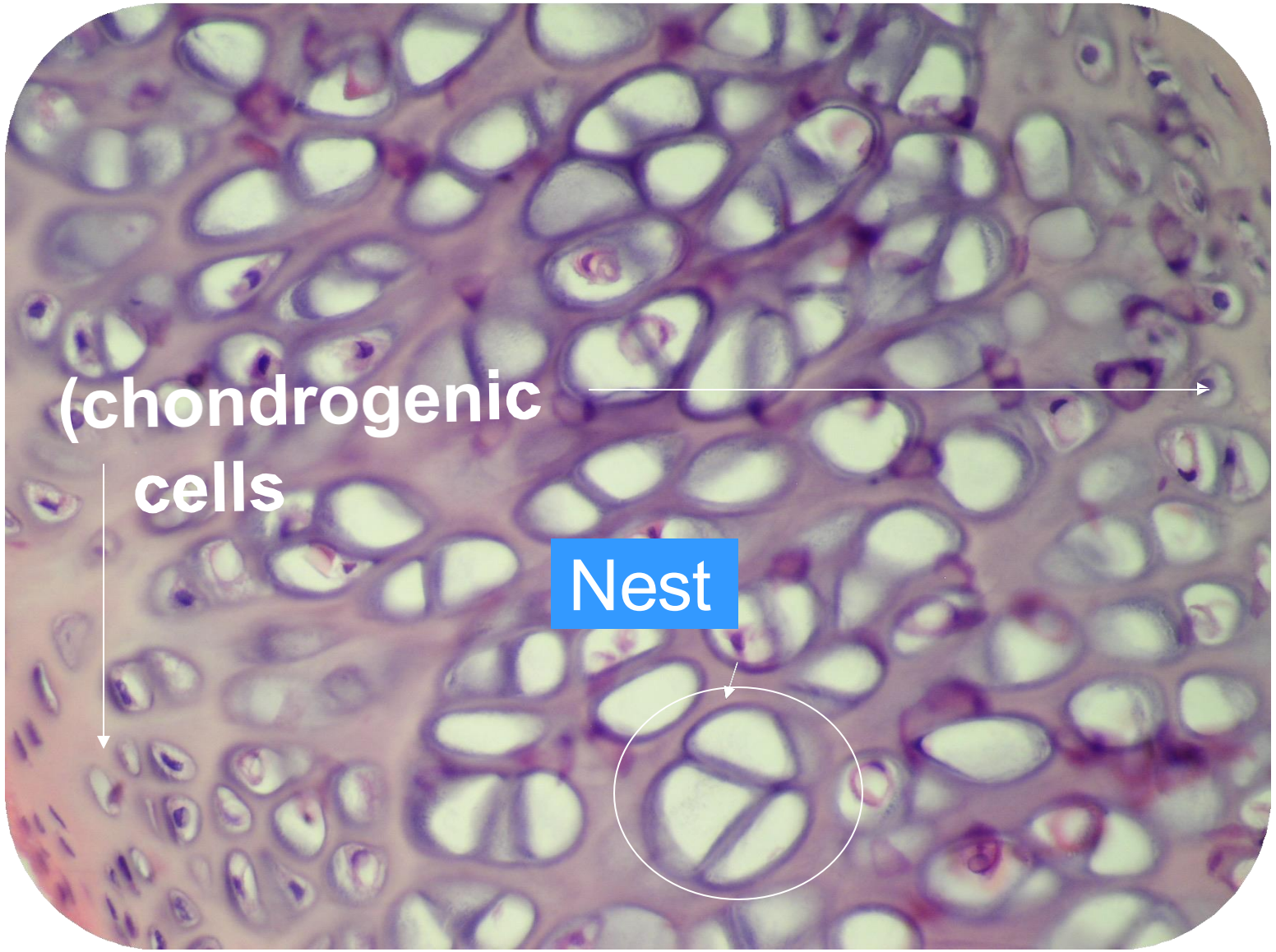

Territorial
zone
+ interterritorial
Nest

Hyaline Cartilage (e.g: Trachea)

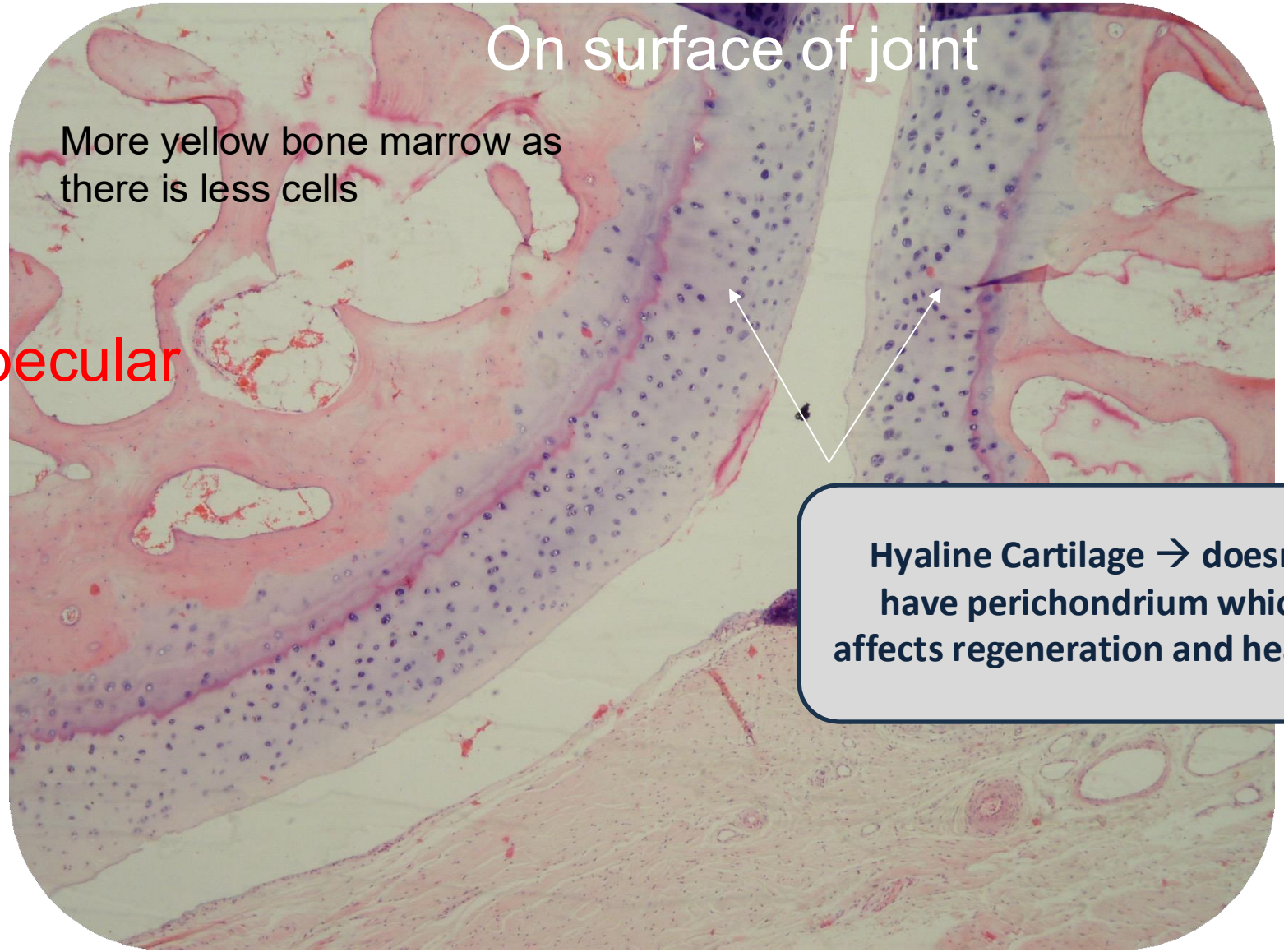
Less basophilia → due to technique of staining and not having "fewer GAGs"



