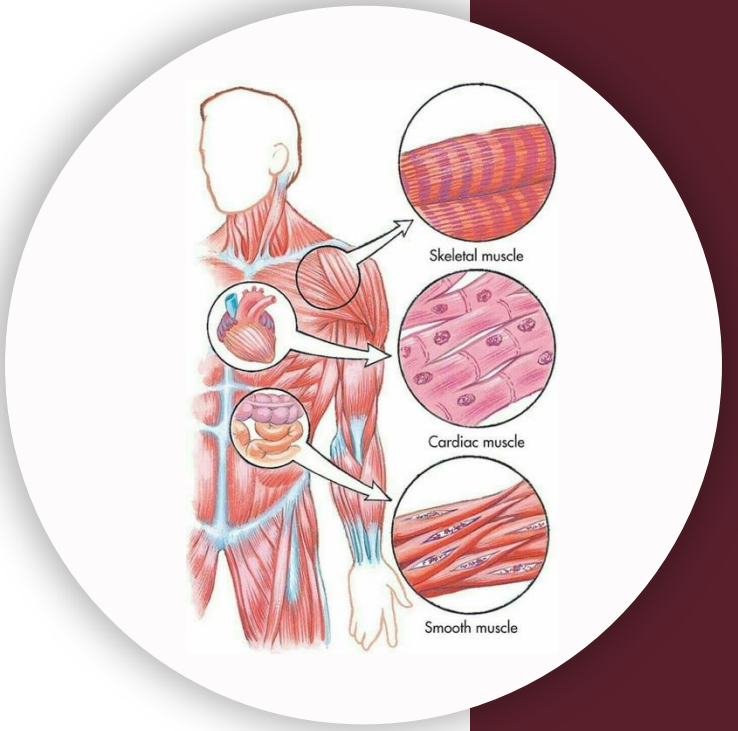
بسم الله الرحمن الرحيم

Histology – Practical

Connective Tissue lab



Done by : **Dopamine 023**

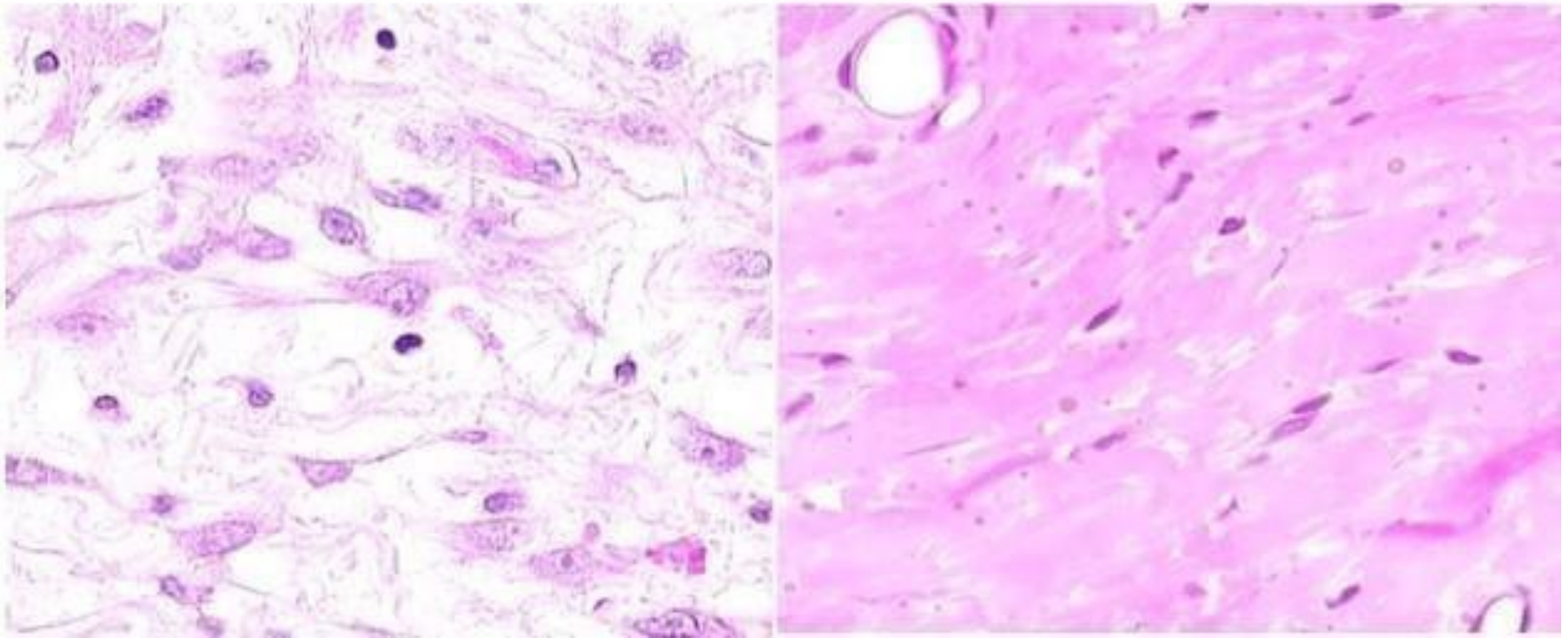
fibroblasts : (Active type)
bigger cells
bigger cytoplasm
Bigger euchromatic nucleus
In the loose CT

fibrocytes :
smaller cells
less processes
small amount of organelles
(heterochromatic)
in the dense CT
*it can be activated to be fibroblast when needed

connective tissue , in contrast to epithelium has some randomness

collagen is a protein
→has many NH2+ ends
→basic (acidophilic) → stains well with eosin → appears pinky

stains : H&E microscope : bright field

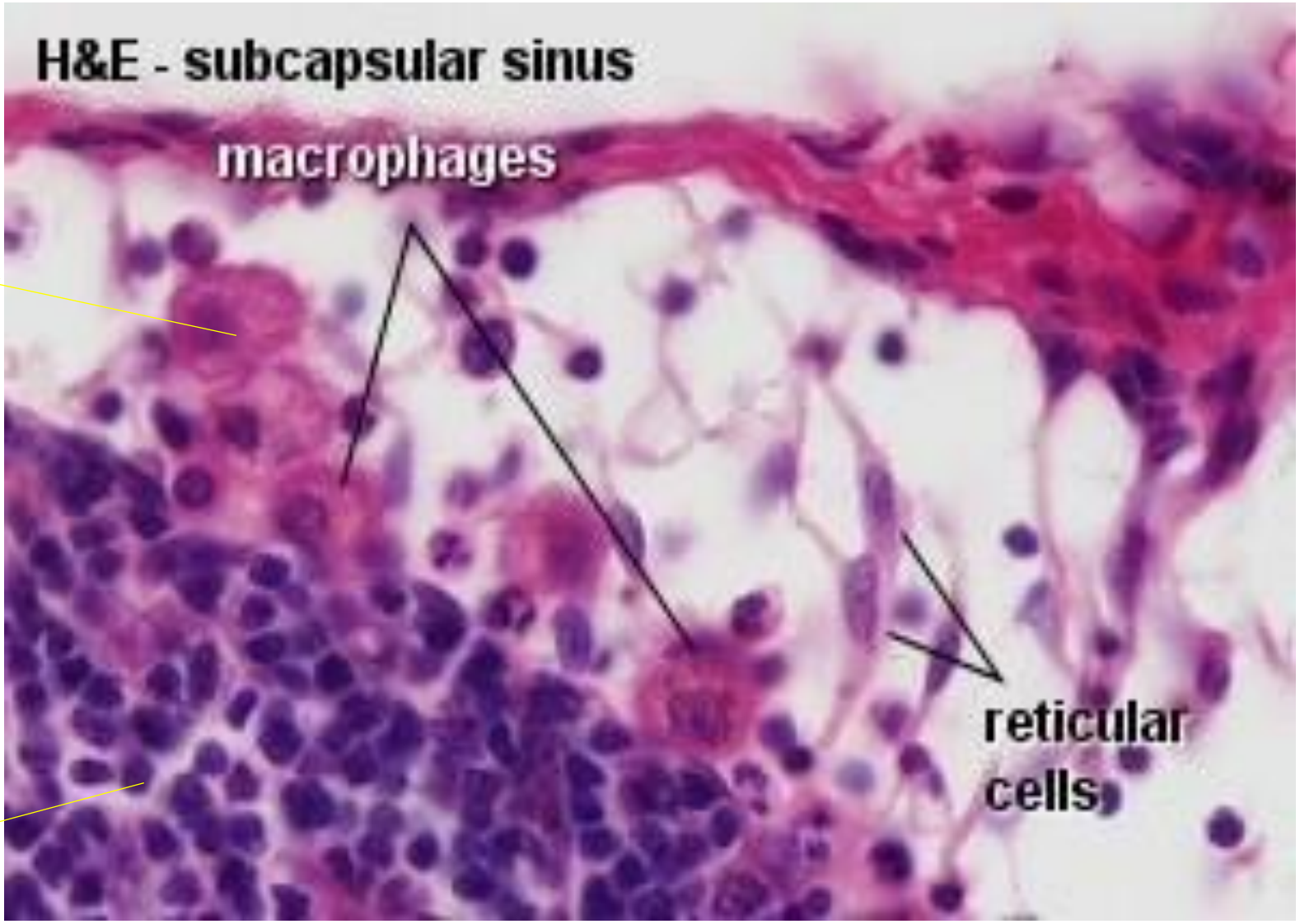


Macrophage

Has immune function

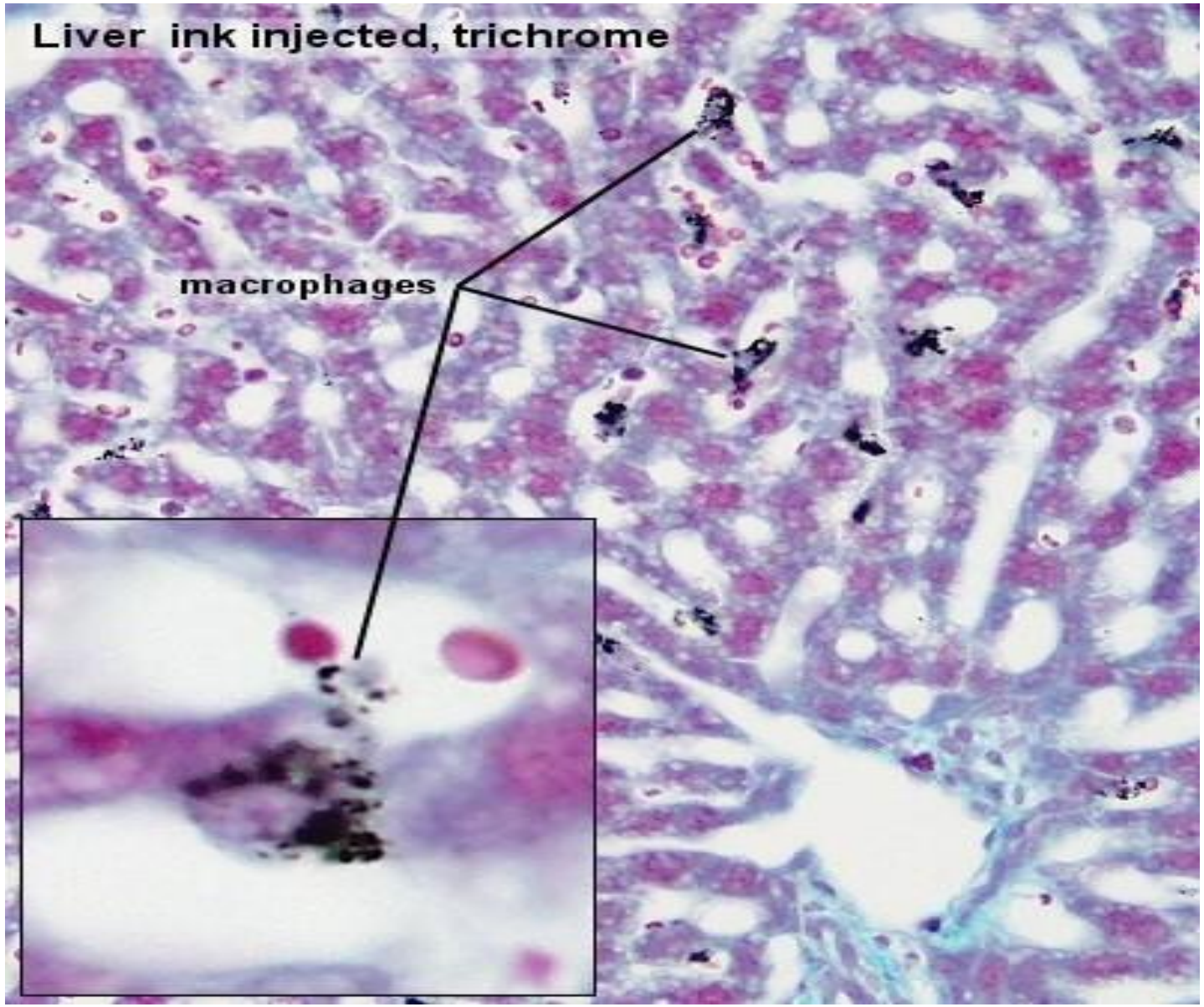
this section is from the liver so this is called : Kupffer cells

Macrophages are large cells (30um diameter)



Macrophage

this section was taken from the liver

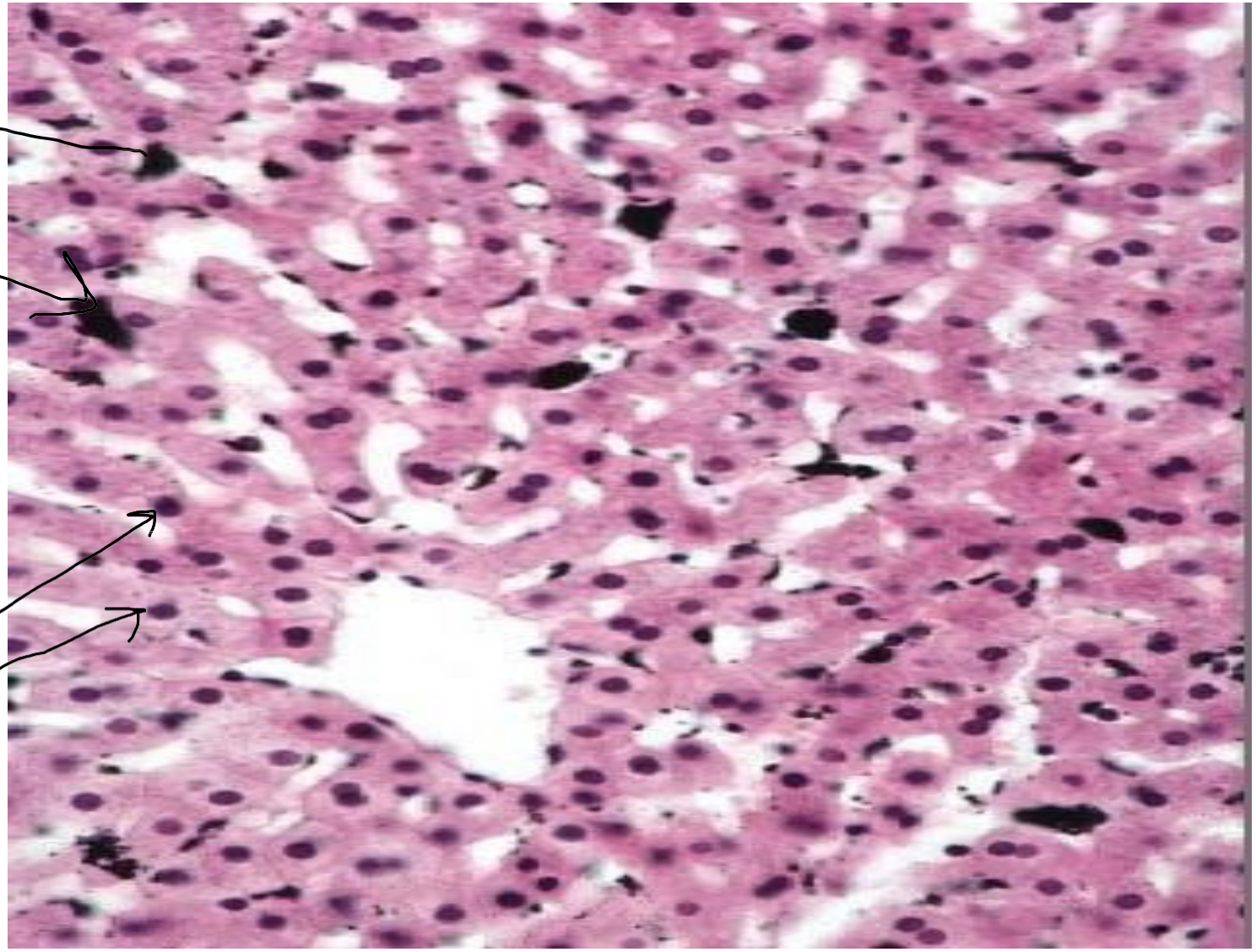


Macrophage

this section was taken from the liver

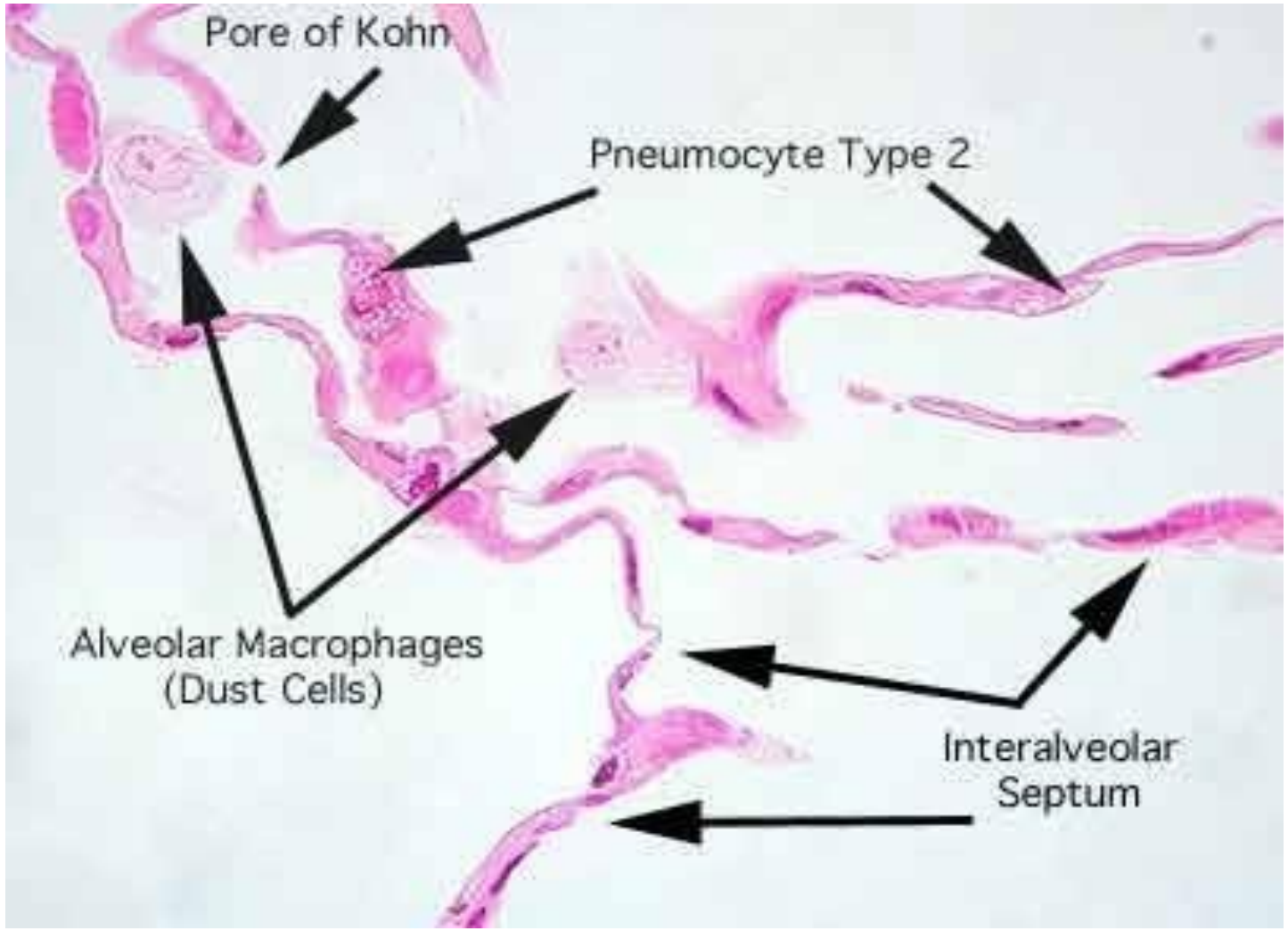
The darkly stained Cytoplasm are Macrophages

hepatocytes



Macrophage

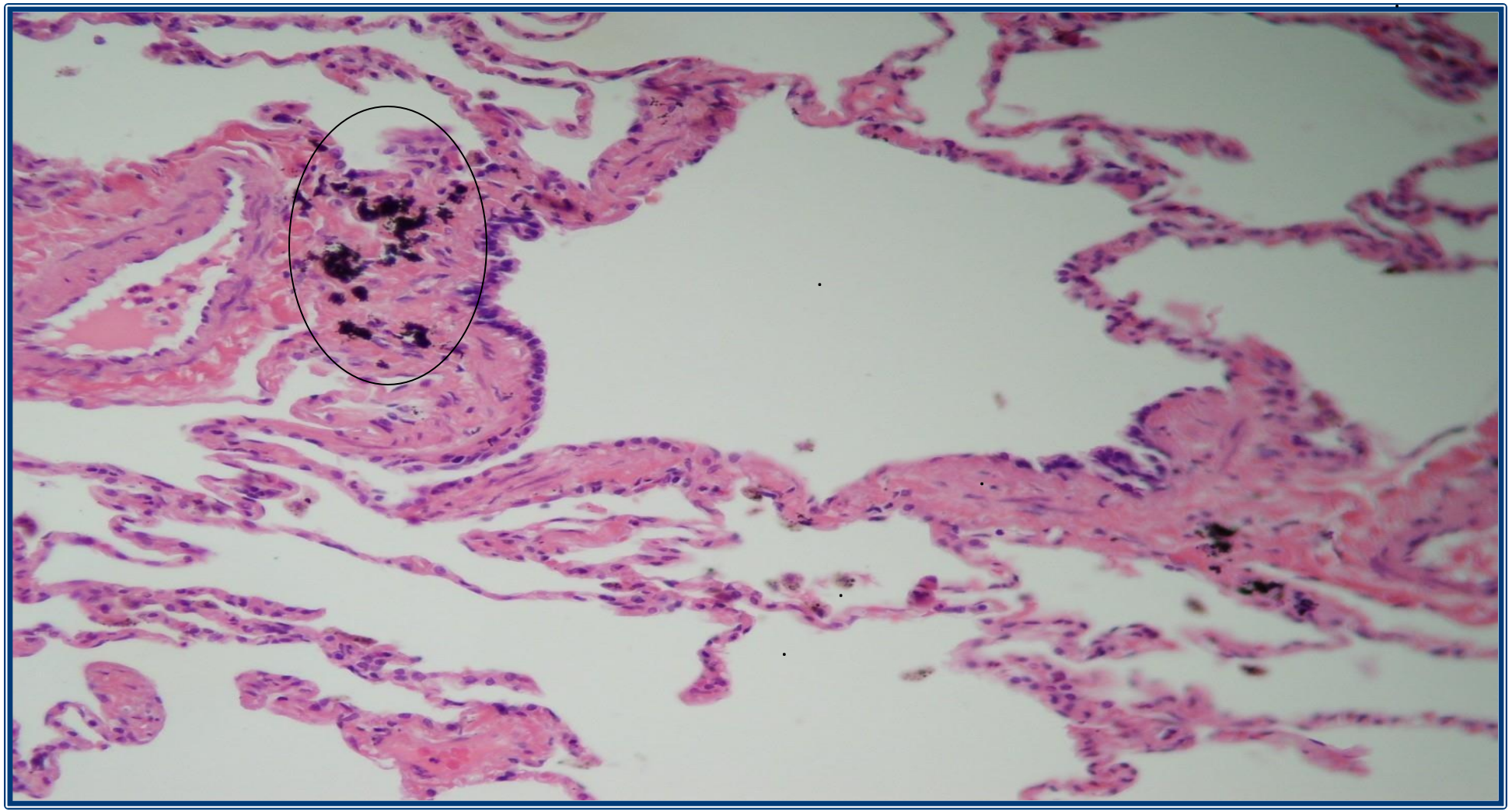
Alveolar macrophages are called : Dust cells