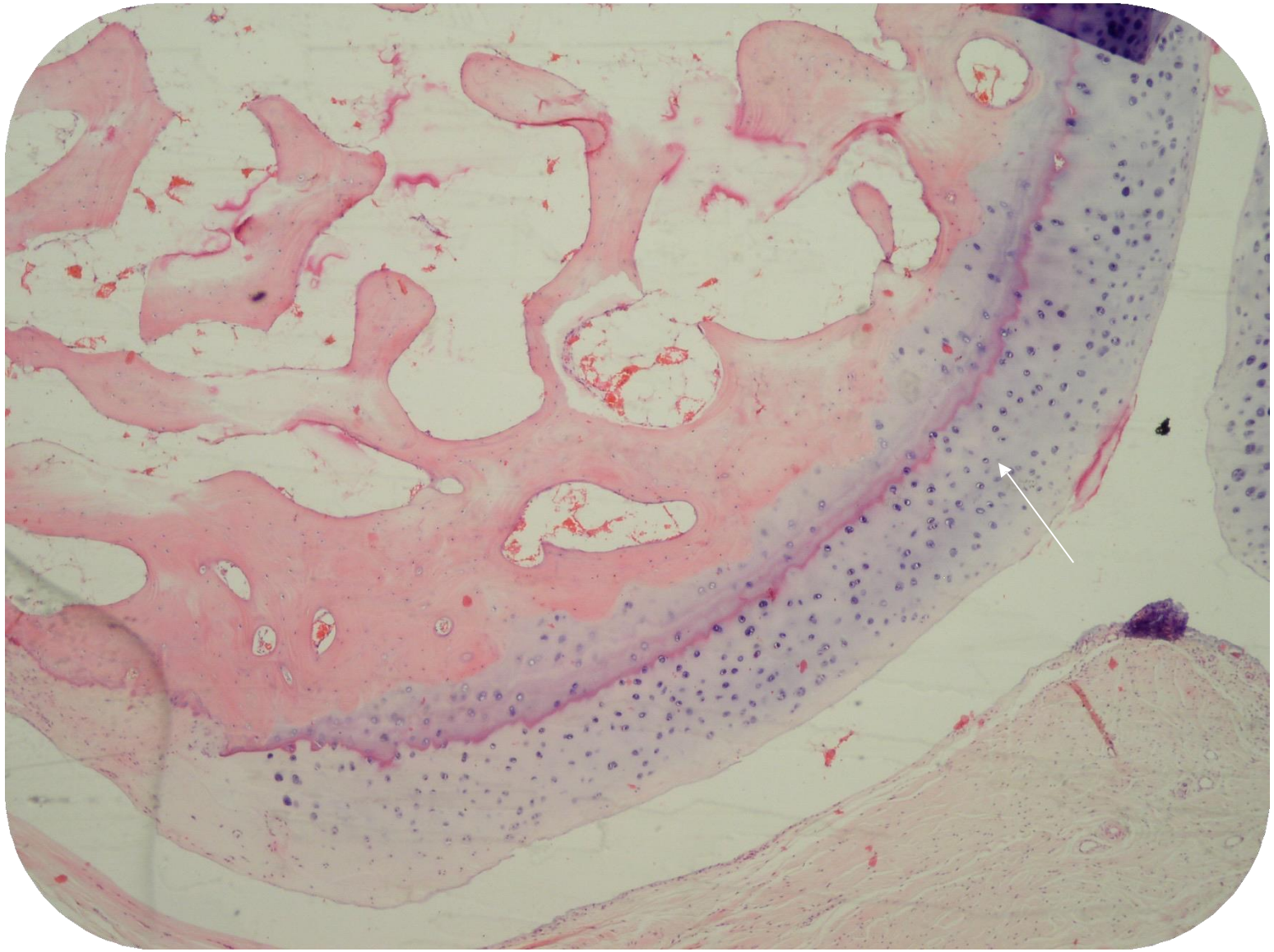
Space→artifact →separation between perichondrium and cartilage and part of the inner cellular layer


(chondrogenic
cells
Nest

Articular cartilage



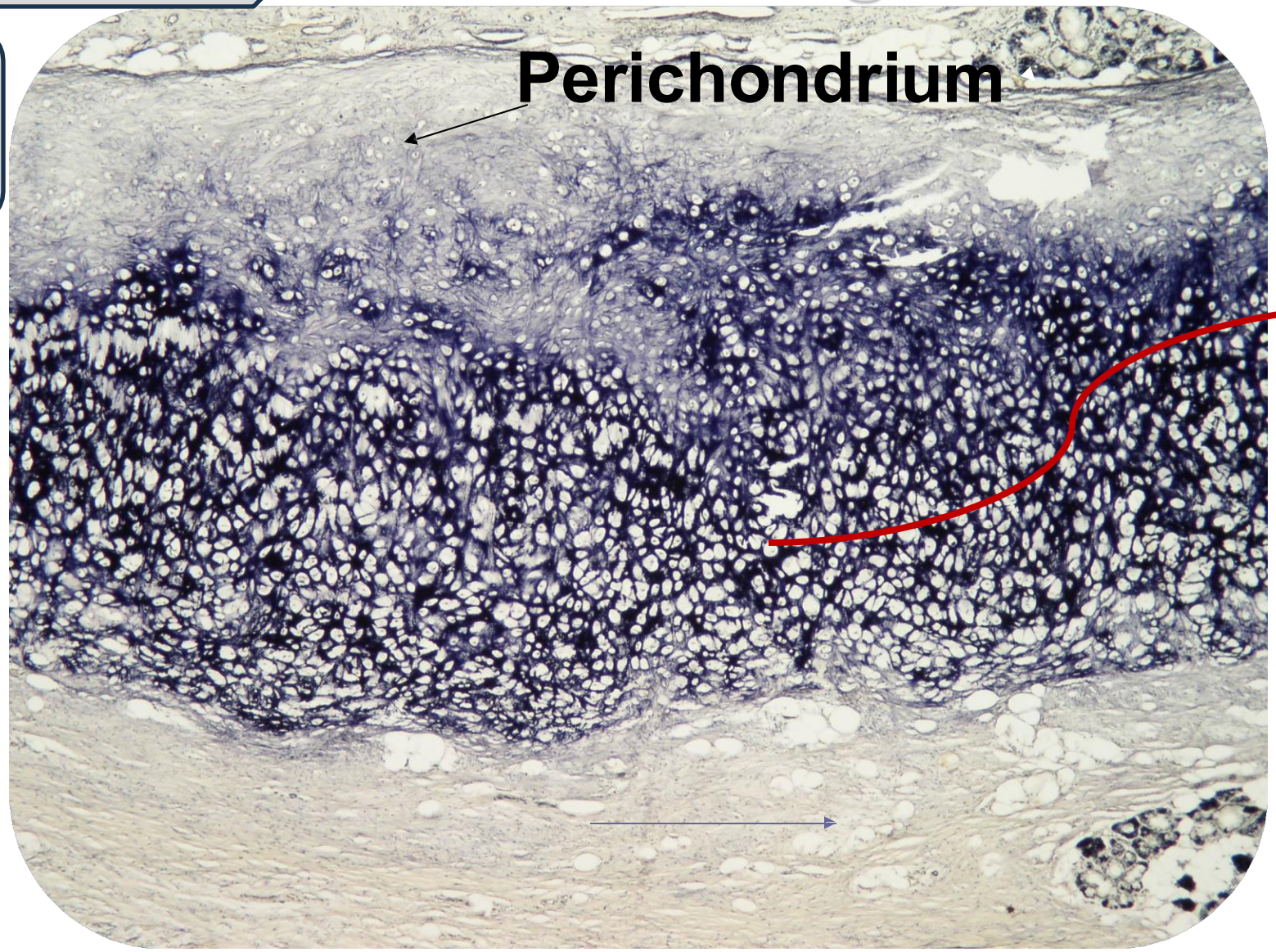
On surfaces of joint



Elastic Cartilage:

Rich with elastic fibers

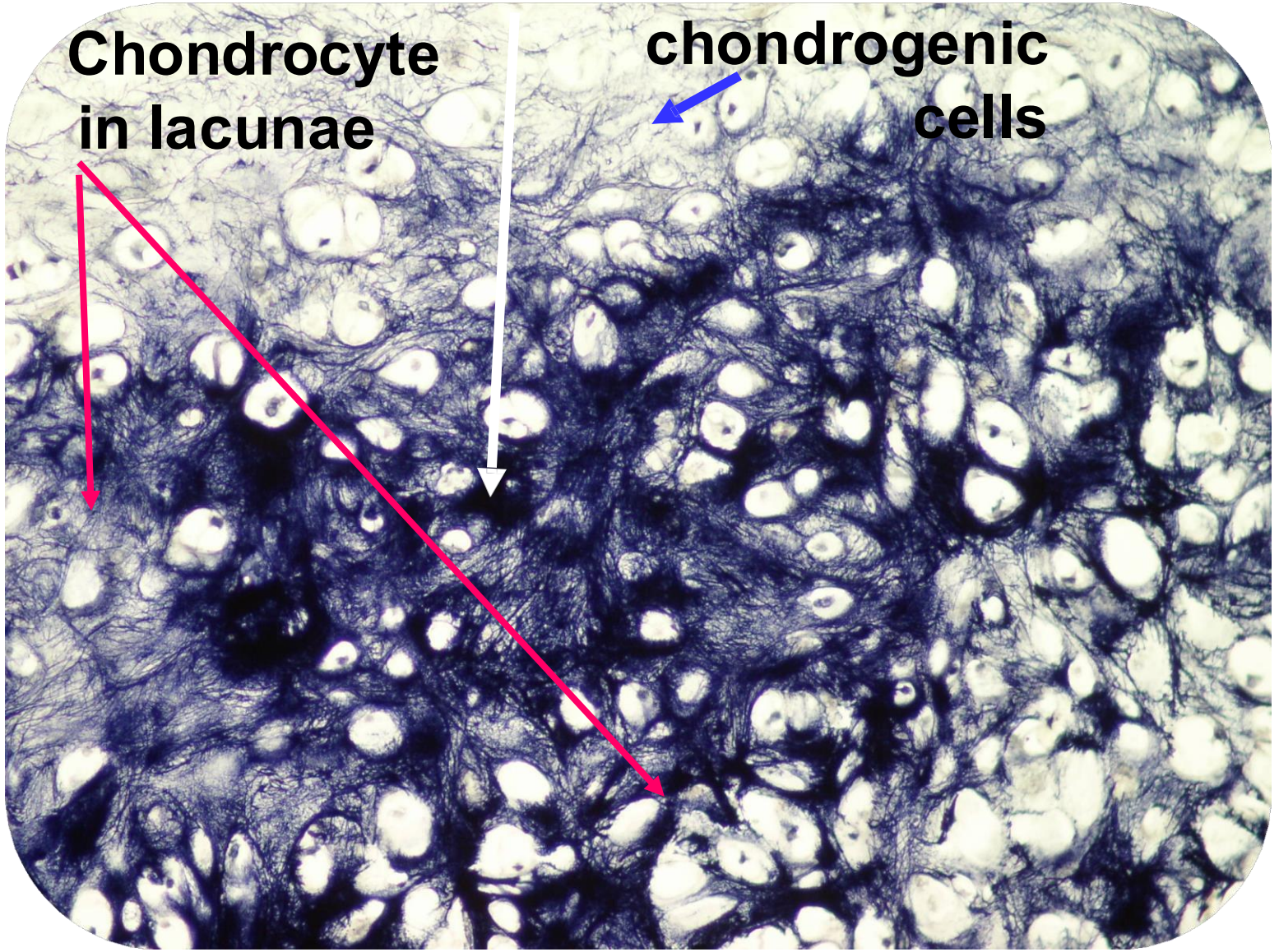
Seen in the respiratory tract and external part of the ear