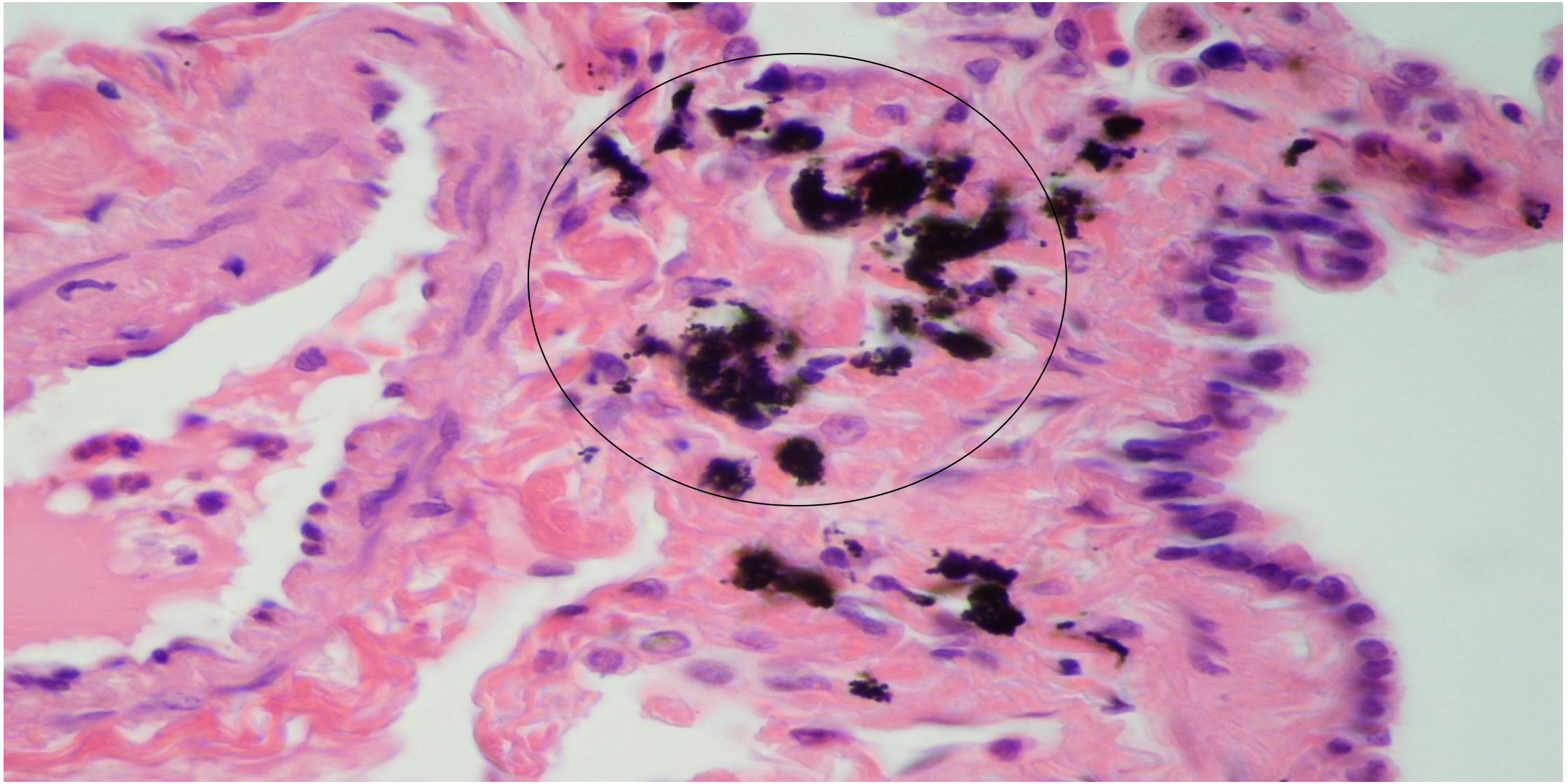
Lung tissue

This is more likely a tissue from Old person , because the macrophages are loaded with cell debris .
or may be it is for a person who live in a polluted area .

so the blackish things are not ink here these are cells debris , they will appear more blackish in a smoker .



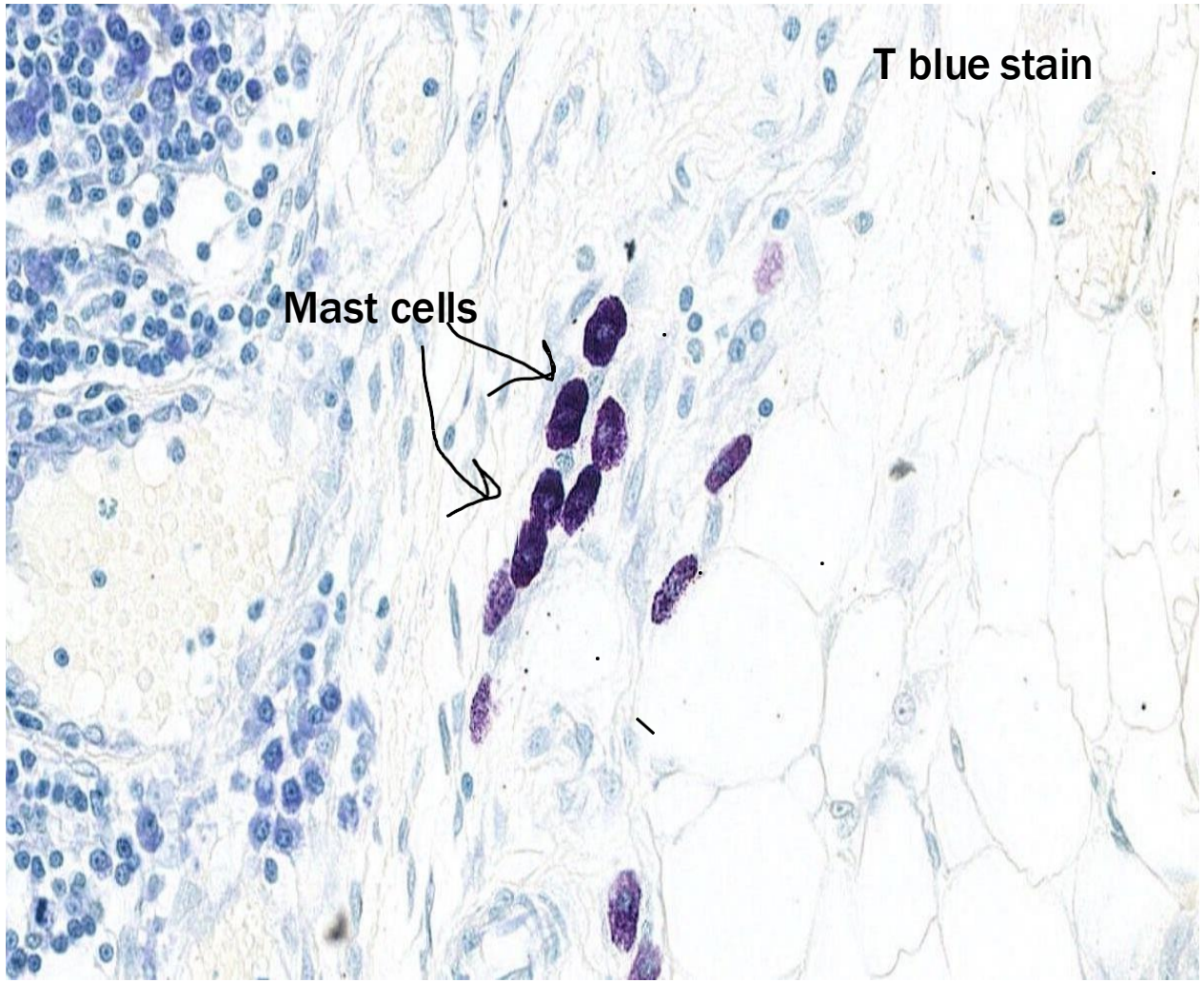
Alveolar **macrophage=dust cell**

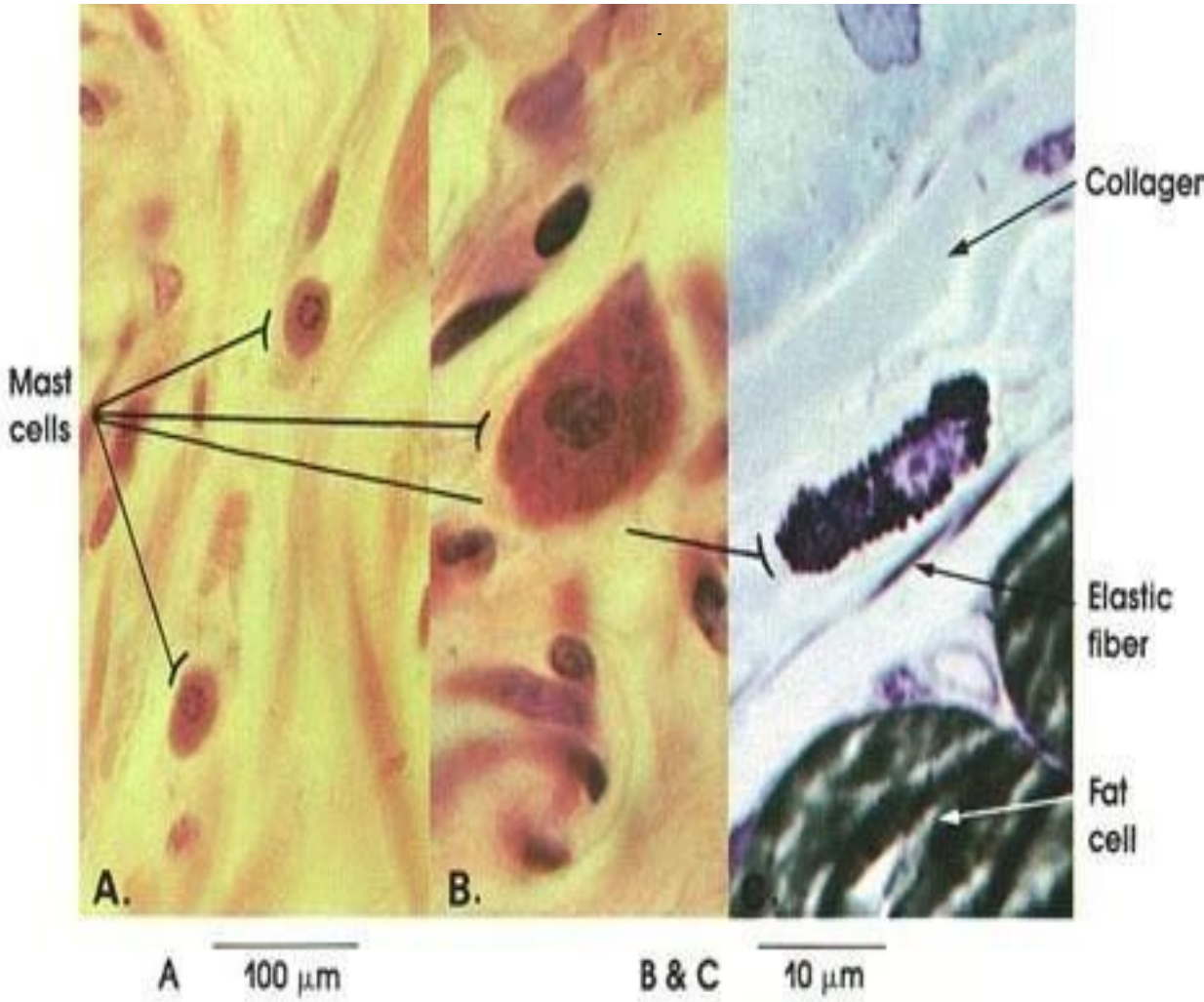


Mast cells

cells that have a lot of granules that contain bioactive molecules .

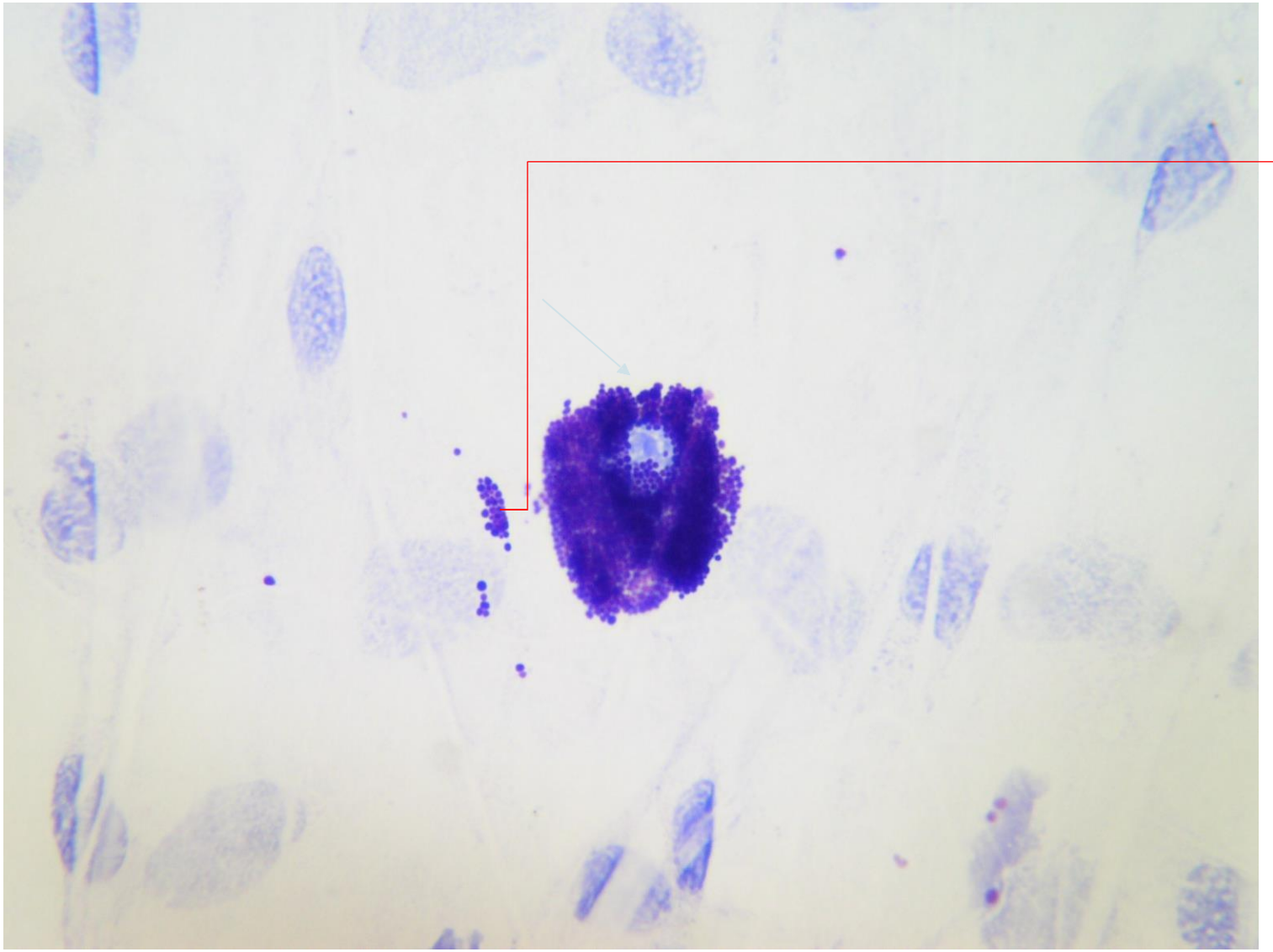
they are important in initiation of inflammation .
ex on bioactive molecules :
histamine
heparin: anticoagulant , if dilation occur with out the presence of heparin
The blood clots, causing more troubles.





Mast cells

Mast cell (toluidine blue stain) granules



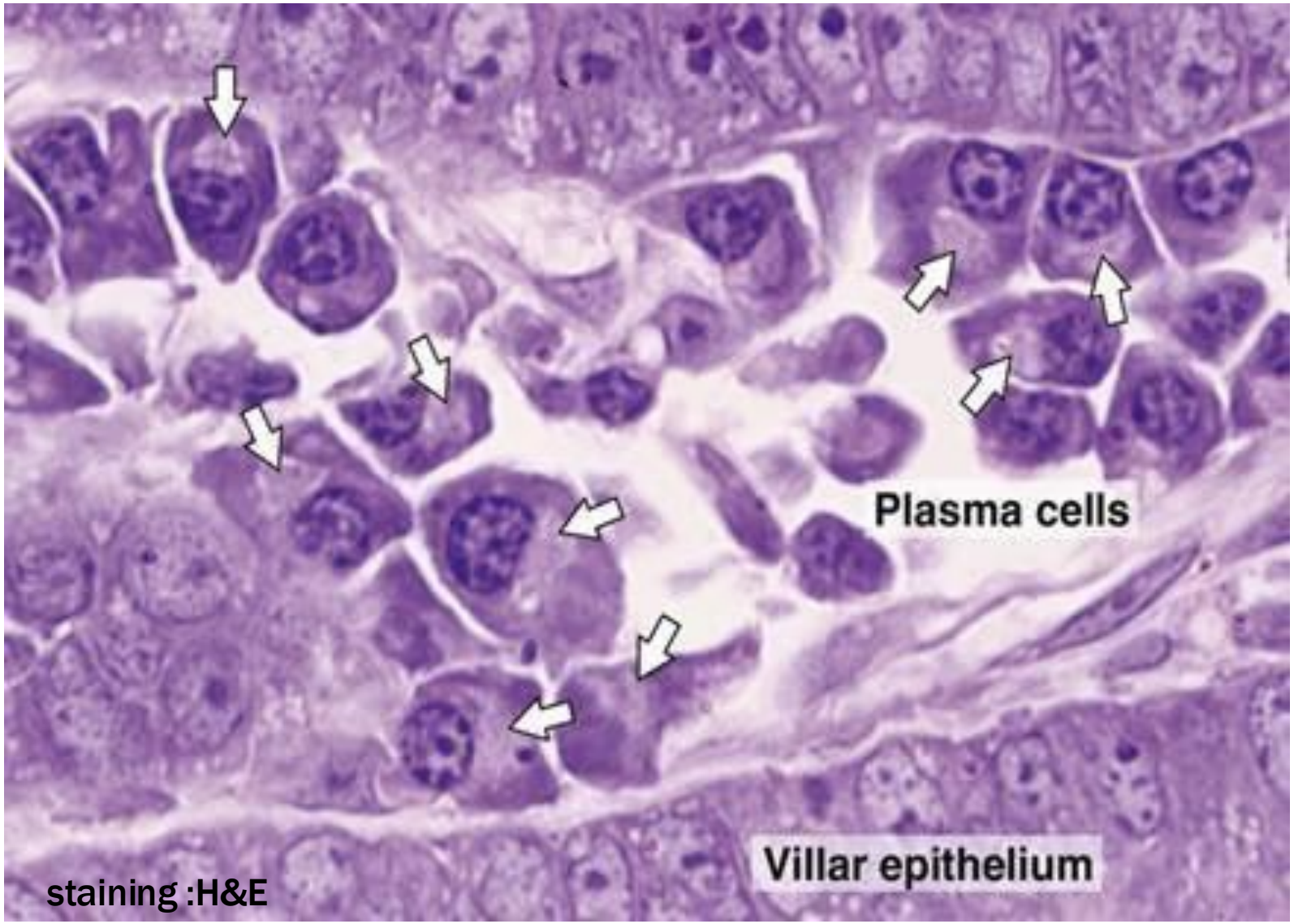
these granules are displaced during preparation
they don't detach when they perform there action ,they empty there content rather.