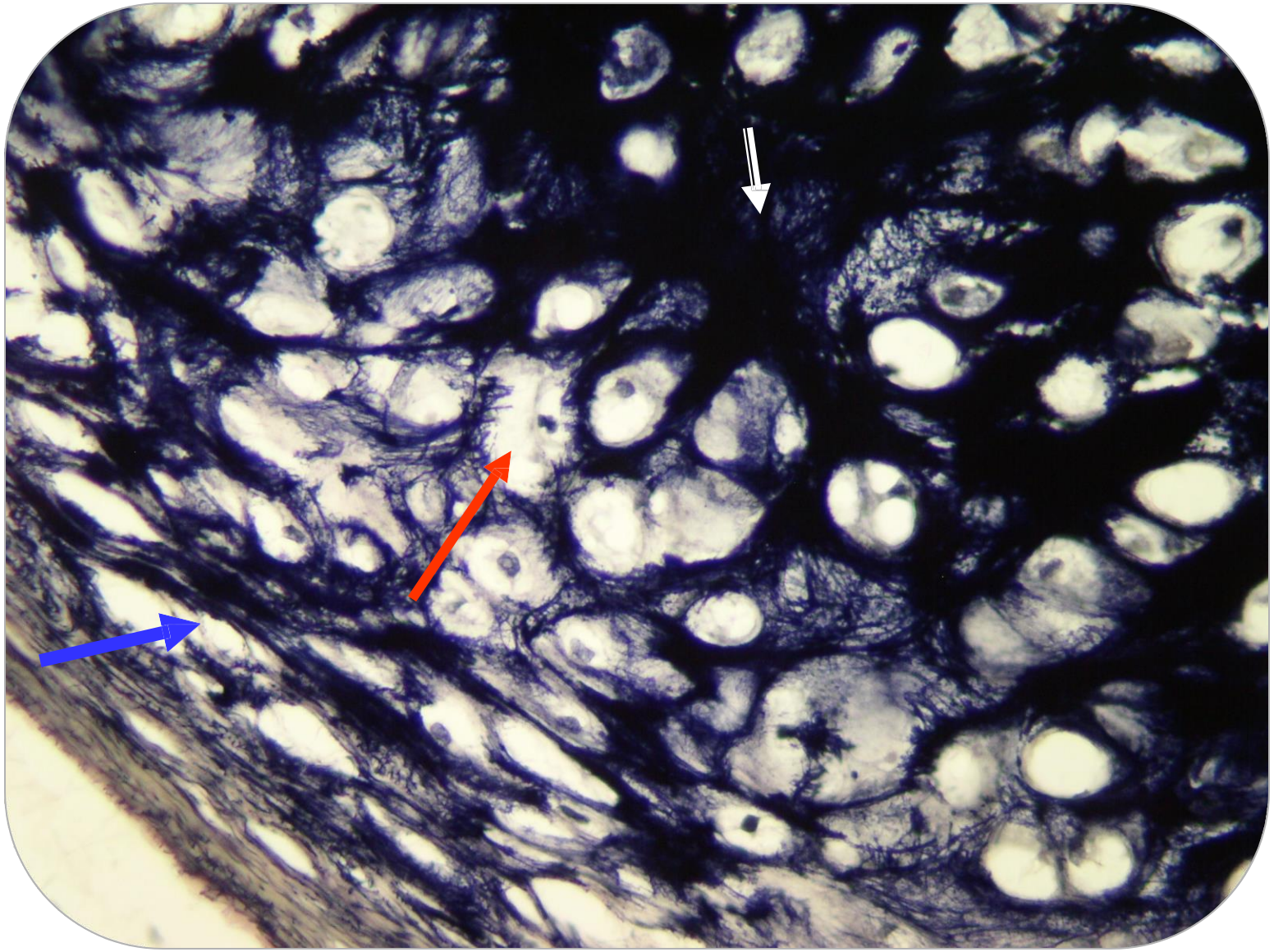


Lacuna for the chondrocytes

Elastic fibers

Going outside → less elastic fibers→ less staining→ closer to outer of elastic cartilage and perichondrium

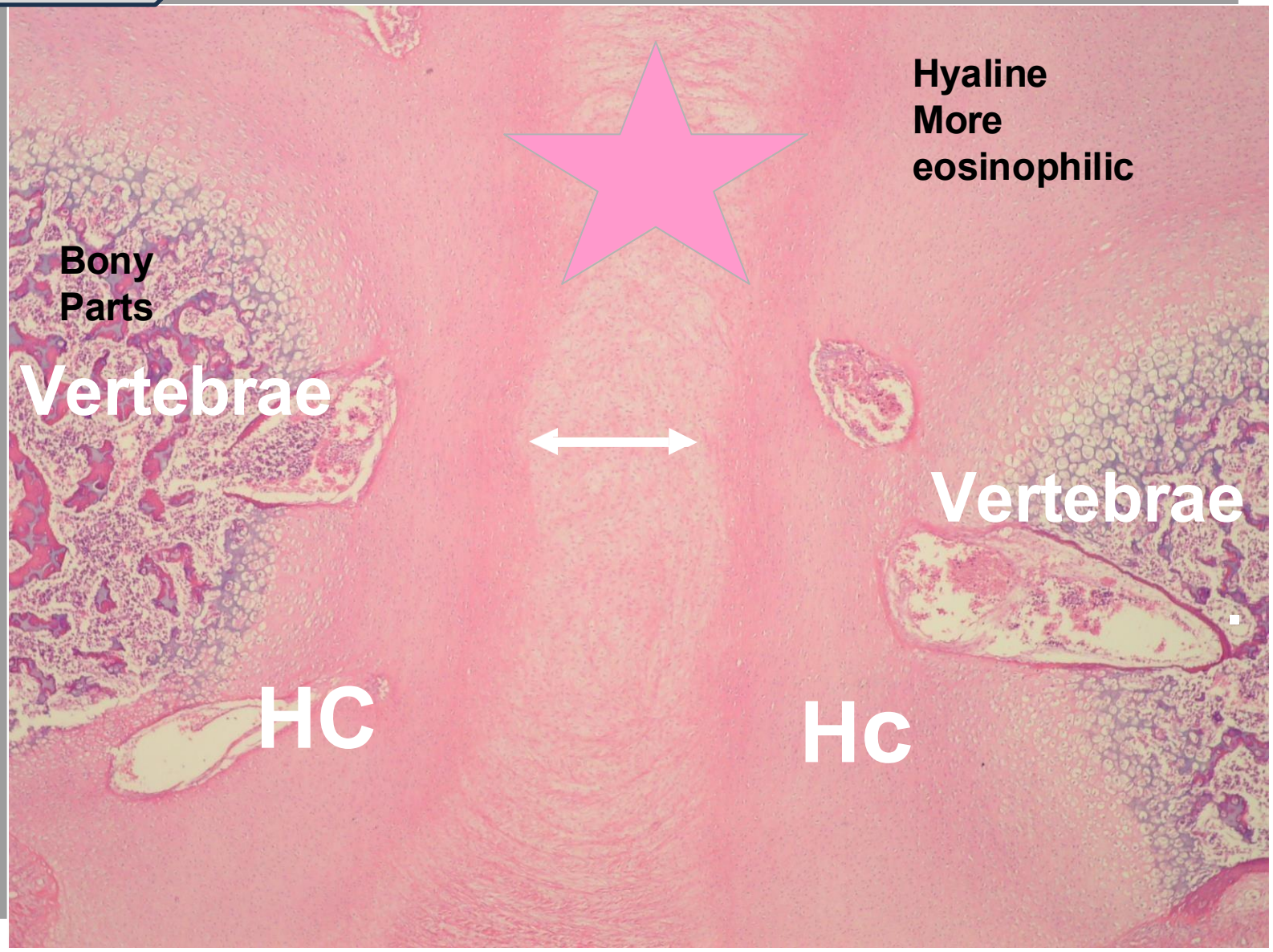




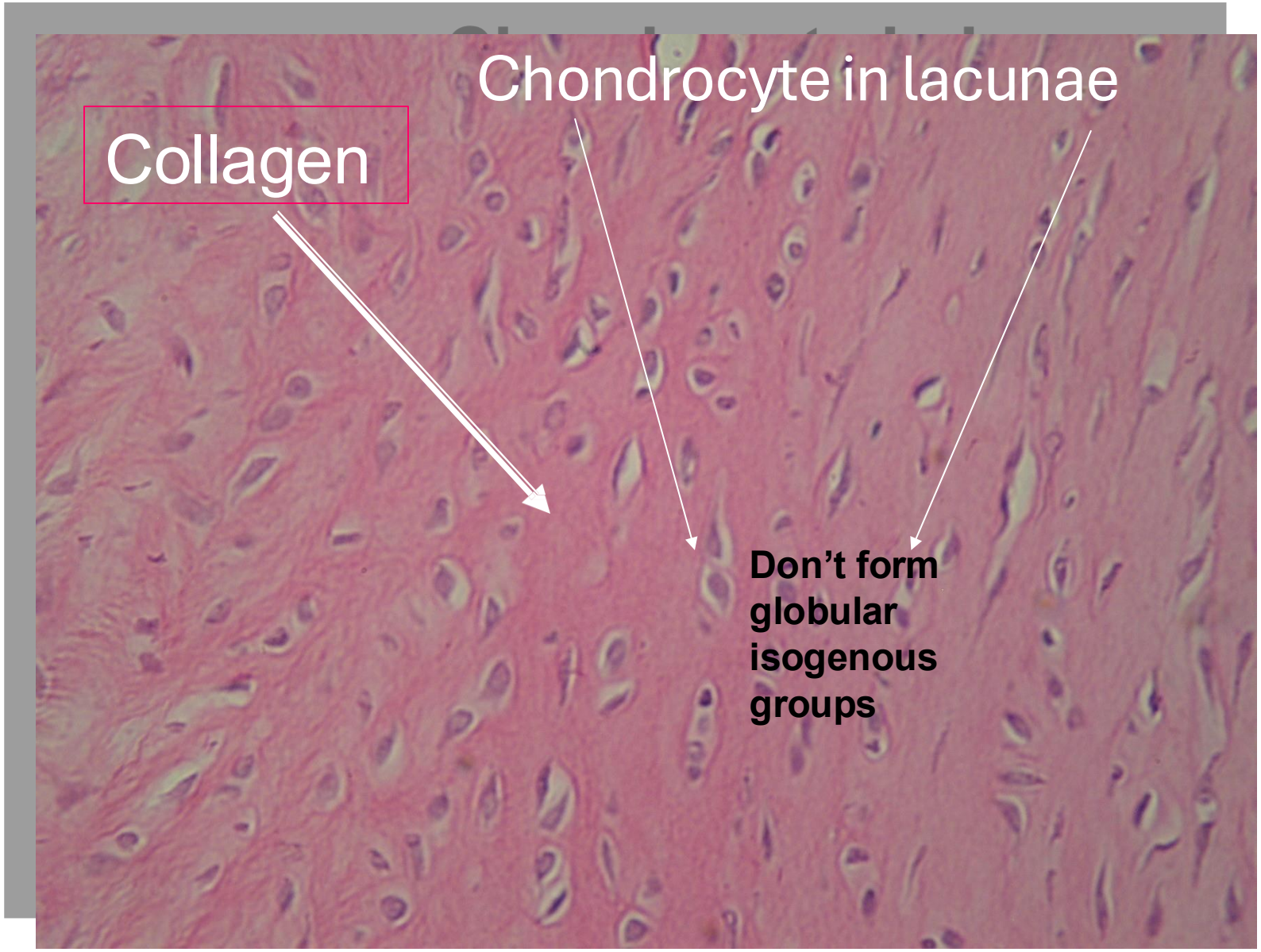
Toughest type → found in the synthesis pubis and the knees