Plasma cells

white blood cells specialized in producing antibodies , they are B- lymphocyte derived.

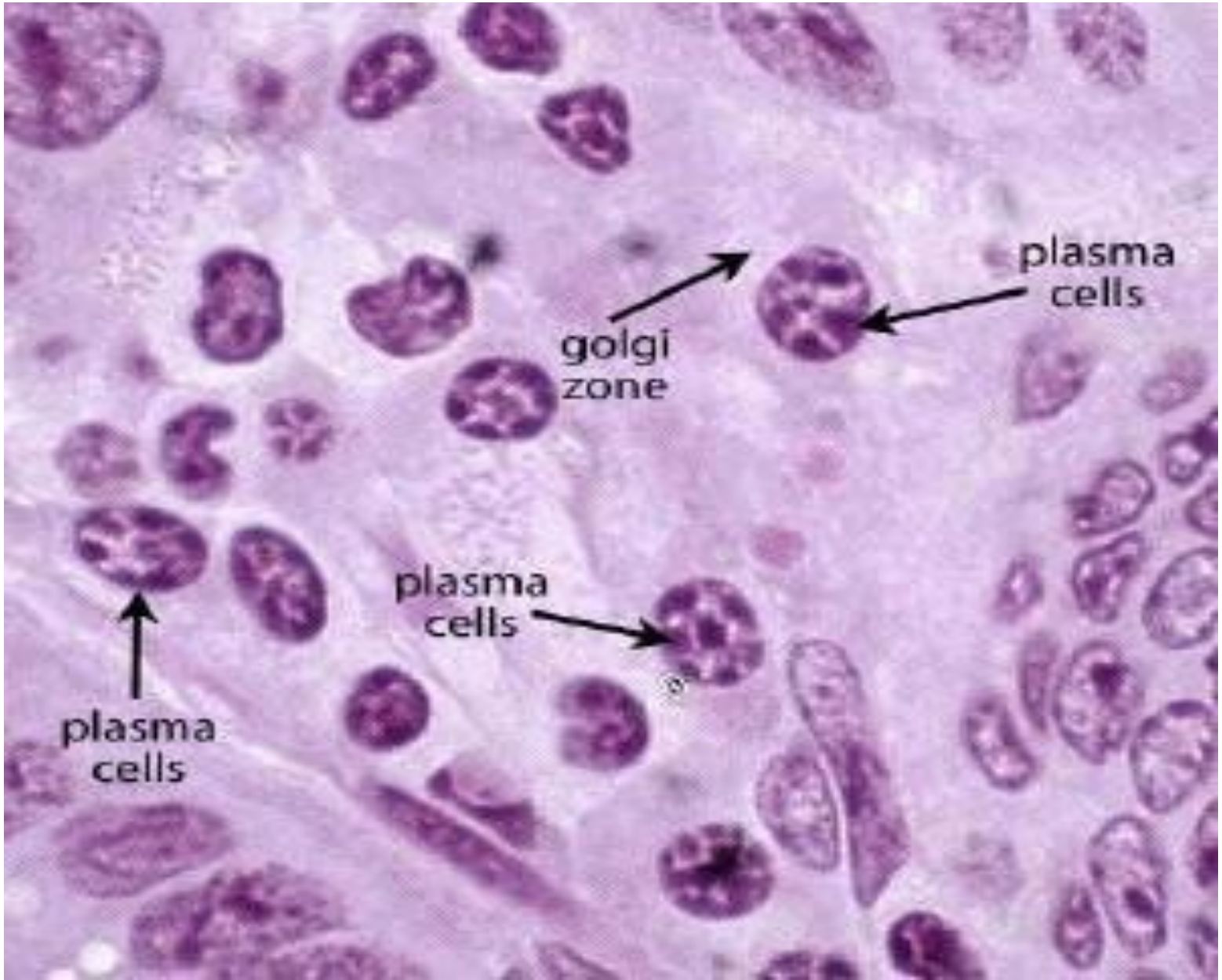
plasma cells are larger than lymphocytes

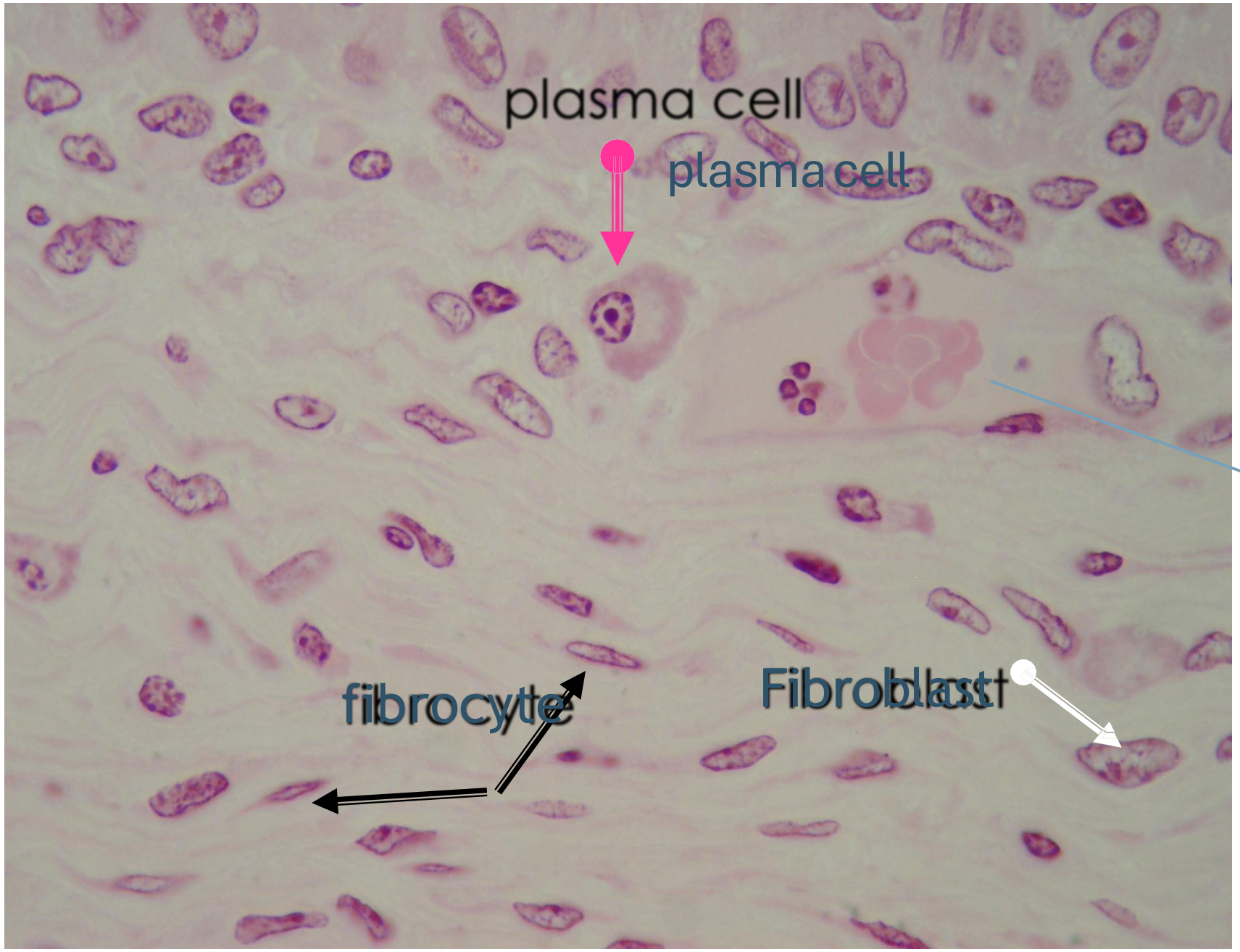
rich with organelles
synthesize immunoglobulin (antibodies)



Plasma cells

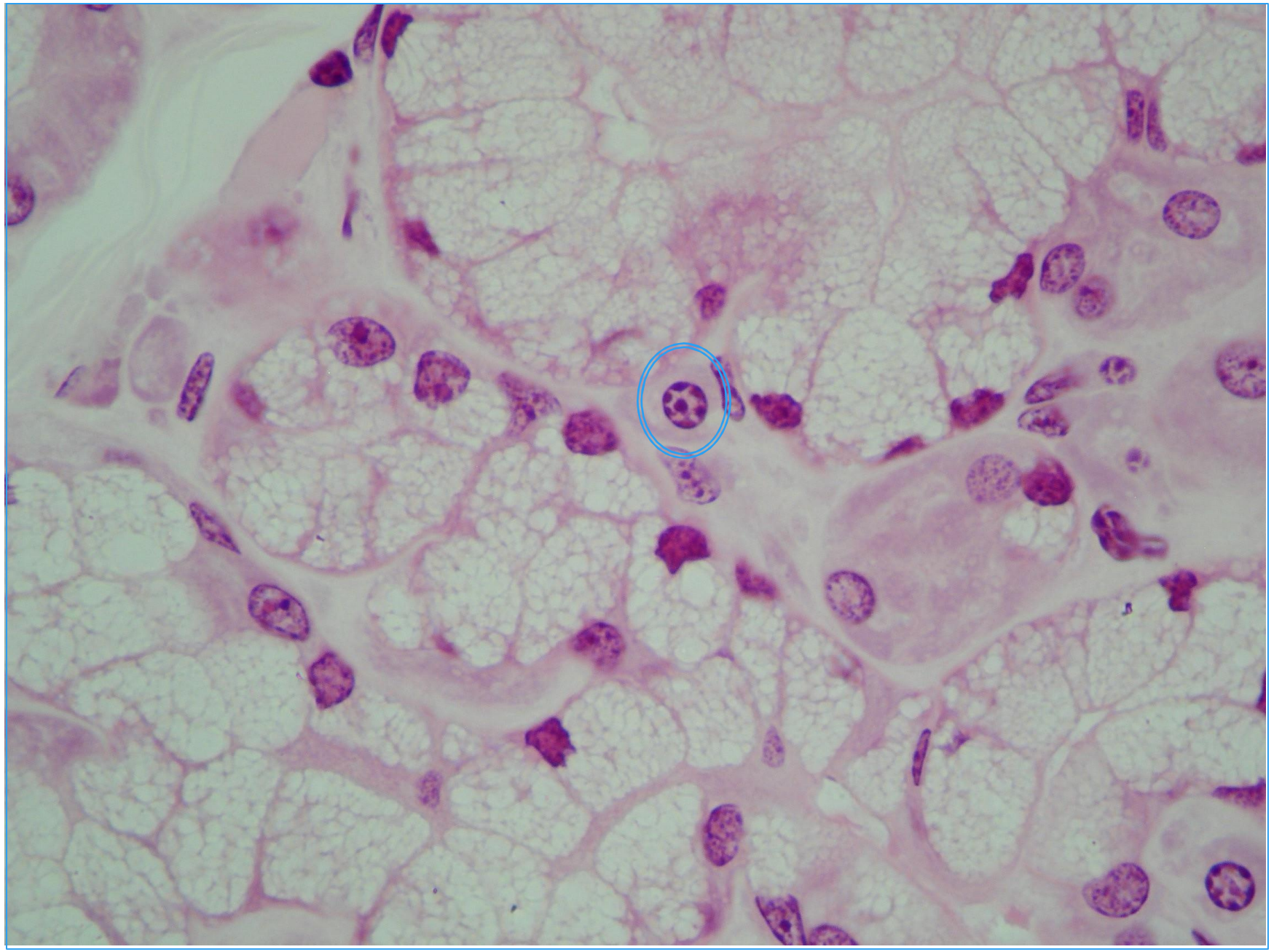
we recognize it , by the cart-wheel appearance of its nucleus.





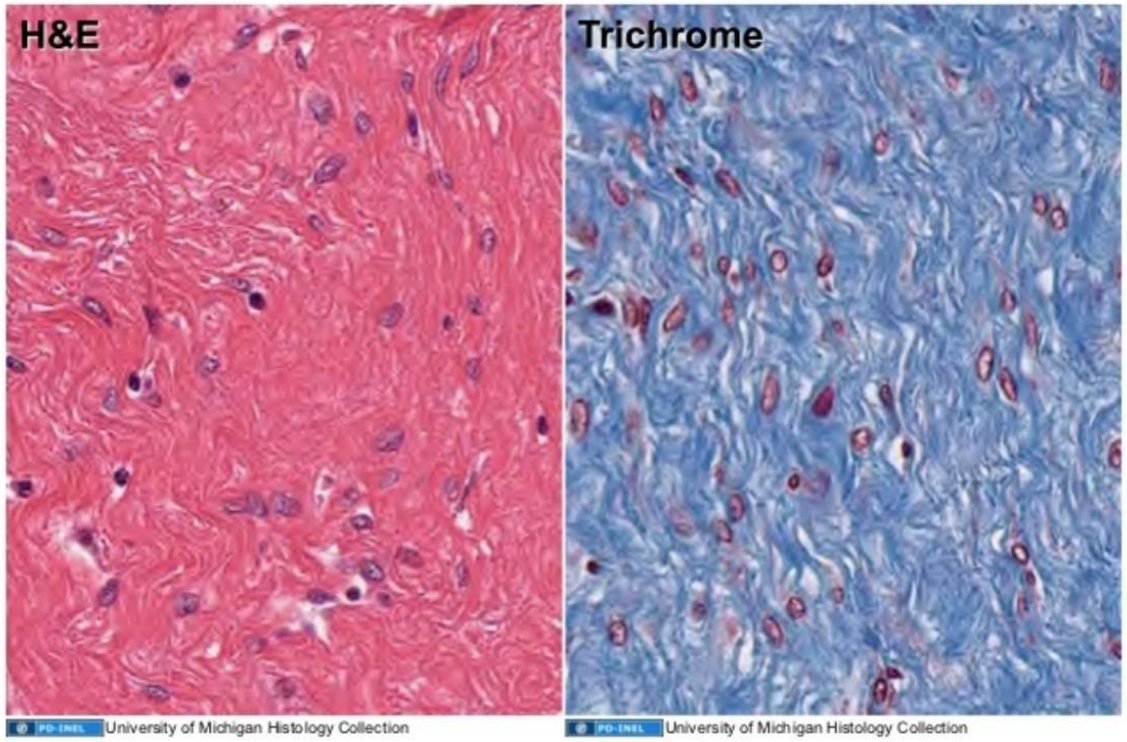
That is a loose connective tissue
cause it has little pinkish (little amount of fibers)

this is a blood vessel , we can see both white and red blood cells



This tissue is taken from a gland
a mucus secreting gland to be specific.

Collagen and elastin

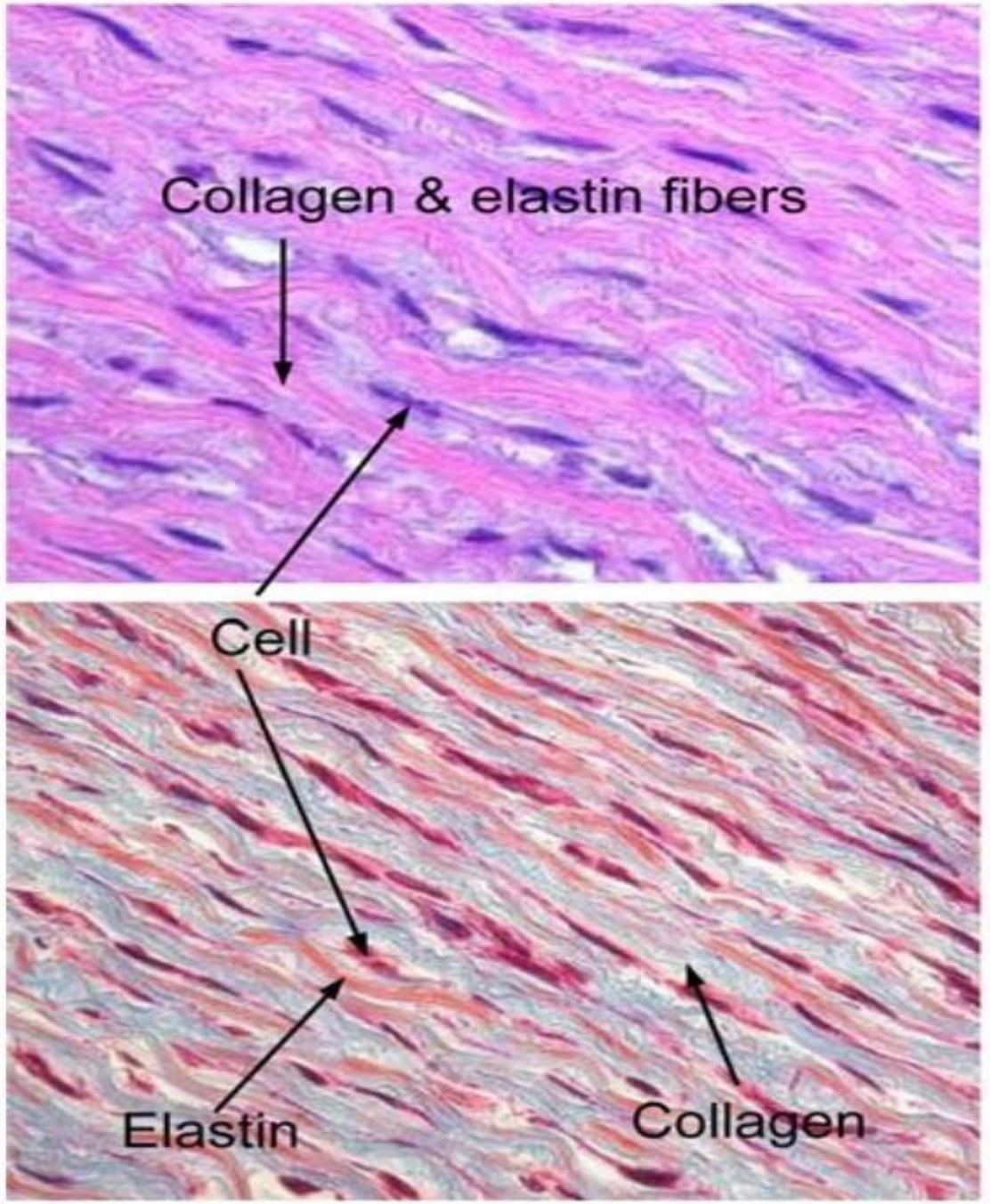


This is a dense CT :

Masson's trichrome

1 we see a lot of pink (which represents collagen fibers)–> dens

2 no arrangement —> irregular

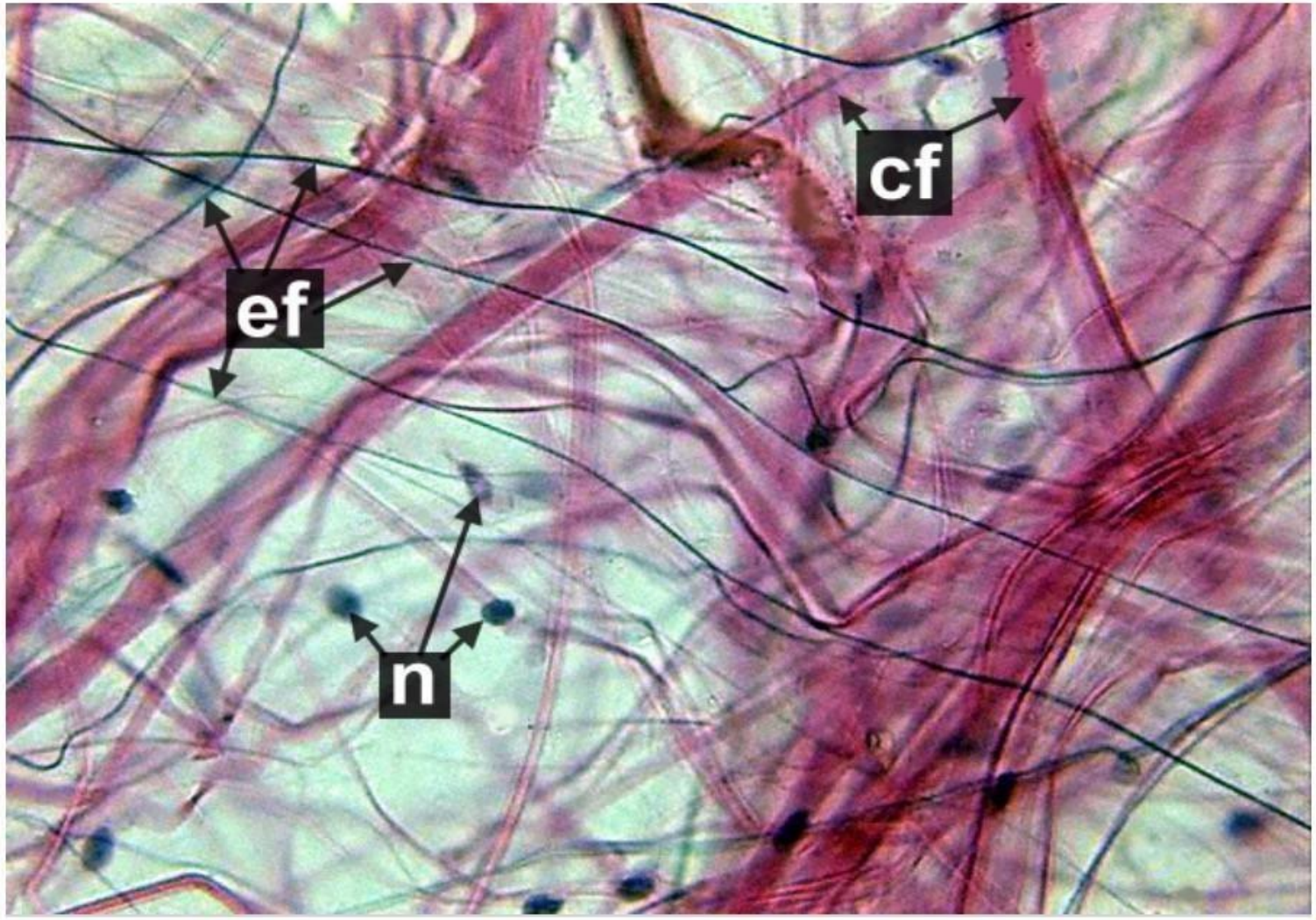


Collagen and elastin

This is a loose
Connective tissue

EF: elastic fibers
CF: collagen fibers
N: nucleus

white gaps : they
are not empty,
they are filled with
ground substance.