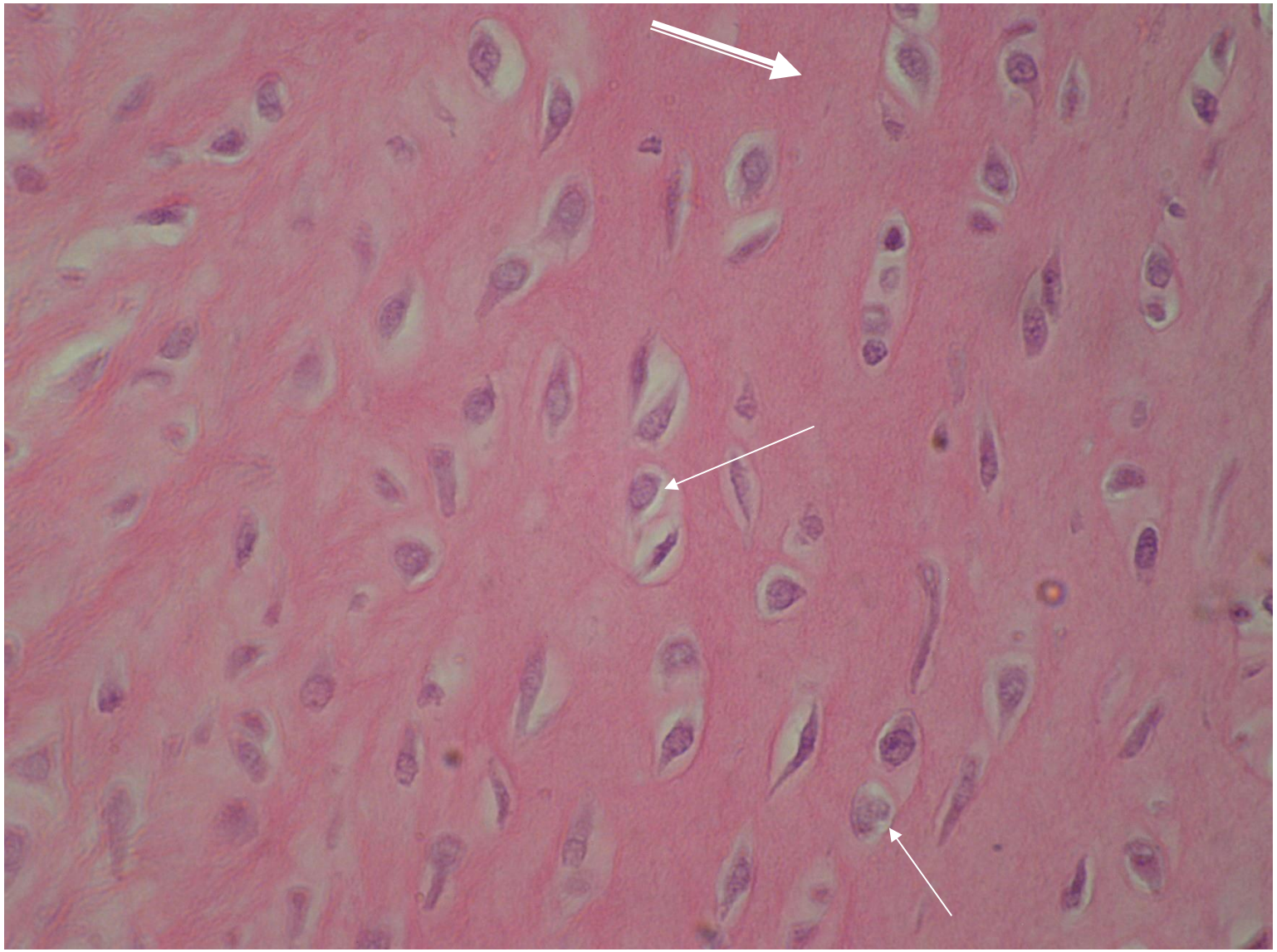
Fibrocartilage:intervertibral disc

The intervertebral disc has a complex structure consisting of hyaline cartilage and fibrocartilage



Fibrocartilage→ hyaline + dense CT → collagen type 1+2

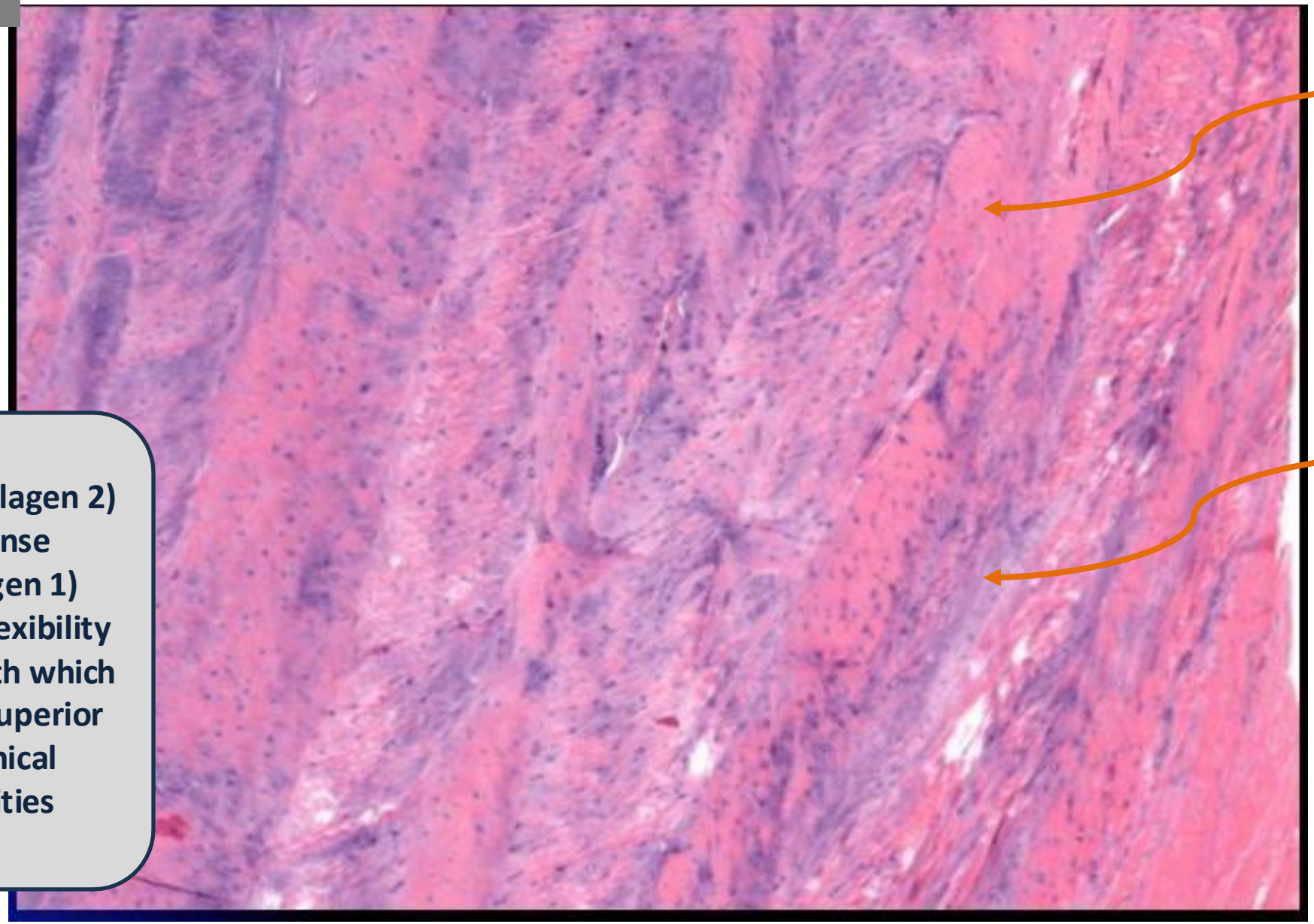




Identify

Low magnification image

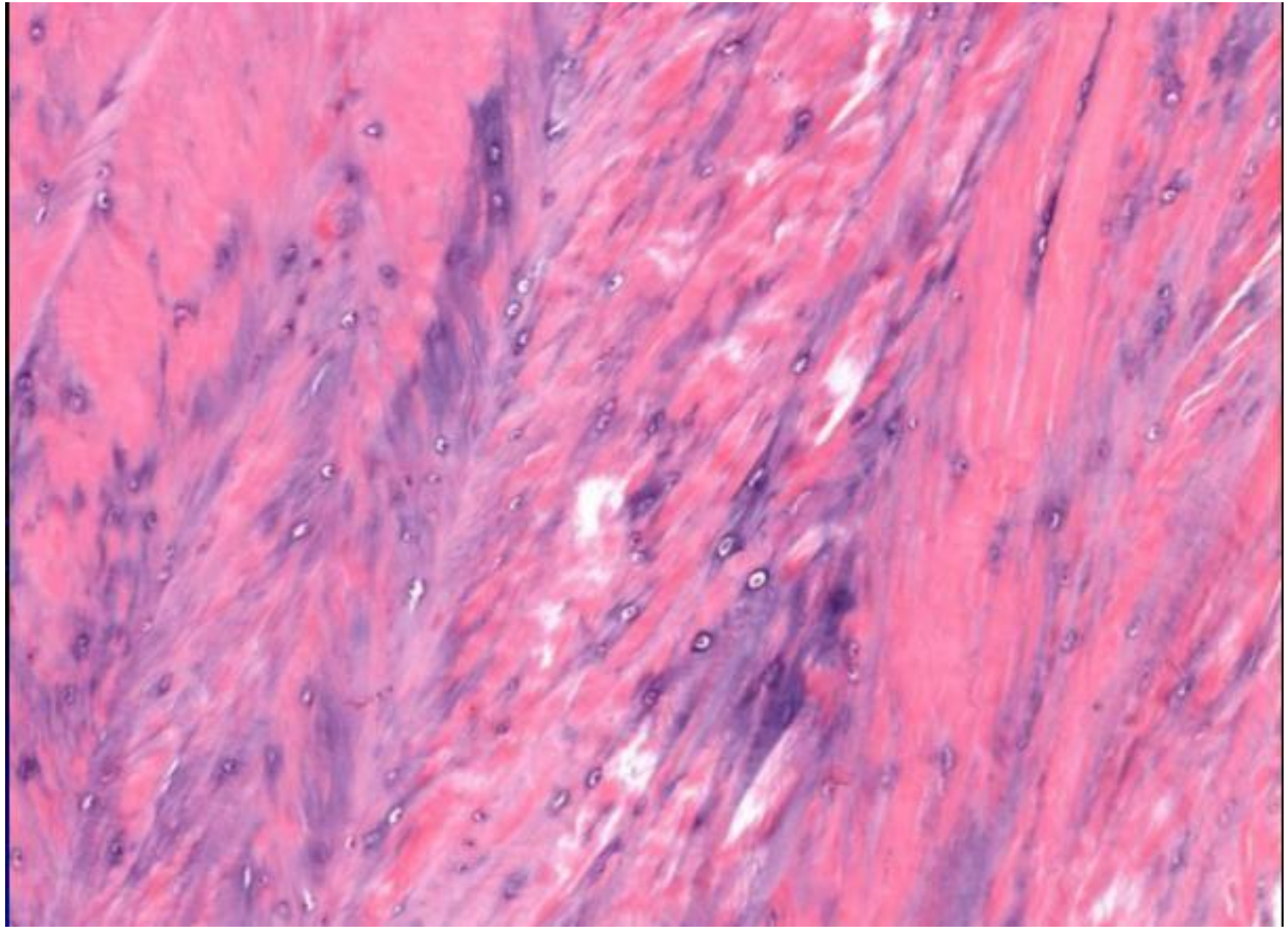
Two types of tissues



Hyaline(collagen 2) and dense CT(collagen 1) Provides flexibility and strength which provides superior mechanical properities