Reticular fibers

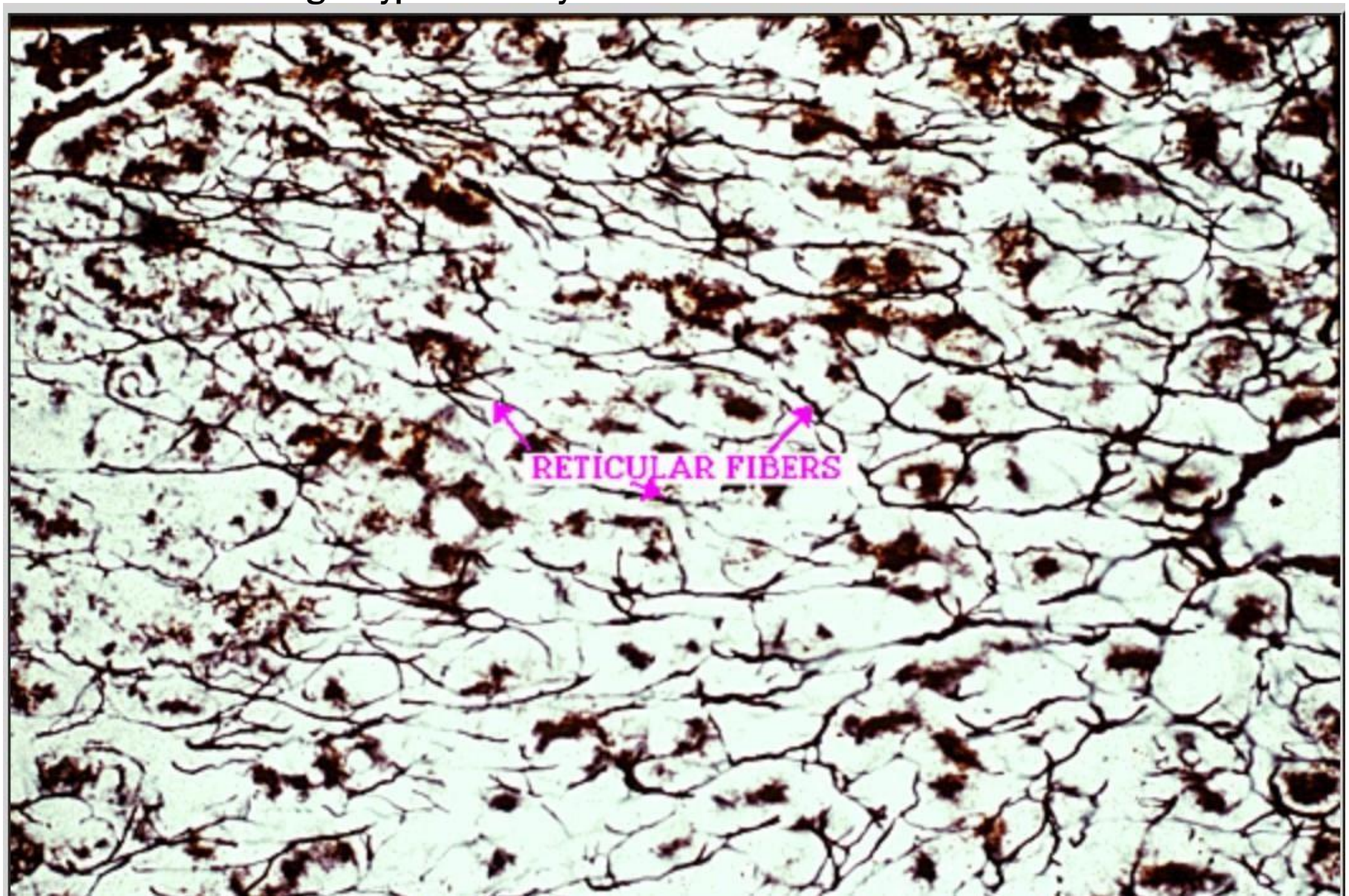
stained with
silver salts
,another way to
stain it is by using
PAS(periodic
acid Schiff)
staining
due to their high
content of sugars

Reticular fibers: form like rooms or tiny apartments

elastic : wavy structures

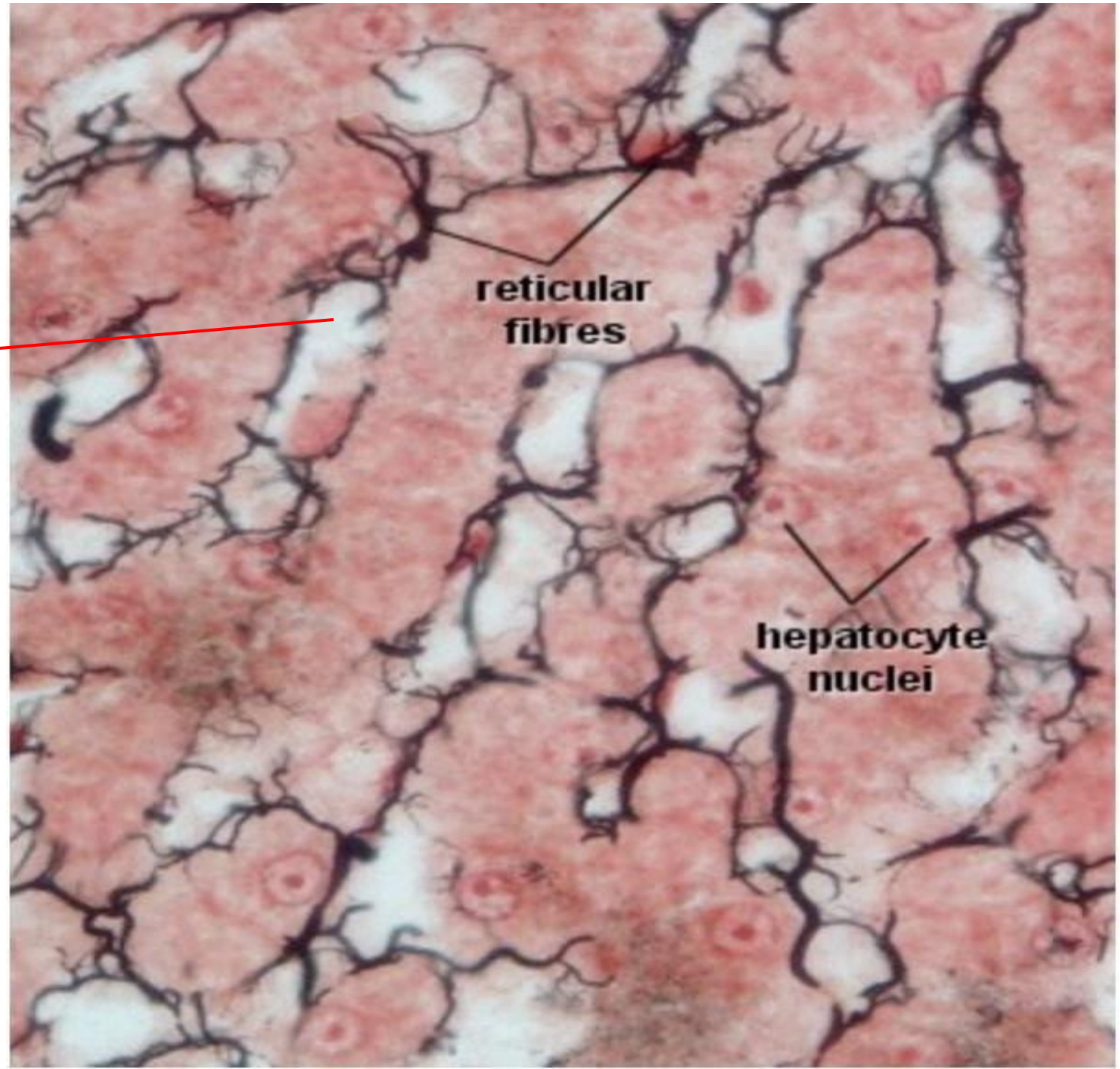
collagen : more likely straight fibers or bundles

Collagen type 3 mainly



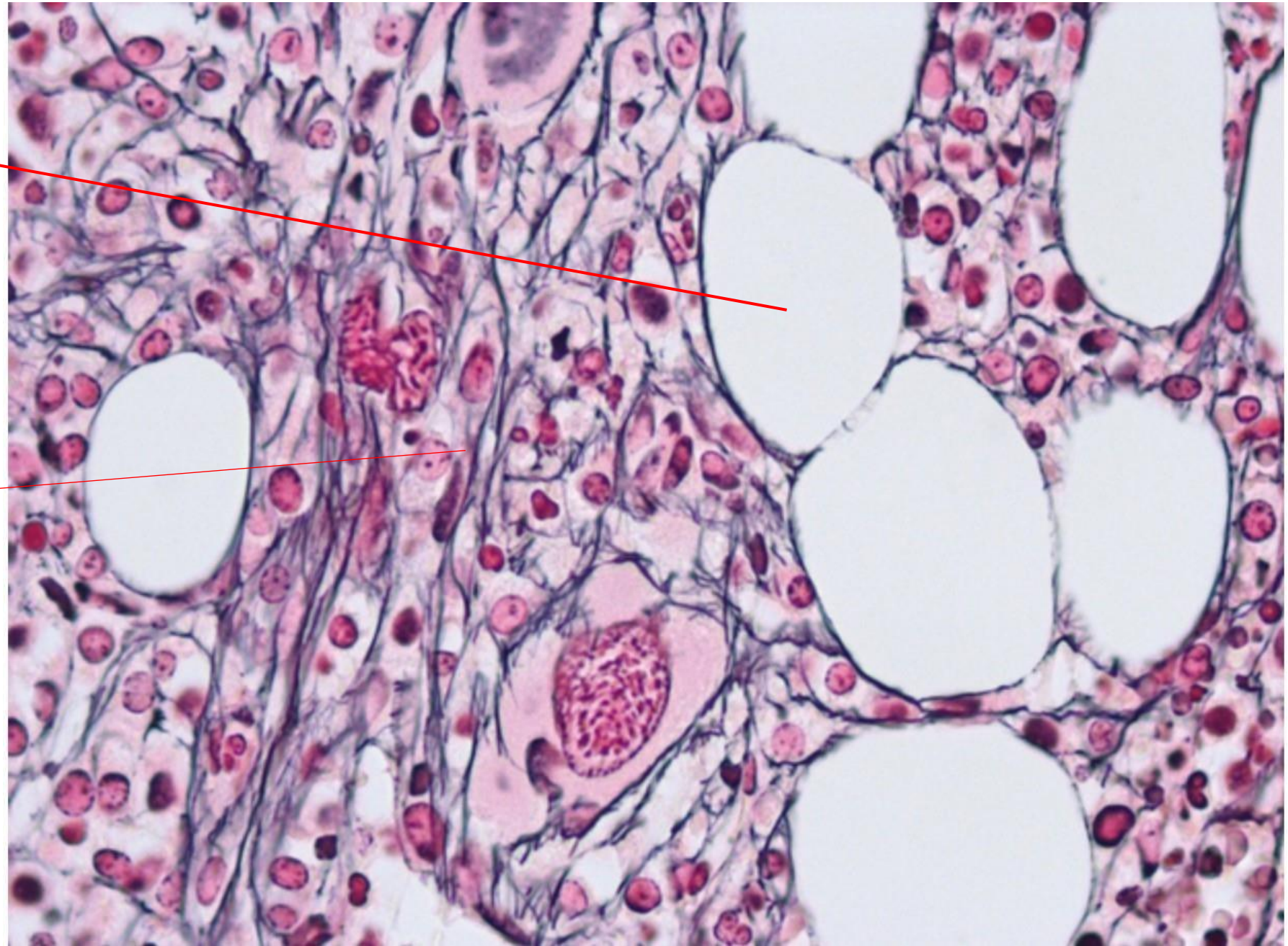
These spaces are called :sinusoids

They are simply capillaries

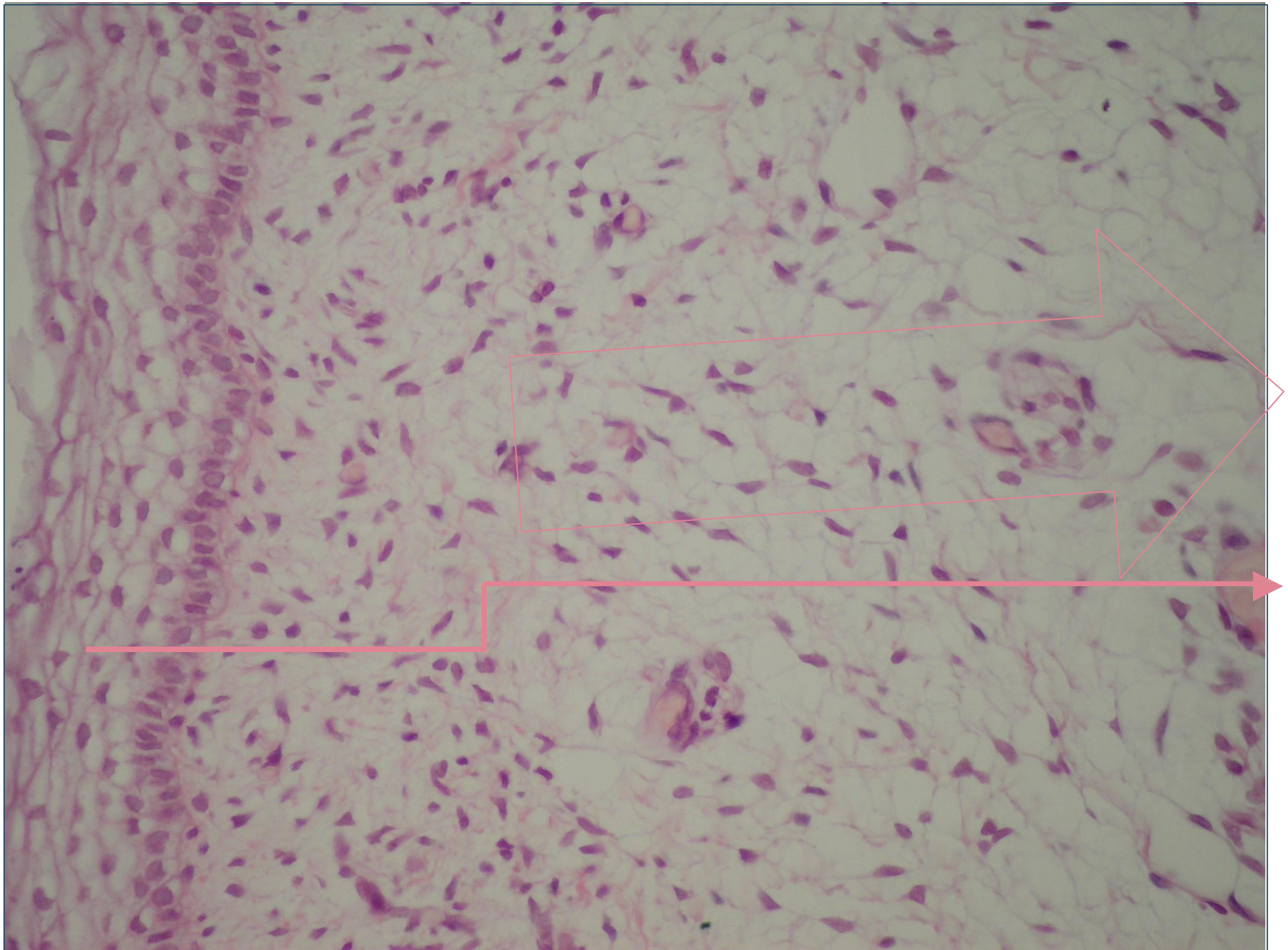


fat cell
adipocyte

reticular fibers



Connective tissue types



Mesenchymal Connective tissue

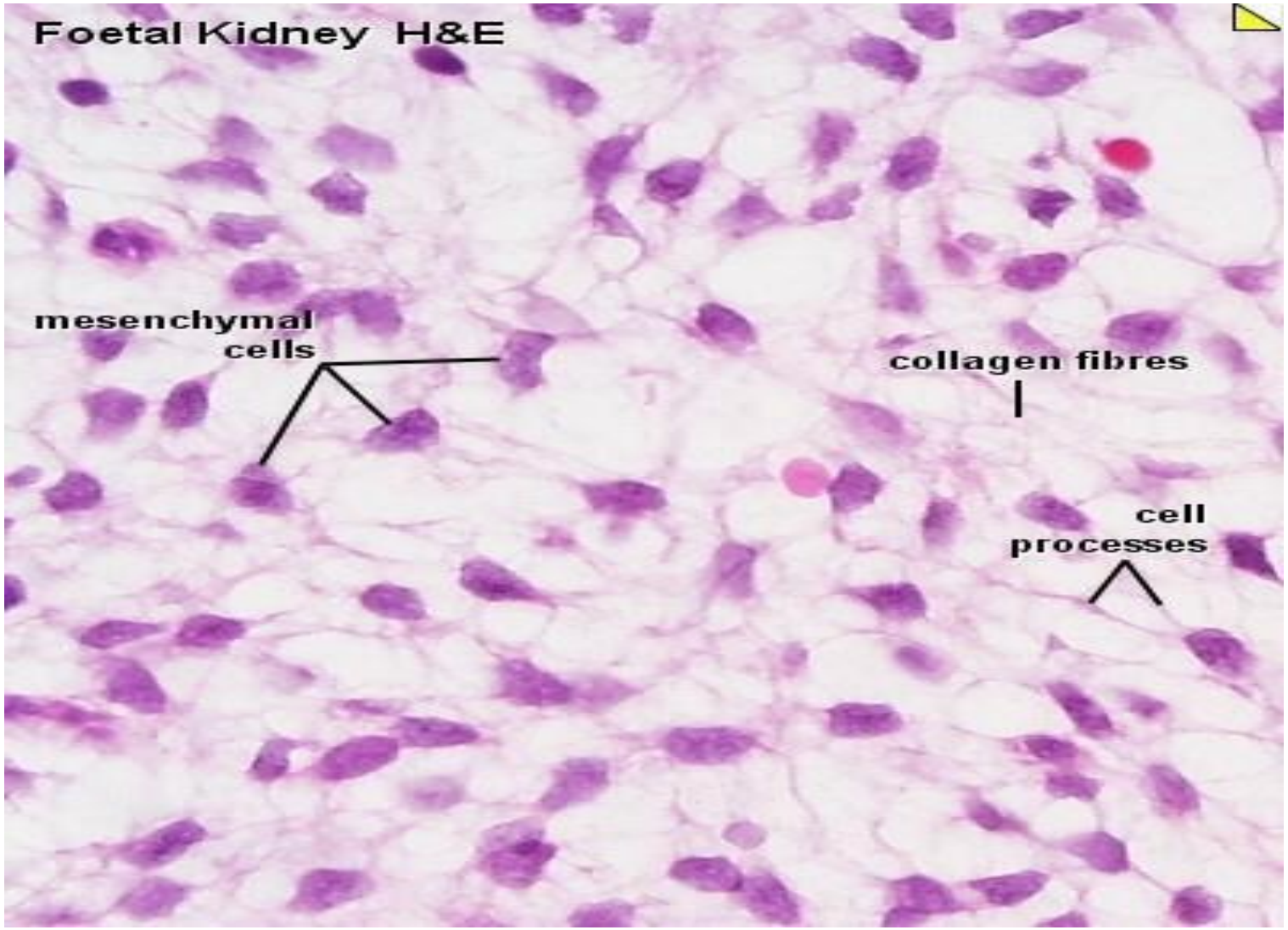
This section is taken from the skin, we know by noticing:

*mesenchymal CT that will form the future dermis

* stratified squamous non keratinized

Mesenchyme

This section was taken from the fetal kidney



how to recognize mesenchymal CT:

1 mesenchymal cells :

spindle shaped

small amount of cytoplasm around it

2 more whitish than pinkish :

some collagen fibers (less pinkish)

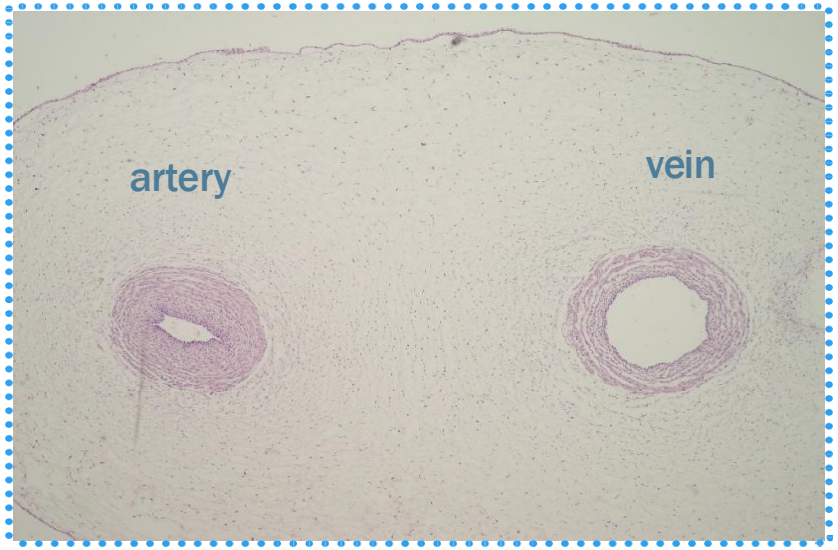
a good amount of ground substance (more whitish)

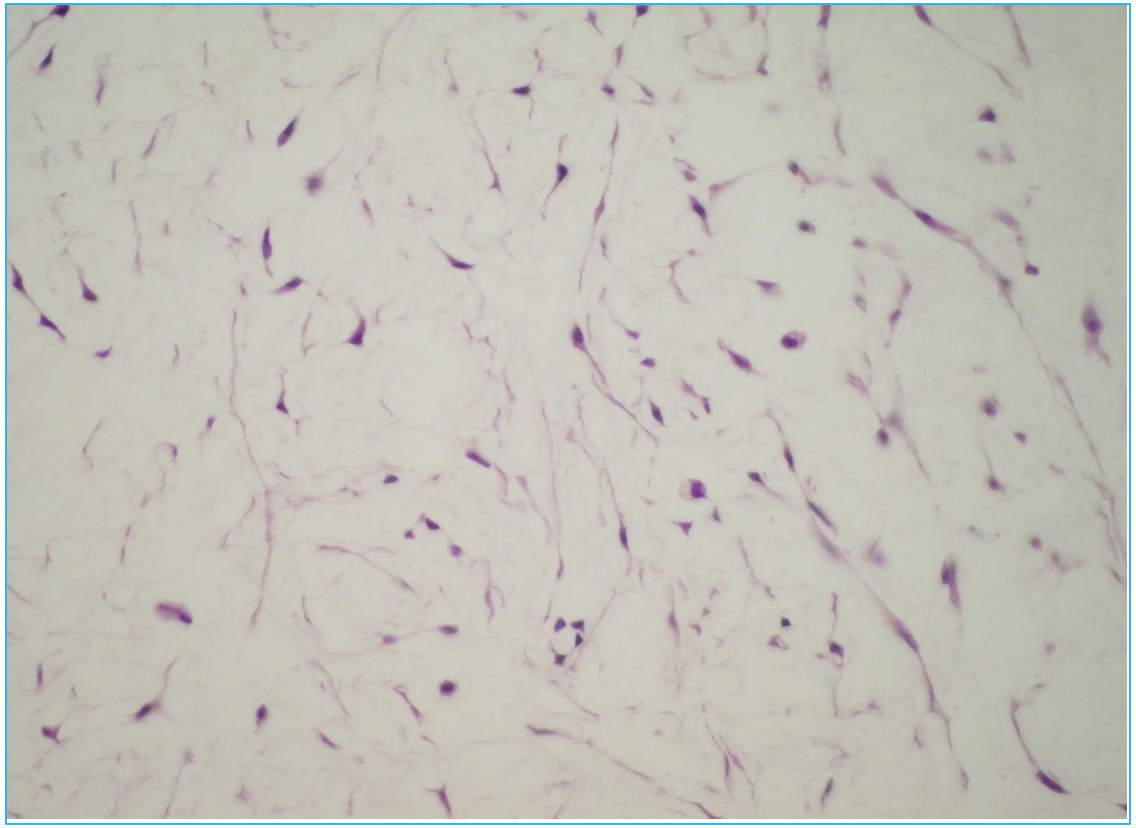
Mucoid connective tissue

this section was taken from the umbilical cord (the main site we can find mucoid CT in) .
mucoid (mucous) :
ground substance: a lot of ground substances precisely hyaluronic acid to protect the internal vessels

cells: mainly fibroblasts + some mesenchymal stem cells

. fibers: small amount of collagen fibers





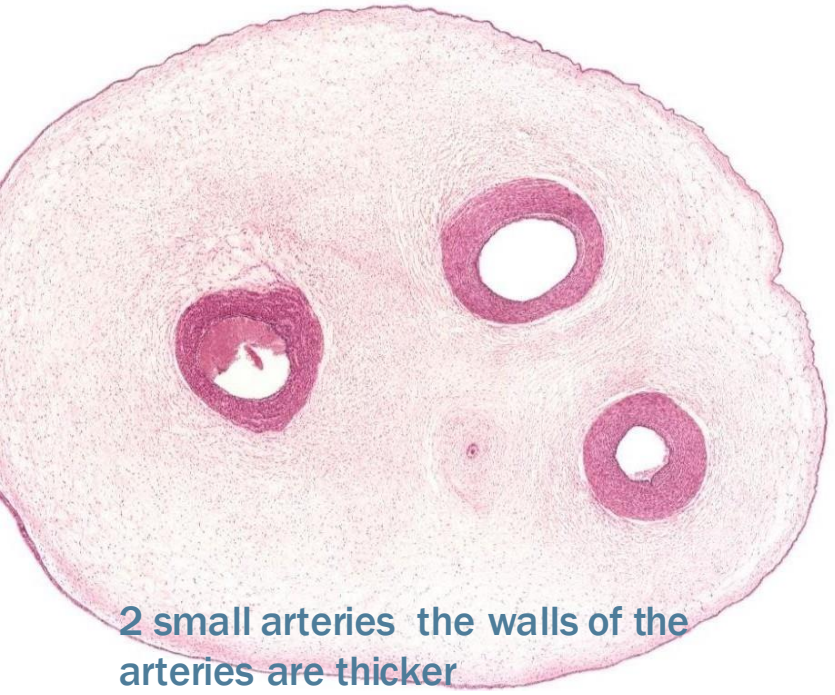
although it has a smaller amount of mesenchymal cells than that found in mesenchymal CT it is useful in extracting mesenchymal stem cells , which is used to treat a Varity of diseases .

Mucoid CT

In advanced stages of umbilical cord:

2 umbilical arteries

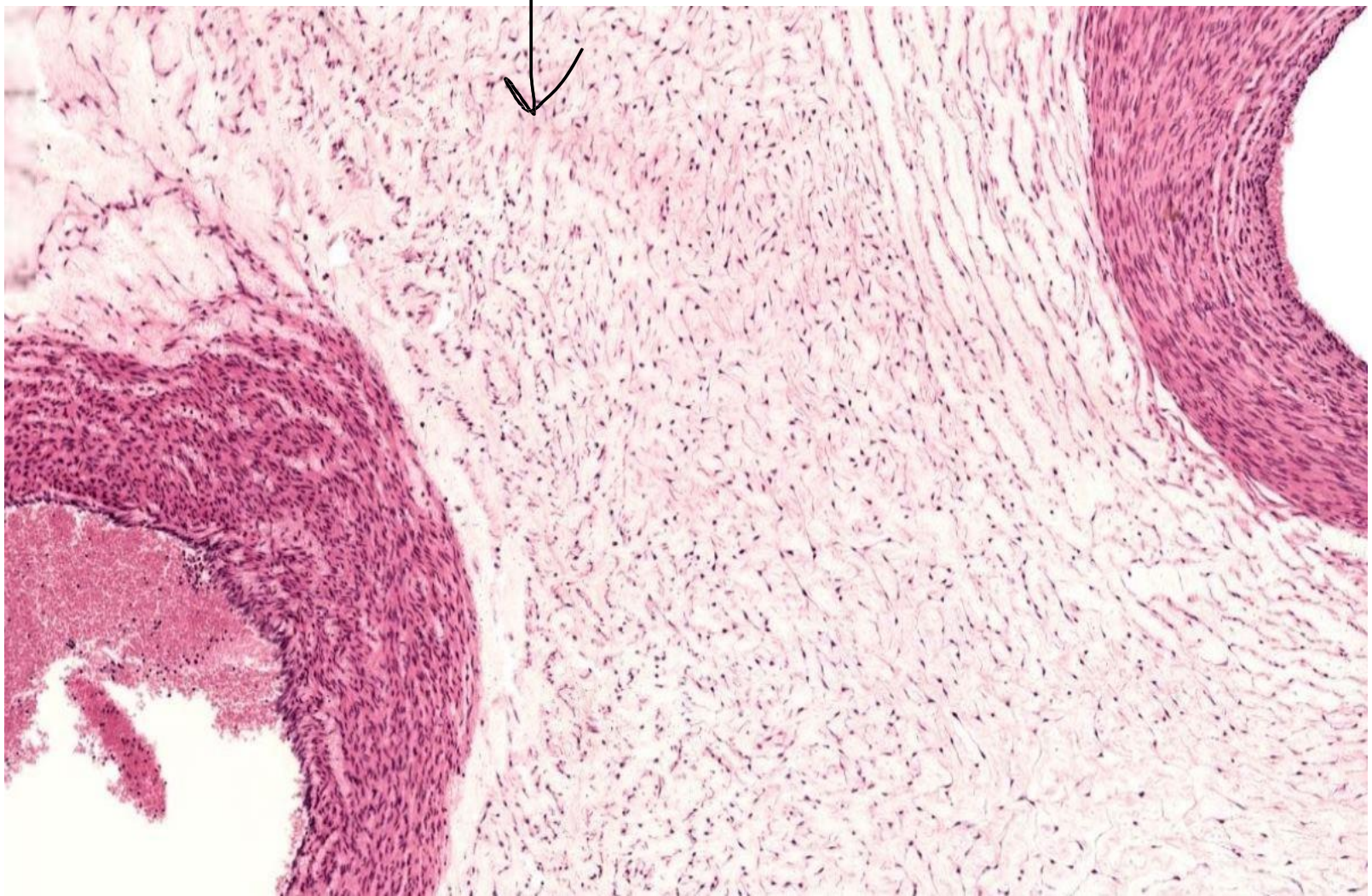
1 vein



2 small arteries the walls of the arteries are thicker

1 vein with thinner wall

Most of them is fibroblasts

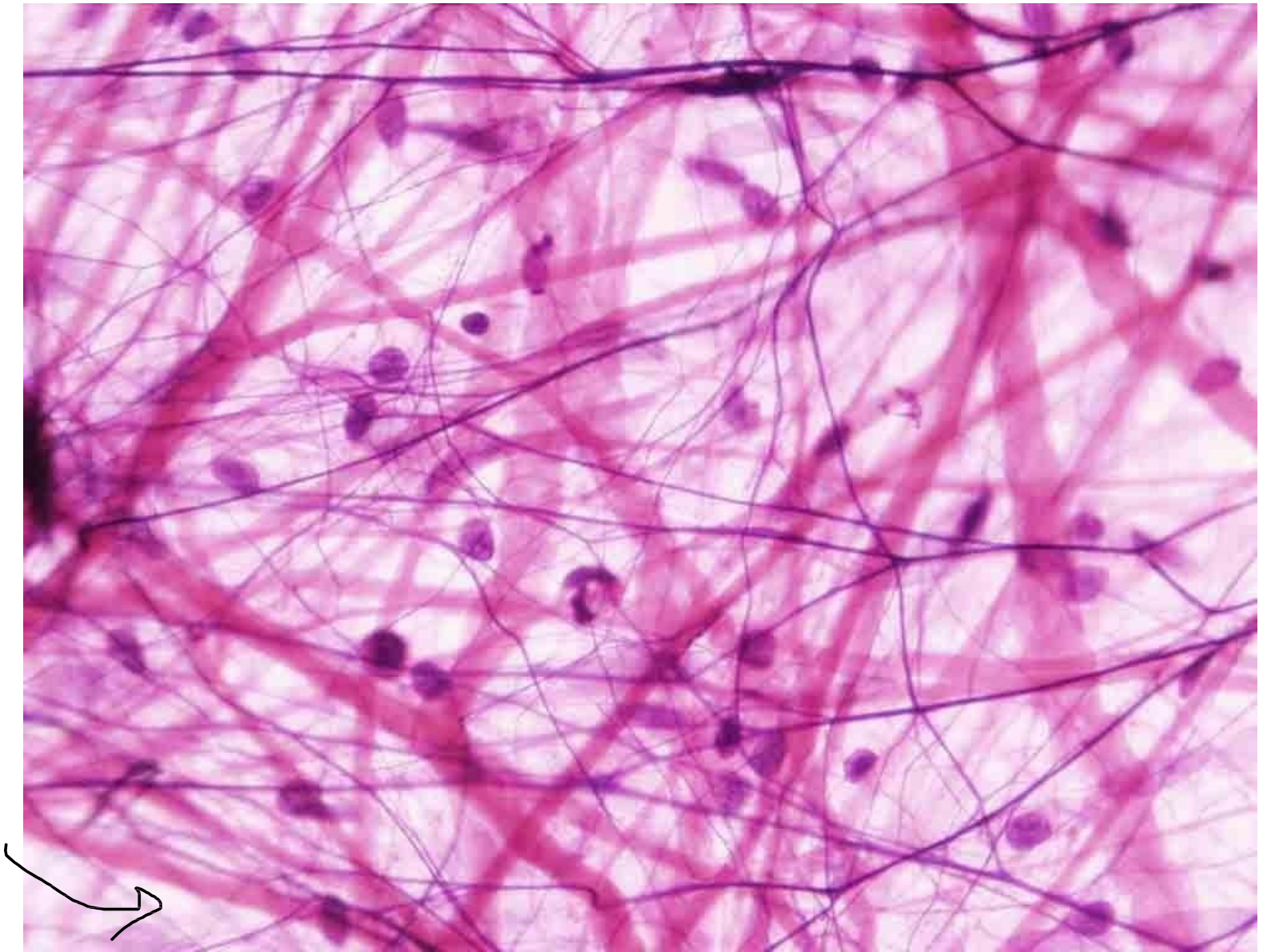


Connective tissue (CT) proper- Loose CT

more cells
how ever the nuclei
are relaxed

more ground
substance

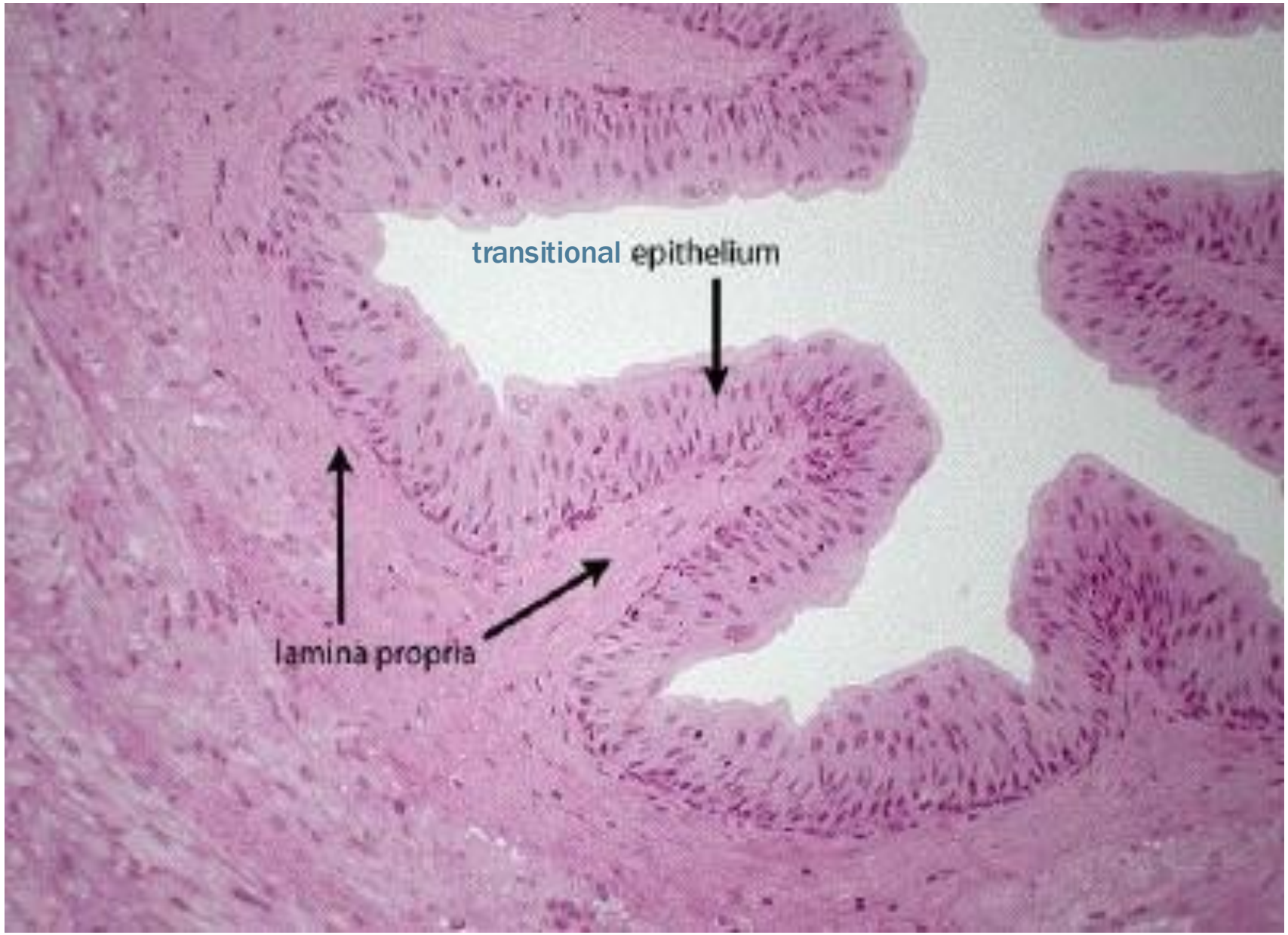
less fibers

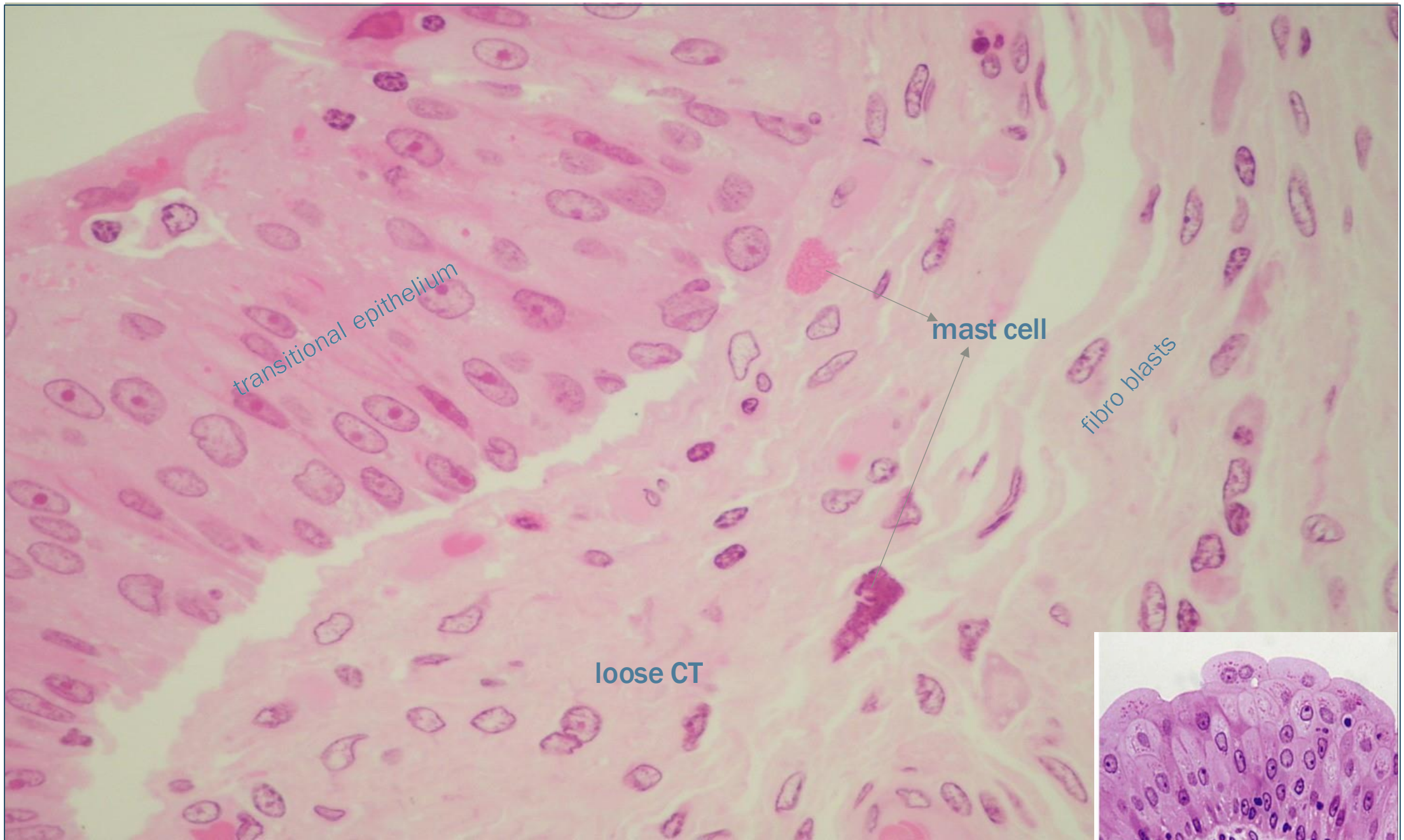


loose CT:
less fibers

more cells

more ground
substance



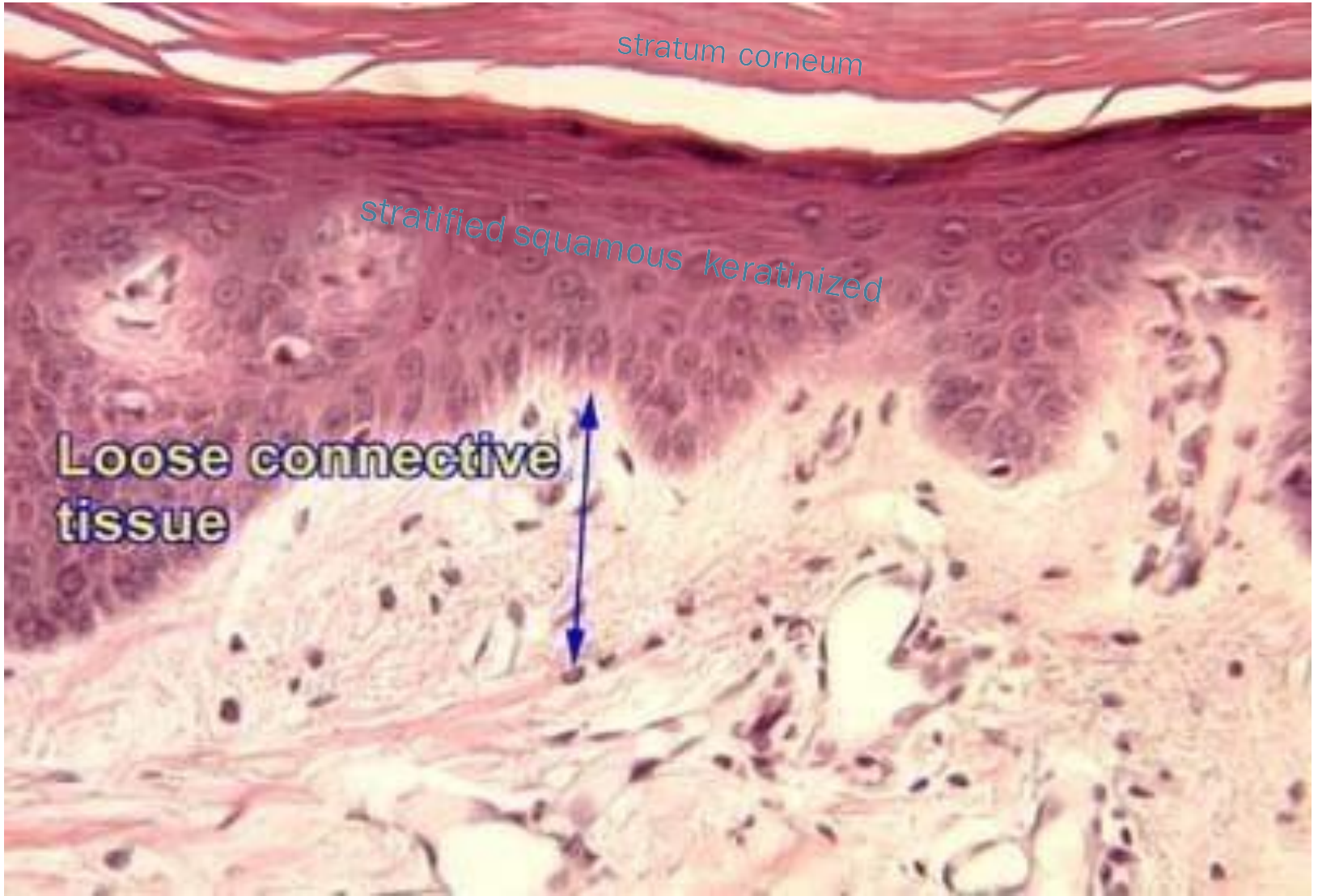

transitional epithelium
mast cell
fibro blasts
loose CT

This section is taken from the skin

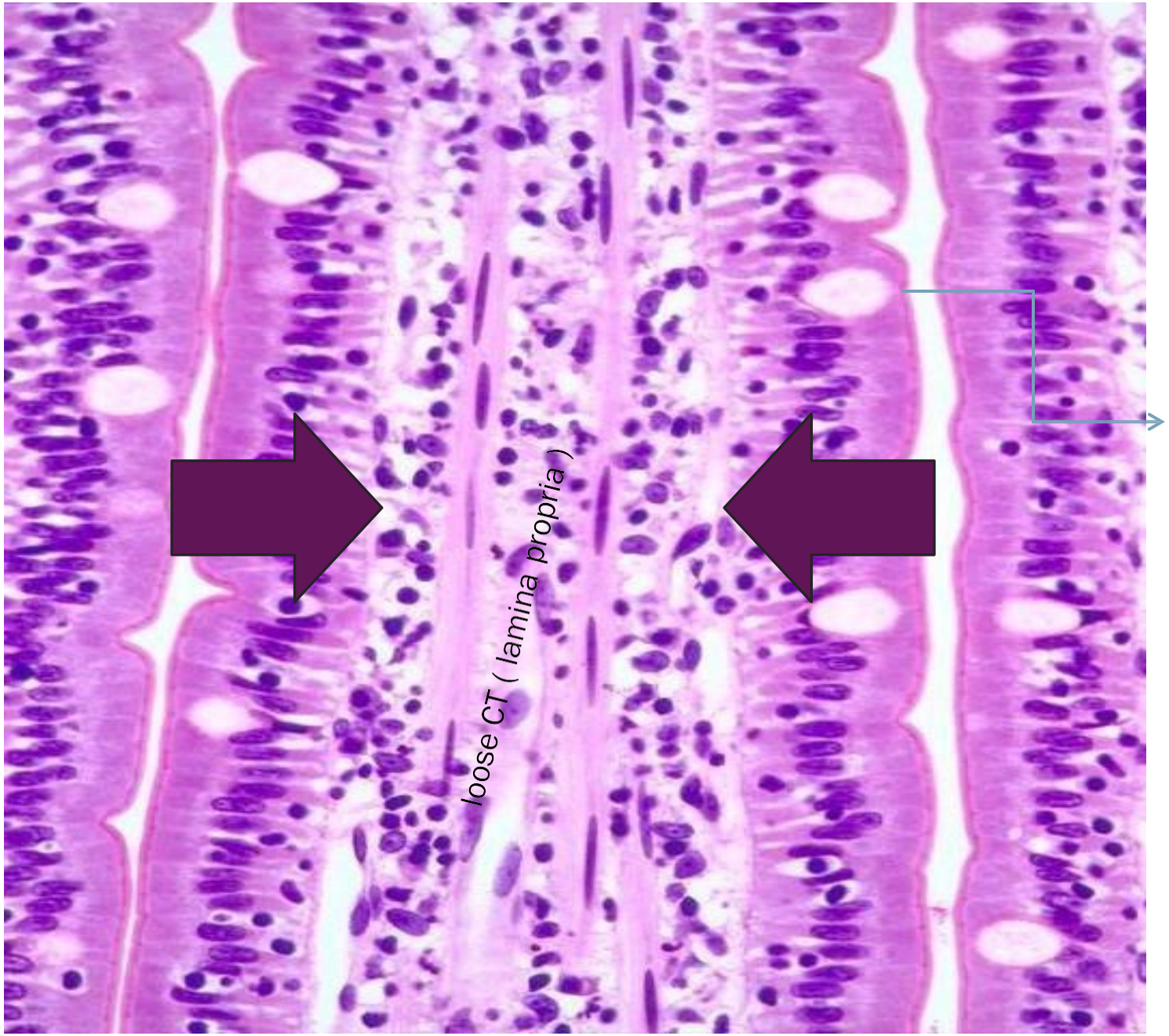
Dermis (2layers):

loose CT (papillary layer)

dense CT

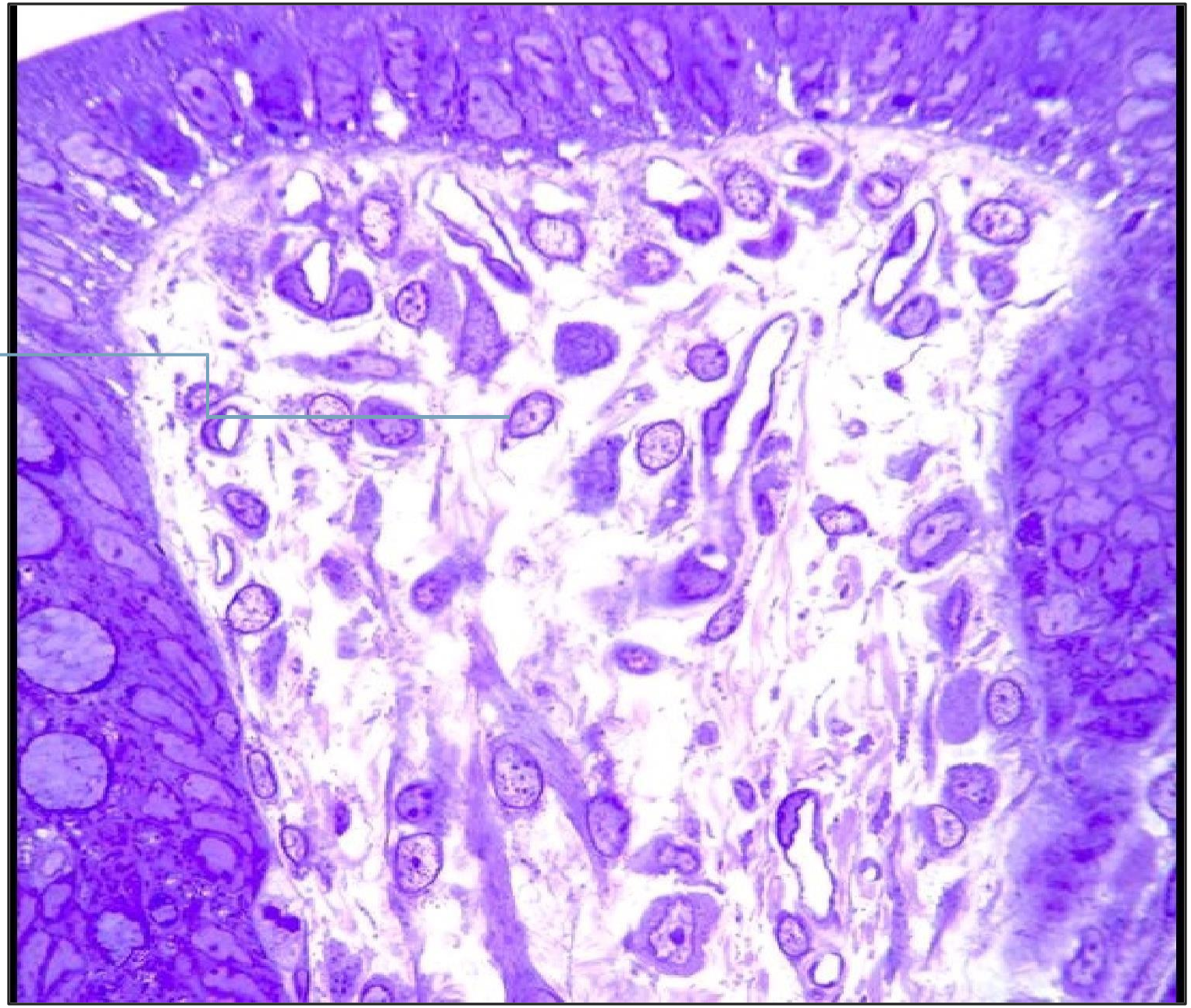


This section was taken from GIT

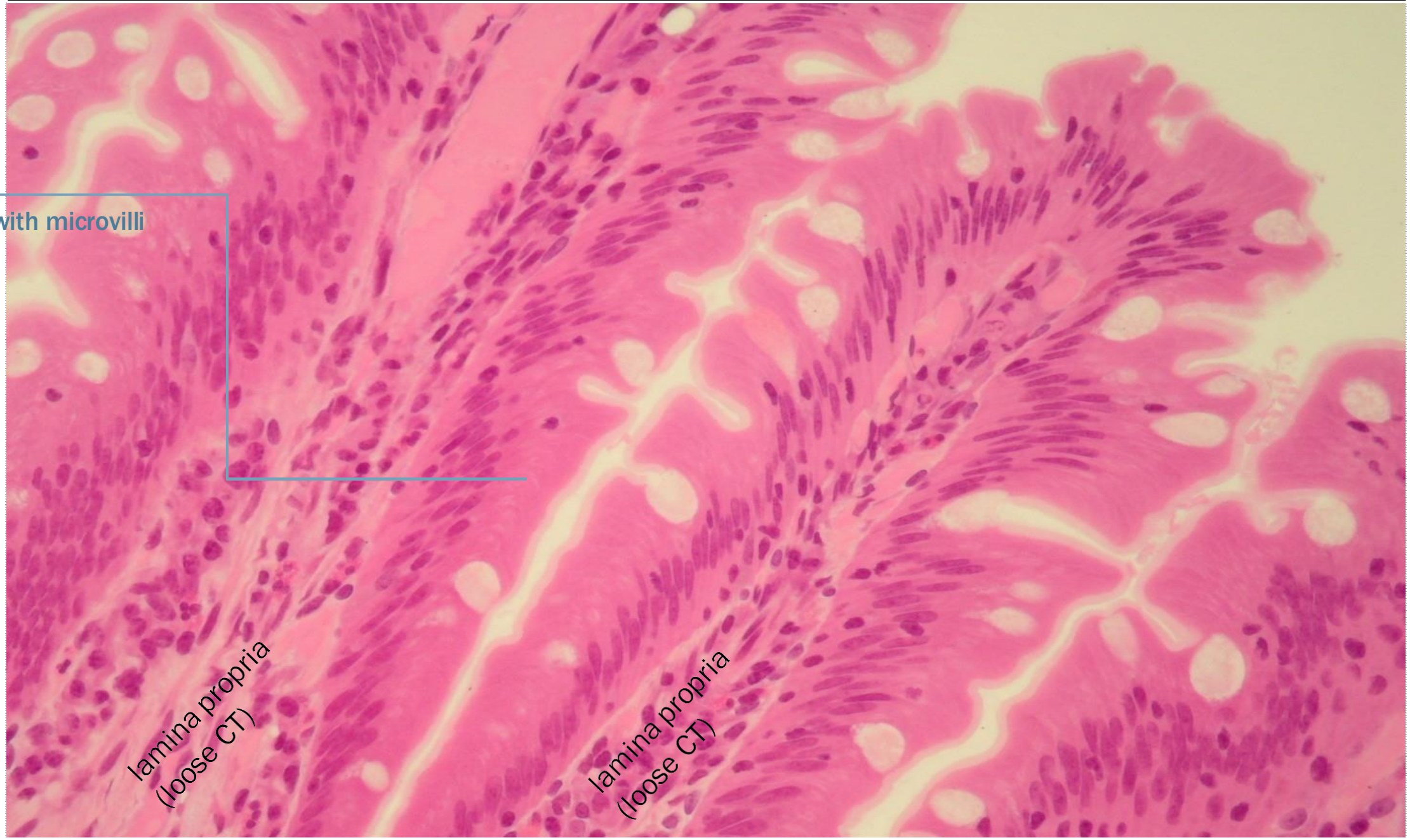


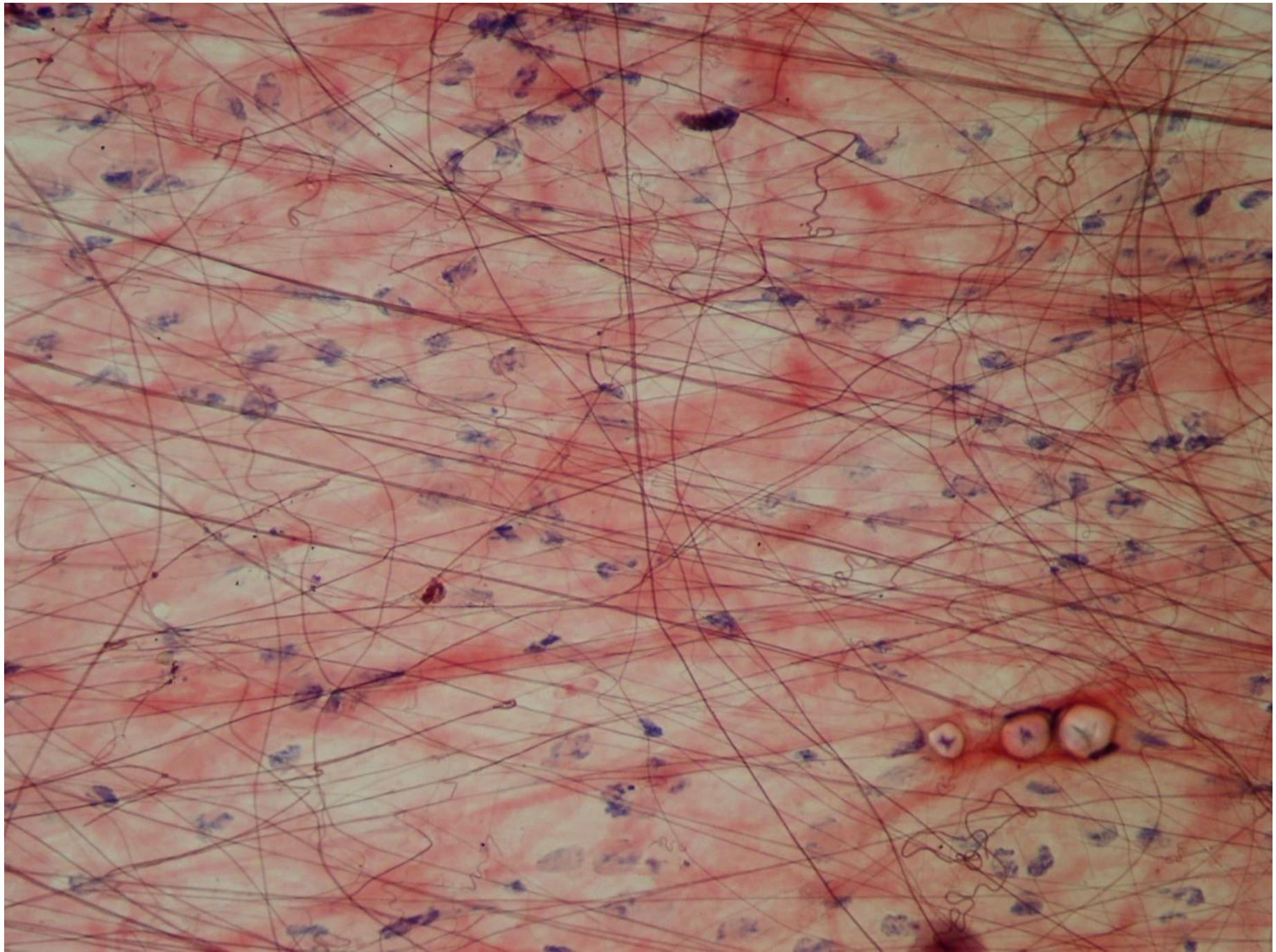
simple columnar epithelium with goblet cells &microvilli