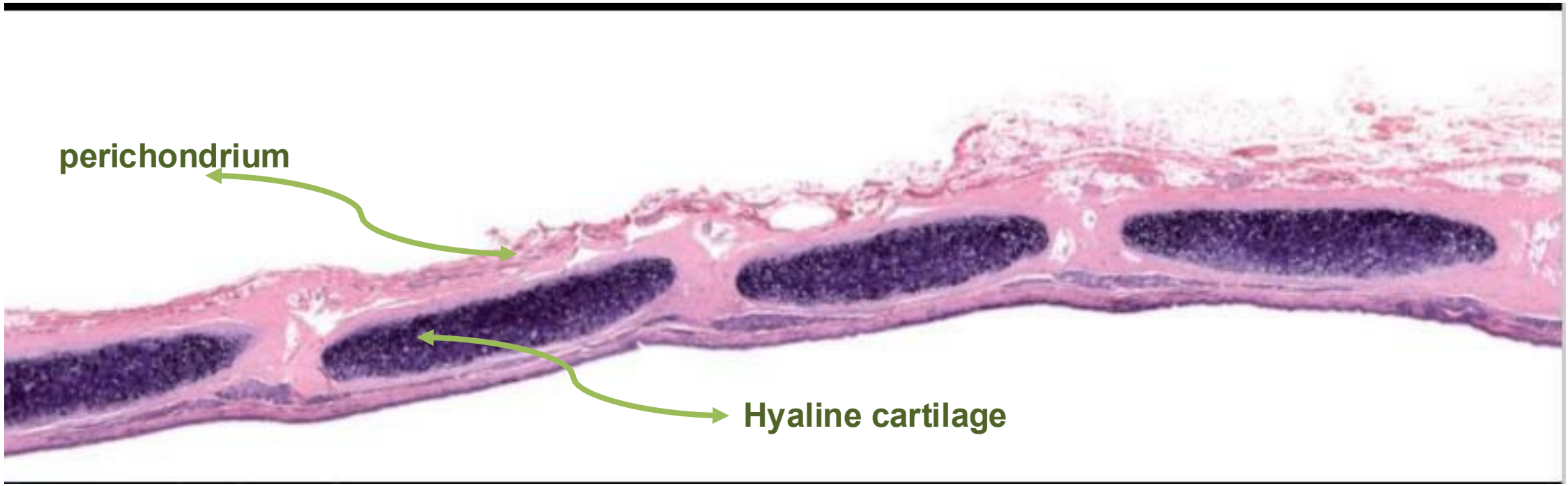
High magnified image

Identify



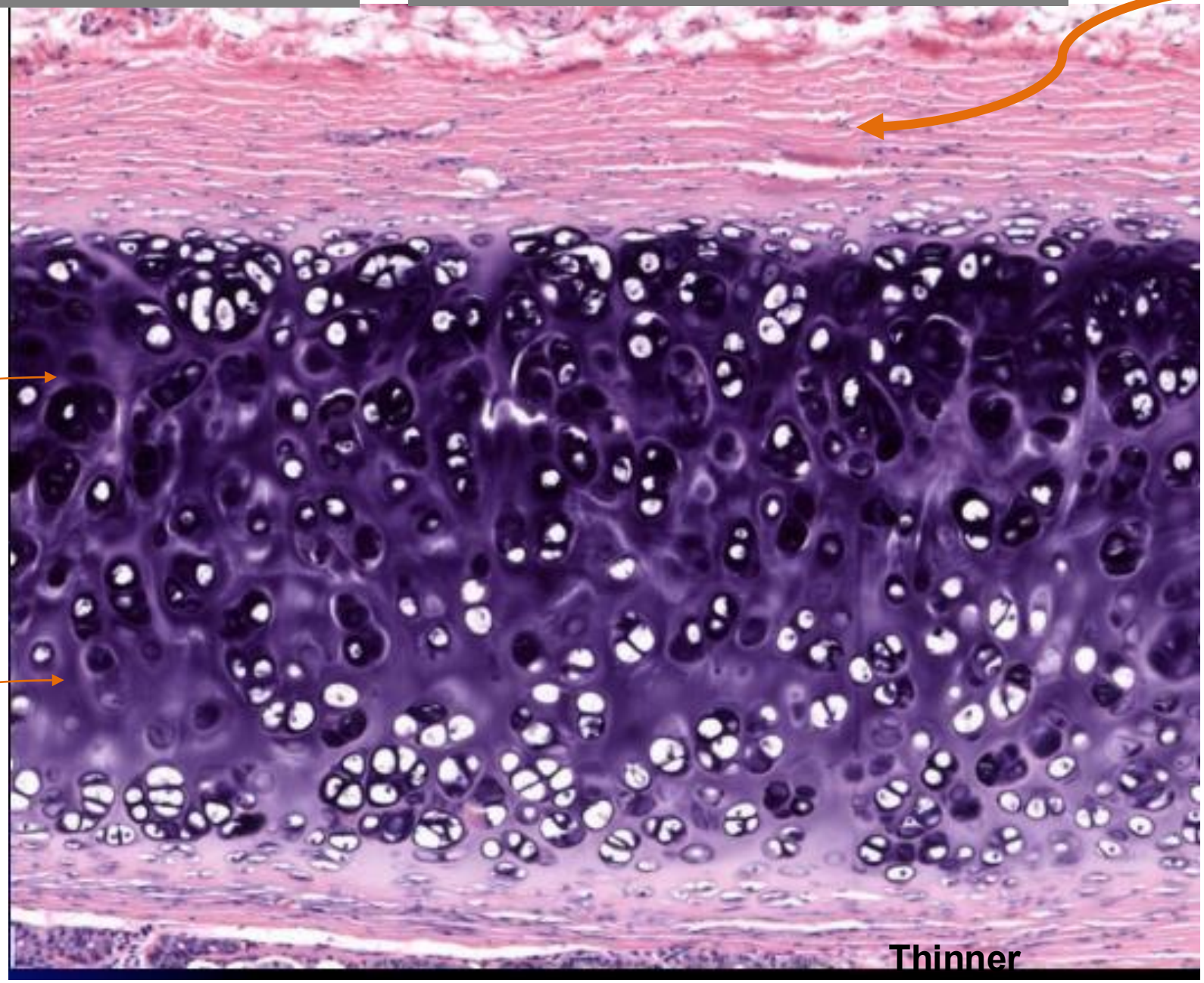
Low magnification

Identify



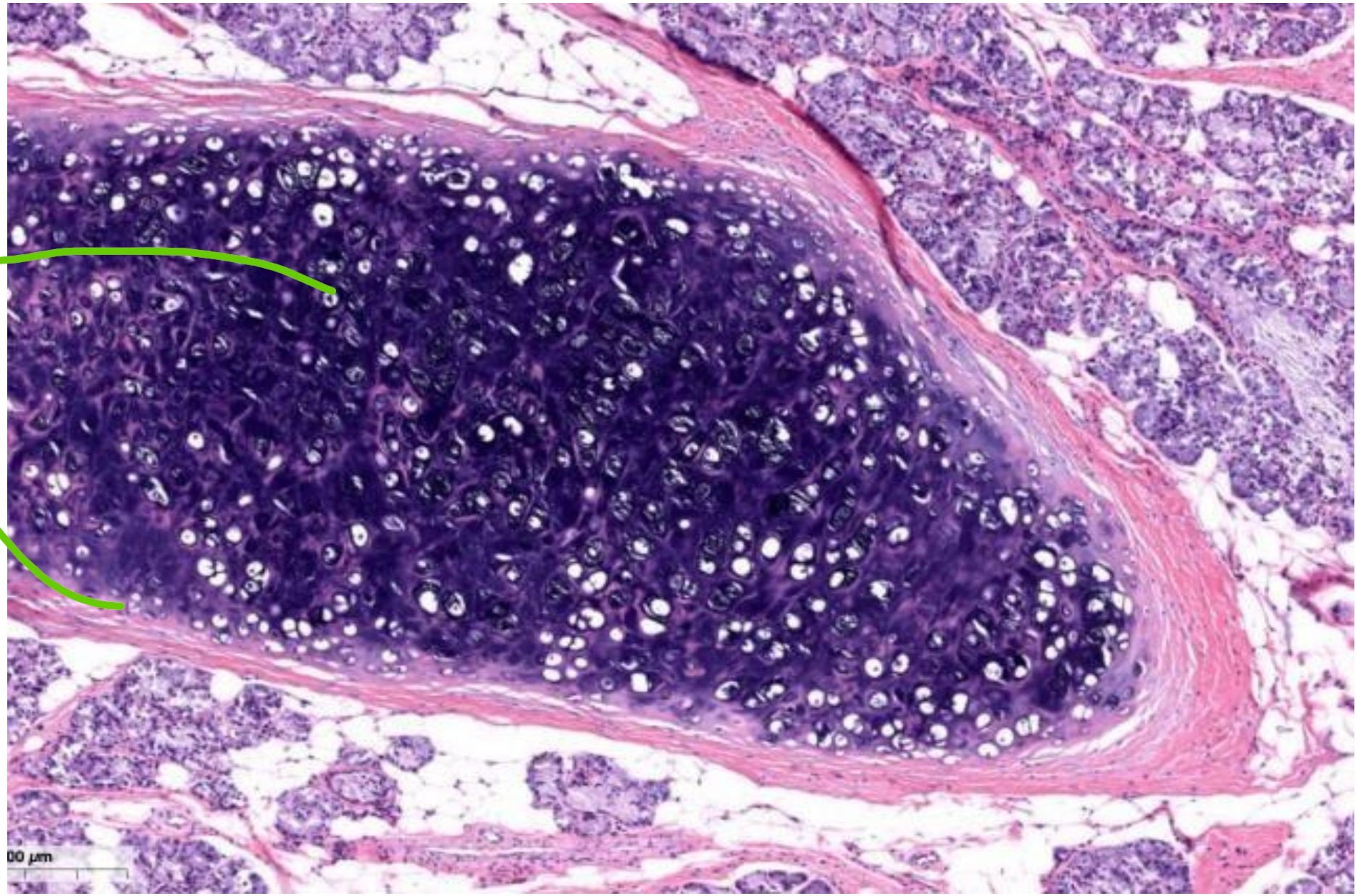
Magnified image → inner tissue of hyaline cartilage

Identify→ hyaline cartilage



Identify

Chondrocytes→ inside
Chondroblasts→ on the junction (between tissue and perichondrium)
Osteogenic → deeper within the perichondrium



For any feedback, scan the code or click on it.

Corrections from previous versions:

Versions	Slide # and Place of Error	Before Correction	After Correction
V0 → V1			
V1 → V2			

Additional Resources:

رسالة من الفريق العلمي:

لا إله إلا الله وحده لا شريك له ، له الملك و له الحمد و هو على كل شيء قدير