loose CT

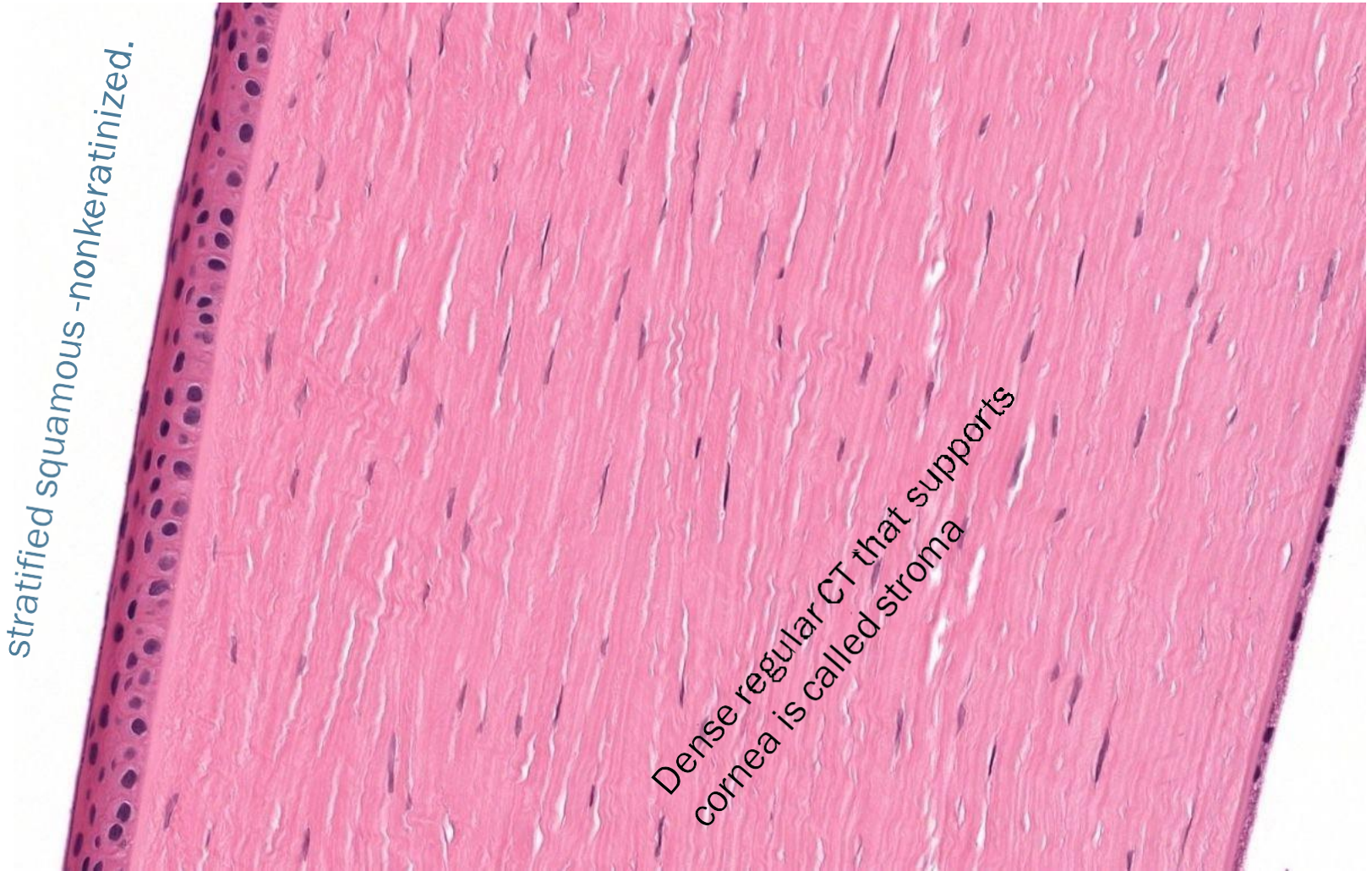


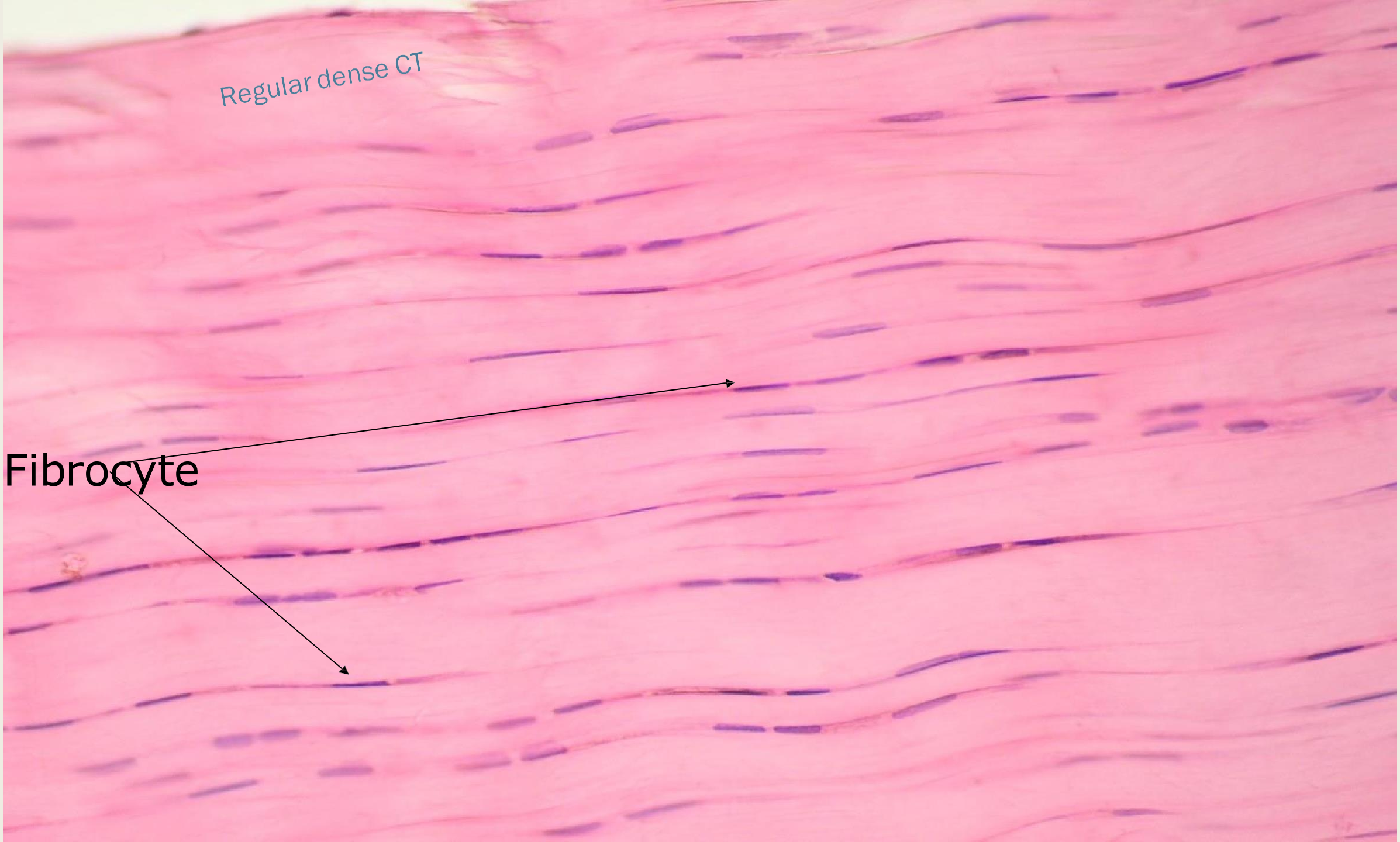
This section was taken from GIT





Connective tissue (CT) proper- Regular dense CT




Regular dense CT
Fibrocyte

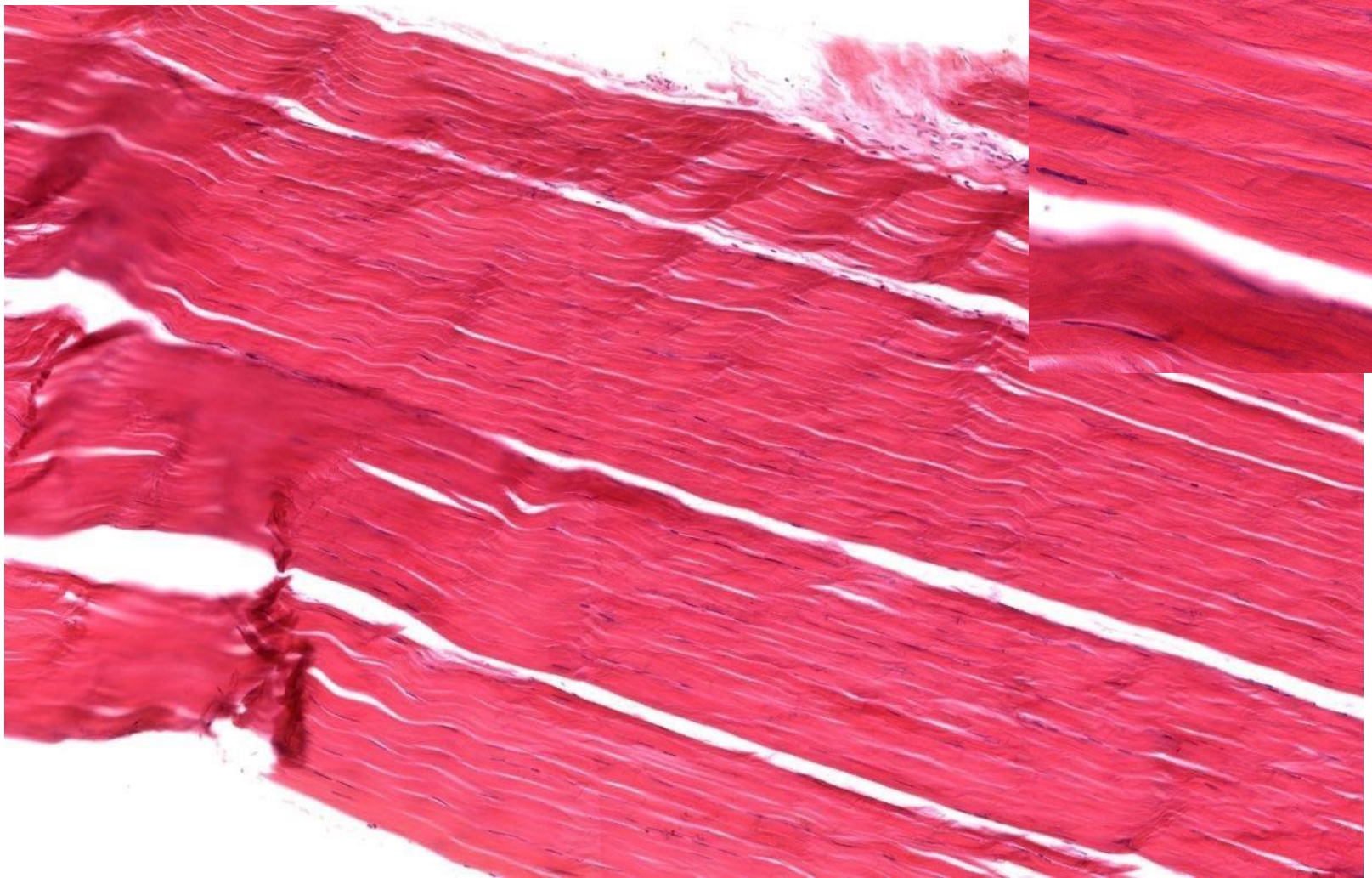
Identify?

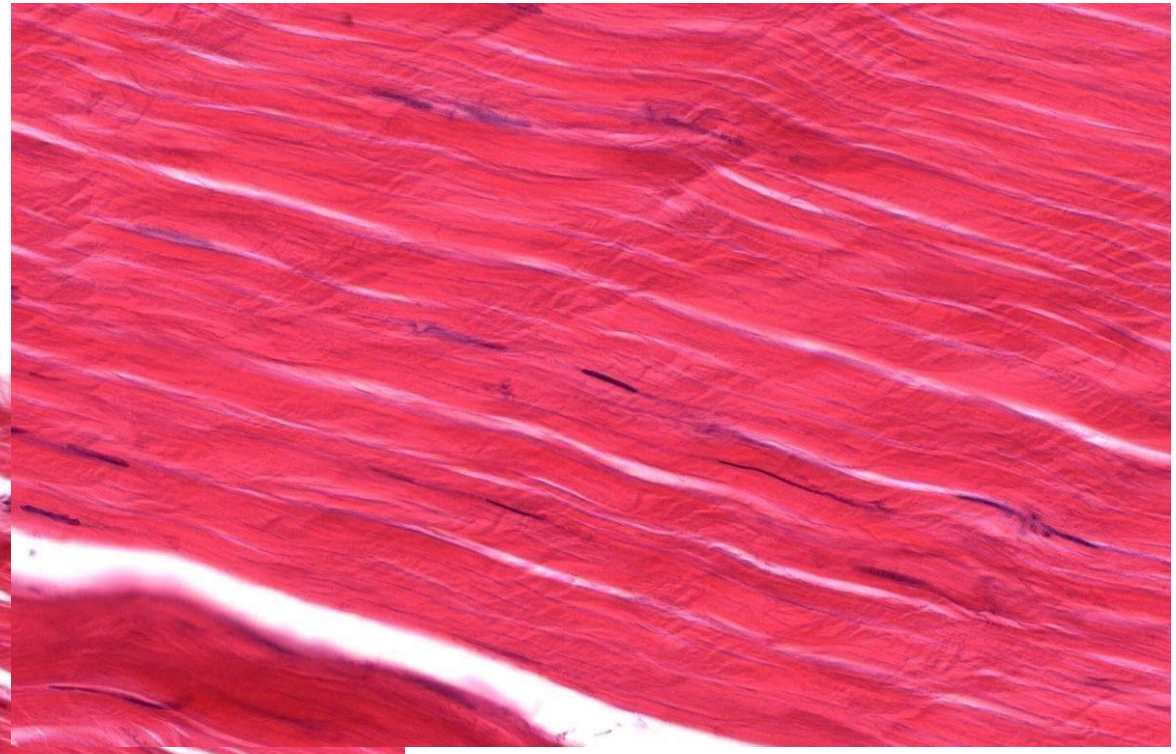
Regular dense CT

Cells?

Mainly fibrocytes

This section was taken from tendon





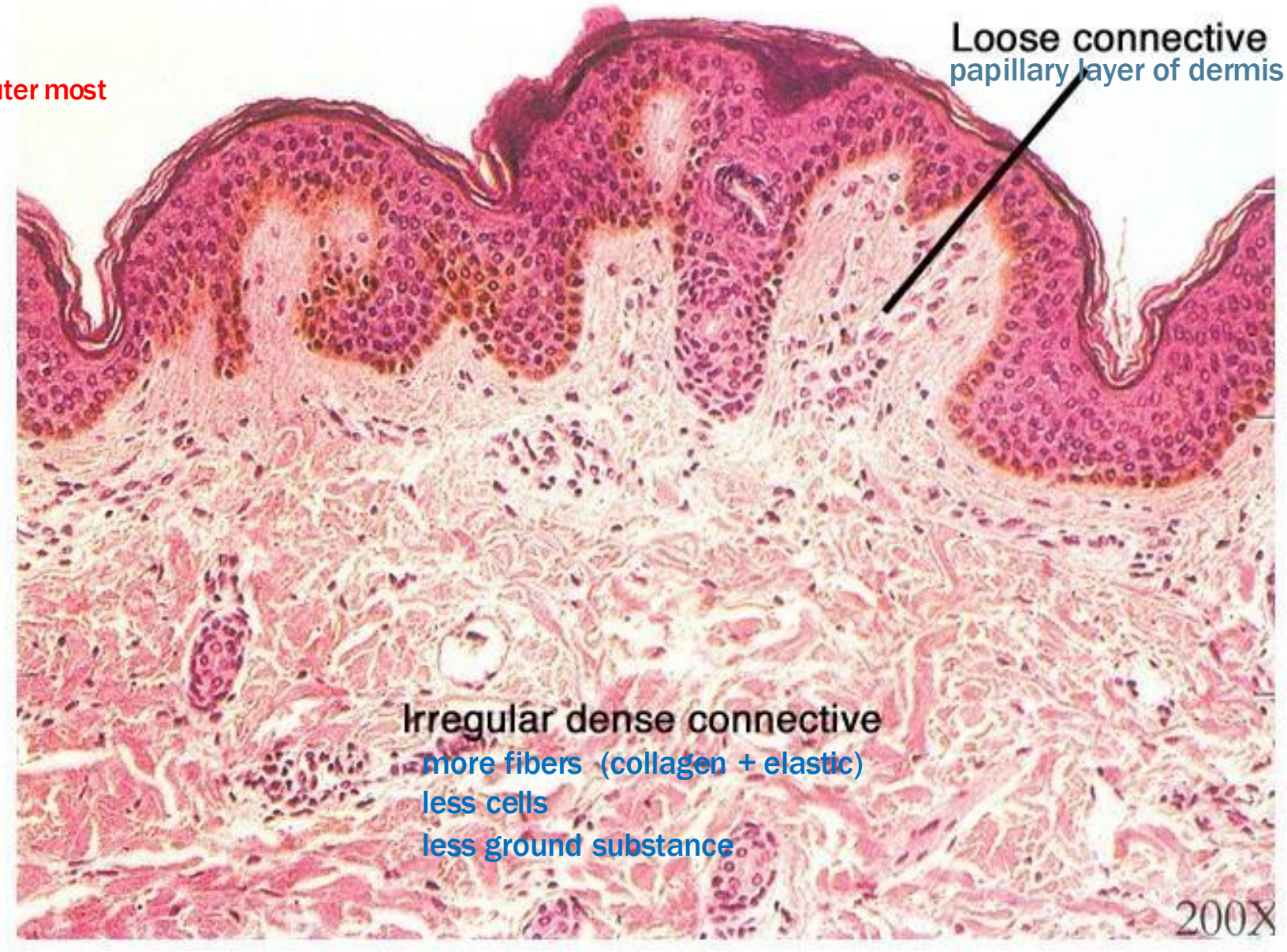
Connective tissue (CT) proper- Irregular dense CT

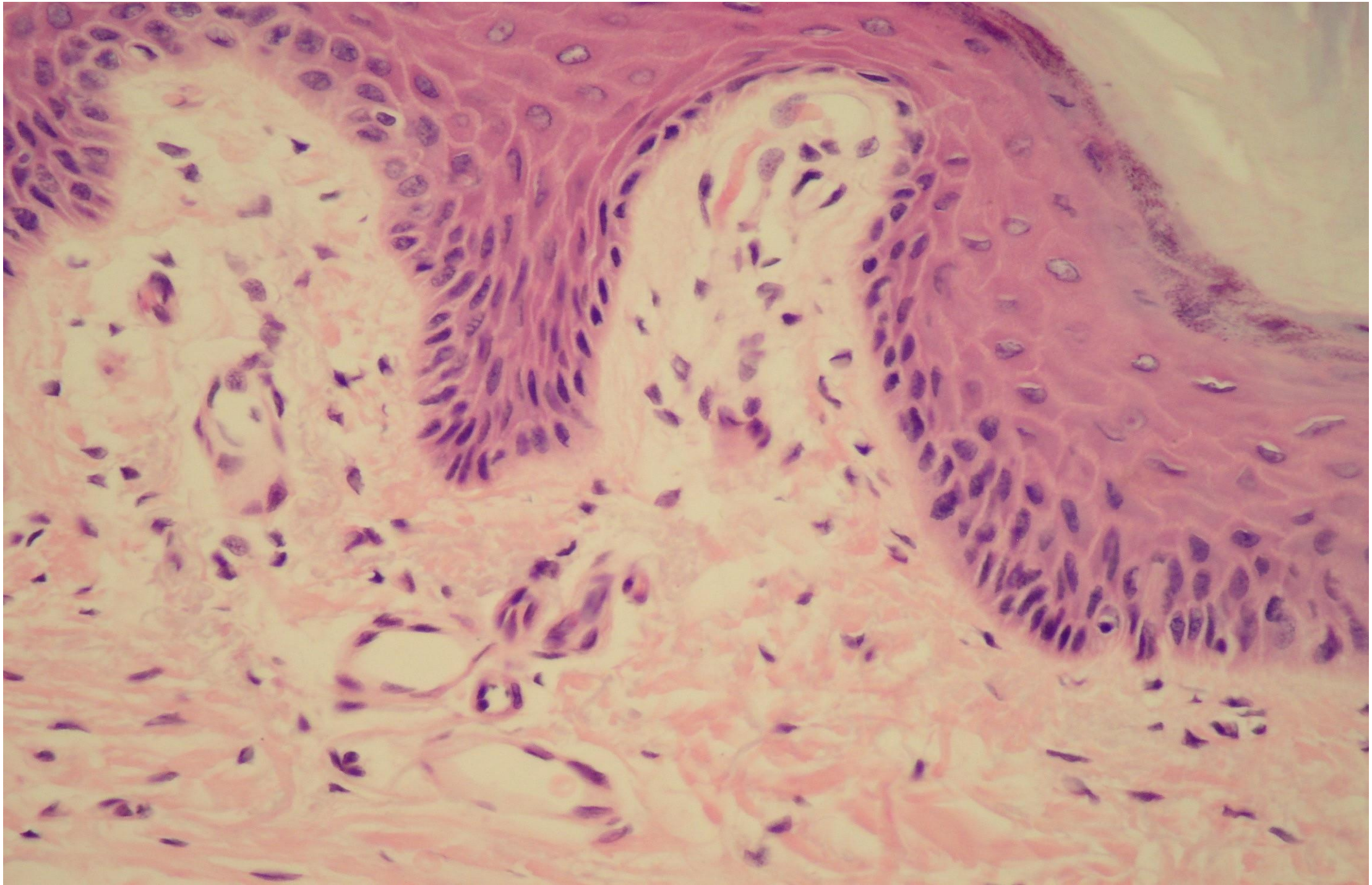
This section was taken from the skin

- epidermis
  - Stratum corneum
  - Stratum lucidum
  - Granular layer
  - Spinous layer
  - Basale layer
- dermis
  - Papillary (loose CT)
  - Reticular layer (dense CT)
- Subcutaneous layer

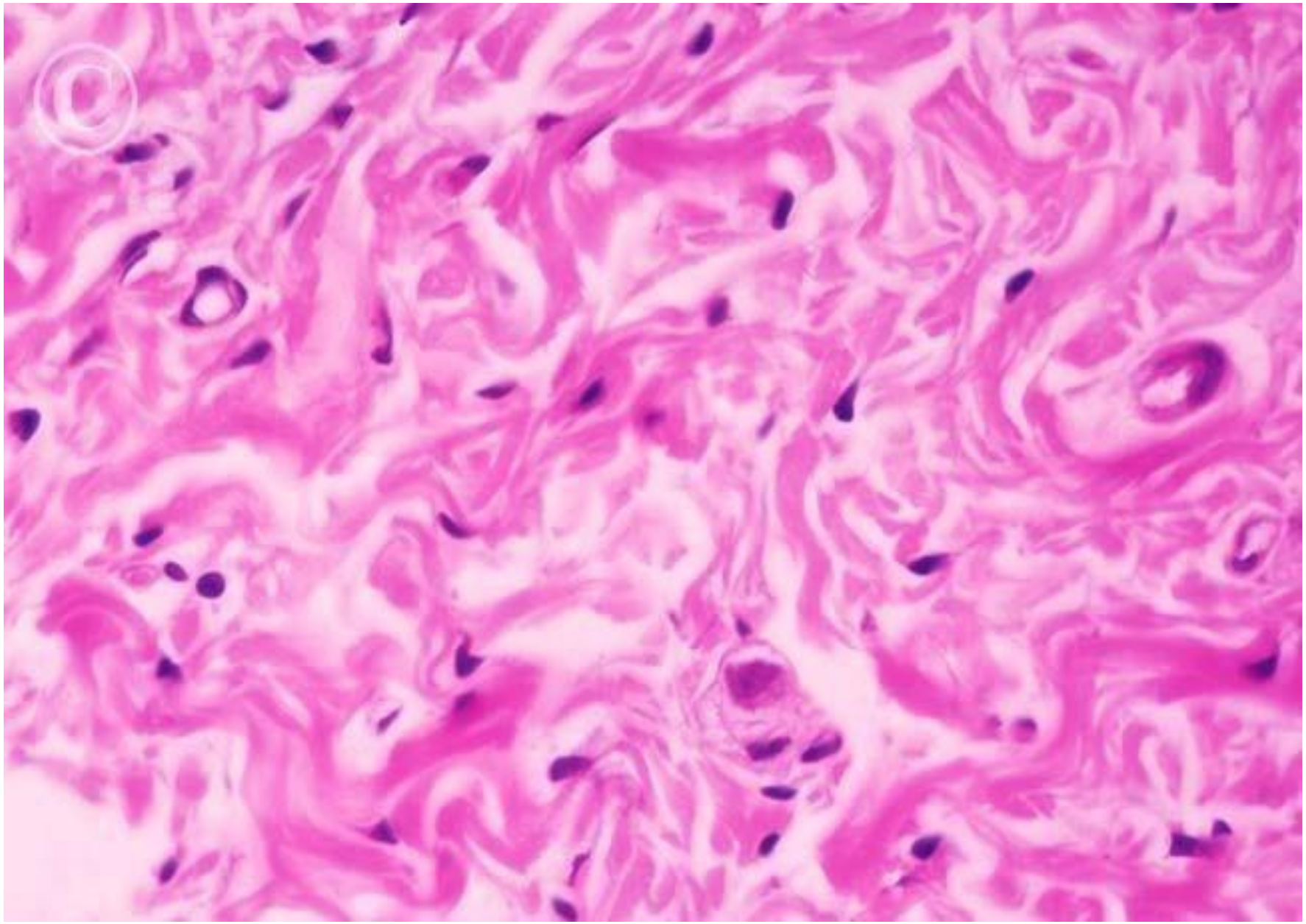
Outer most

Inner most

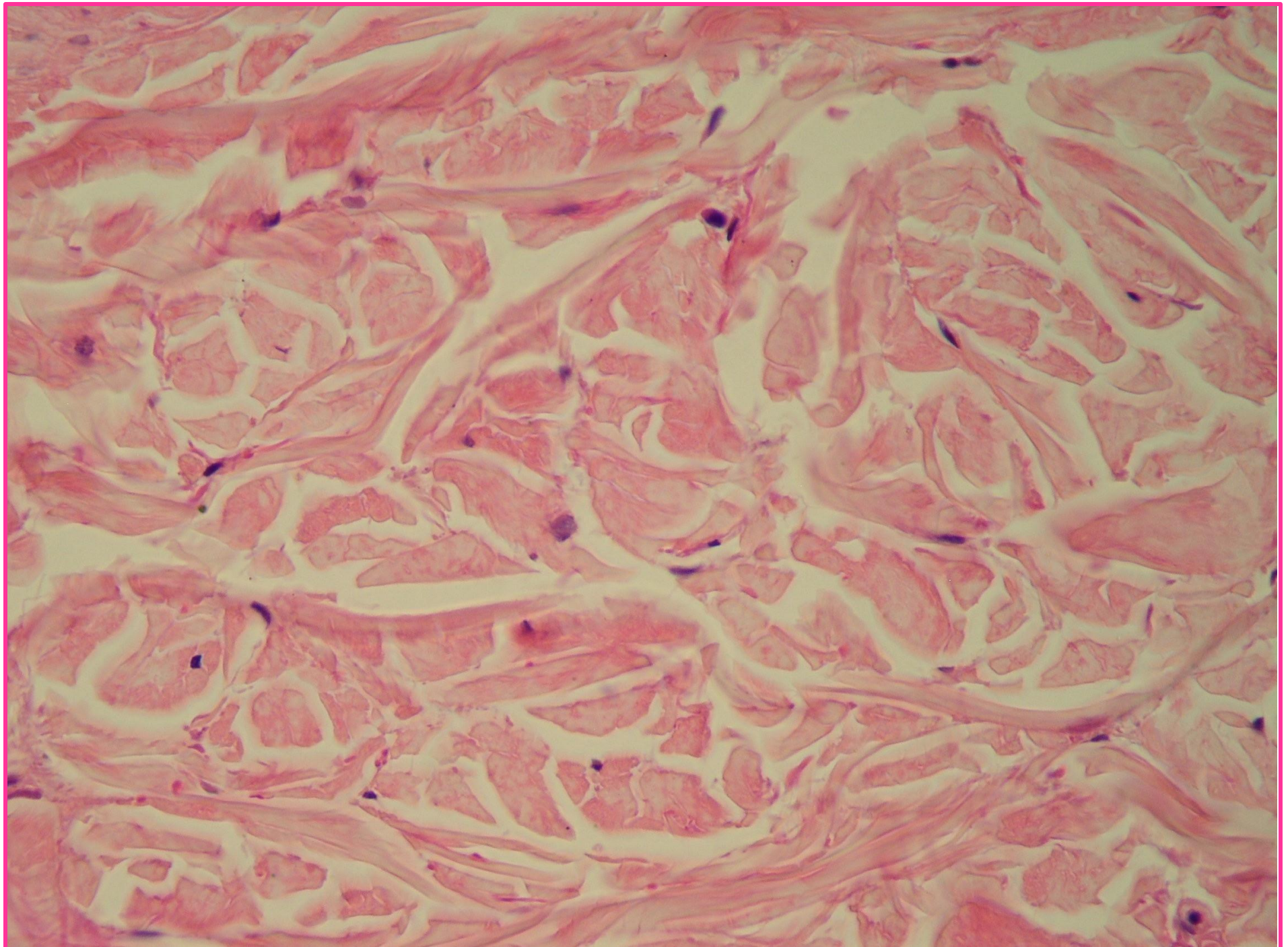




Dense irregular CT



Dense irregular CT

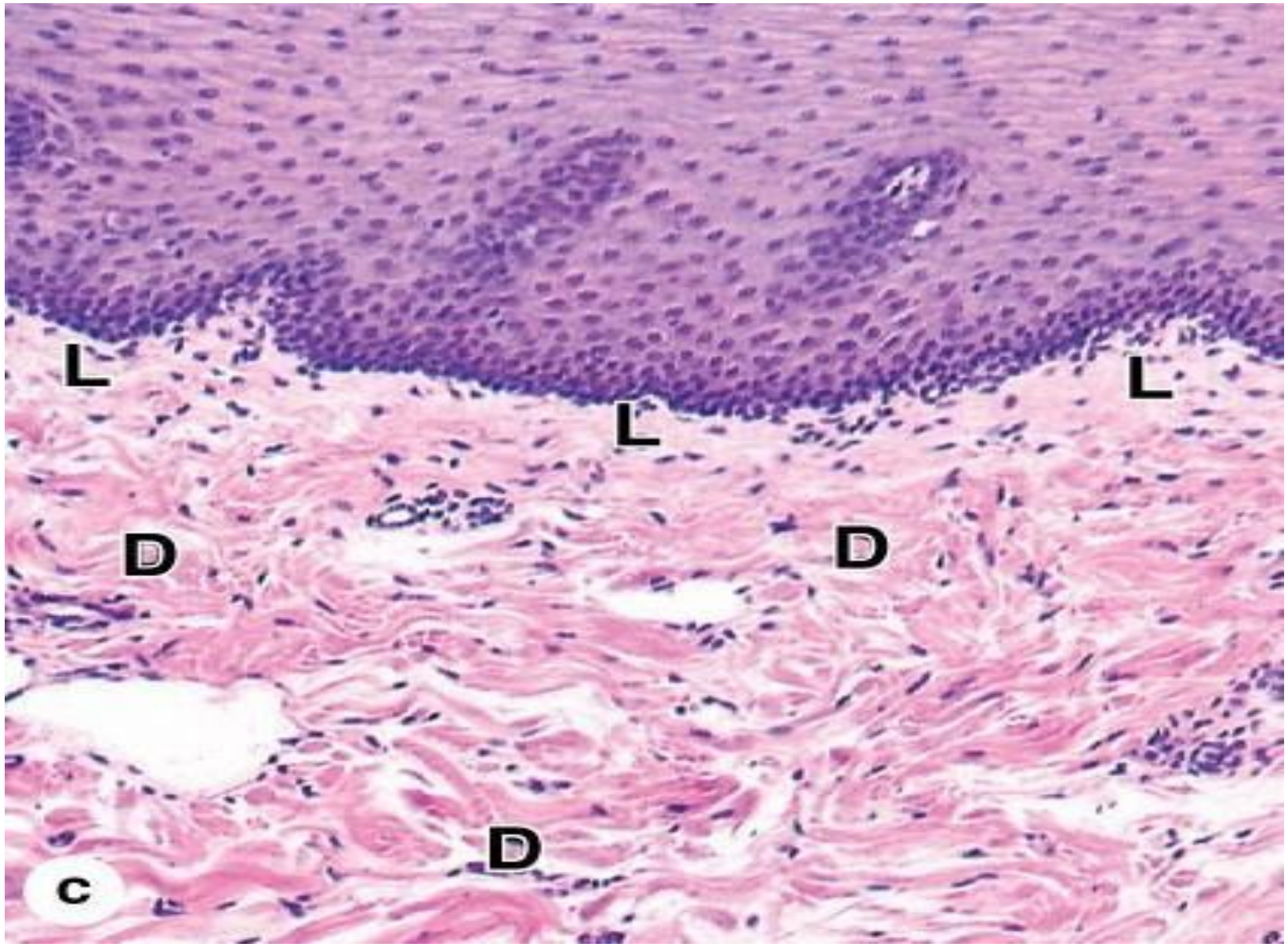


we can notice the difference between loose and dense by eosinophilia

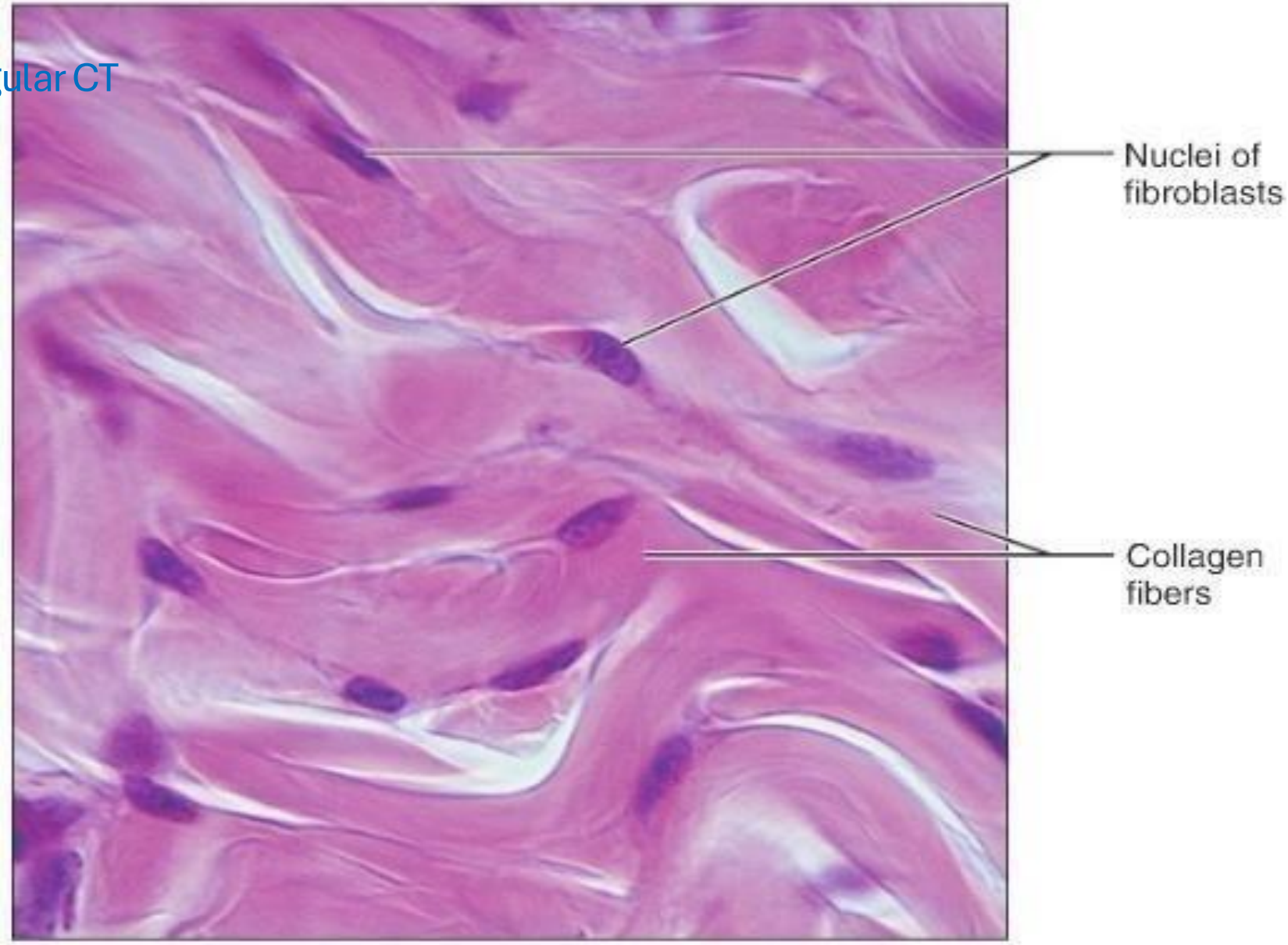
dense CT stains more darkly since it has more fibers.

regular CT , can withstand uni-axial tension , because of the arrangement of the collagen bundles parallel to each other.

where the Irregular CT ,can withstand multi-axial tension , because of collagen bundles arrangement in many directions.

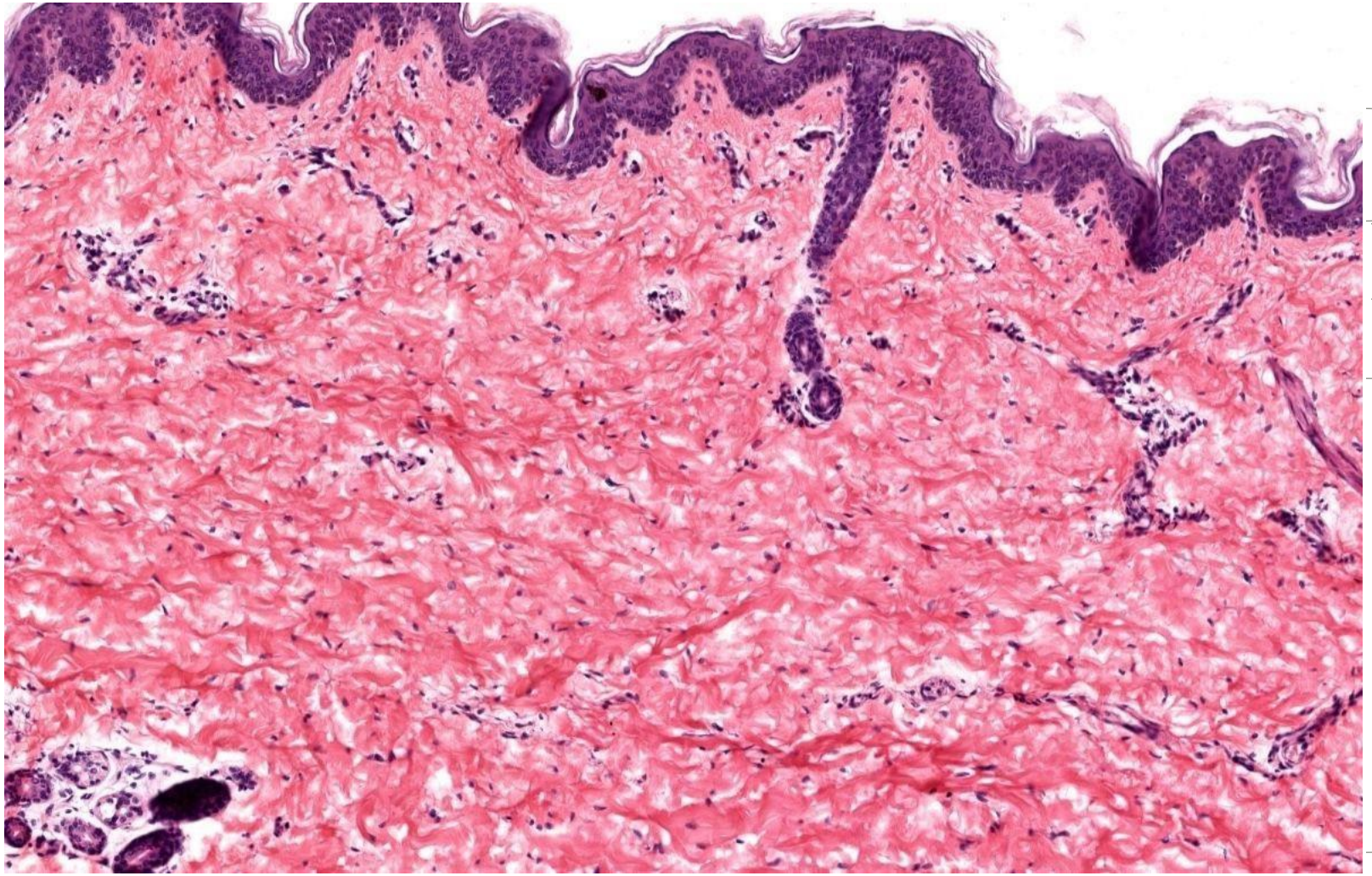


Dense irregular CT



Identify? Dense irregular CT

It is obvious that this section was taken from the skin



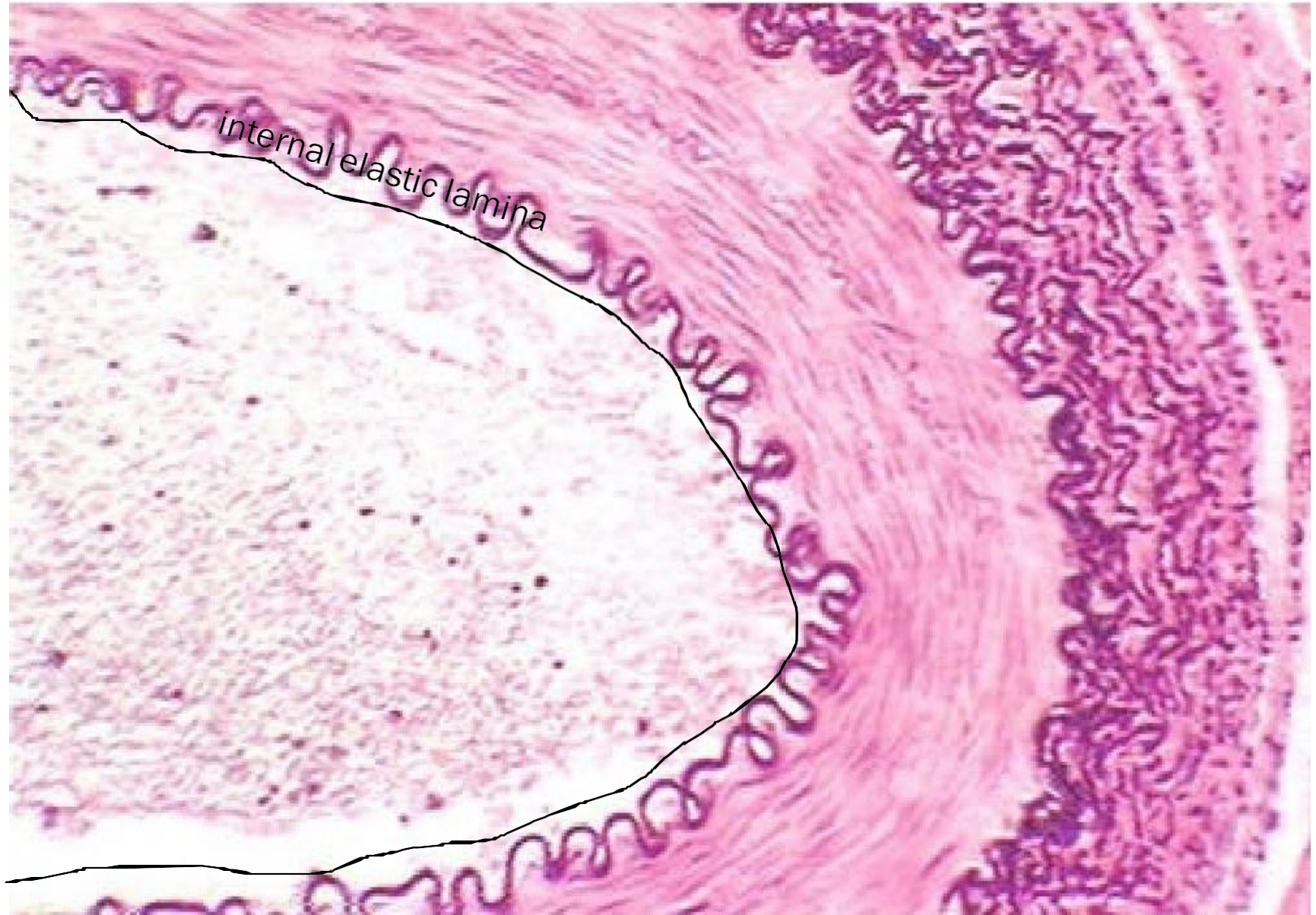
Aldehyde fusion/elastic

Dense irregular
were elastic fibers
appear dark (pinkish - reddish)
due to aldehyde fusion
staining

Elastic fibers

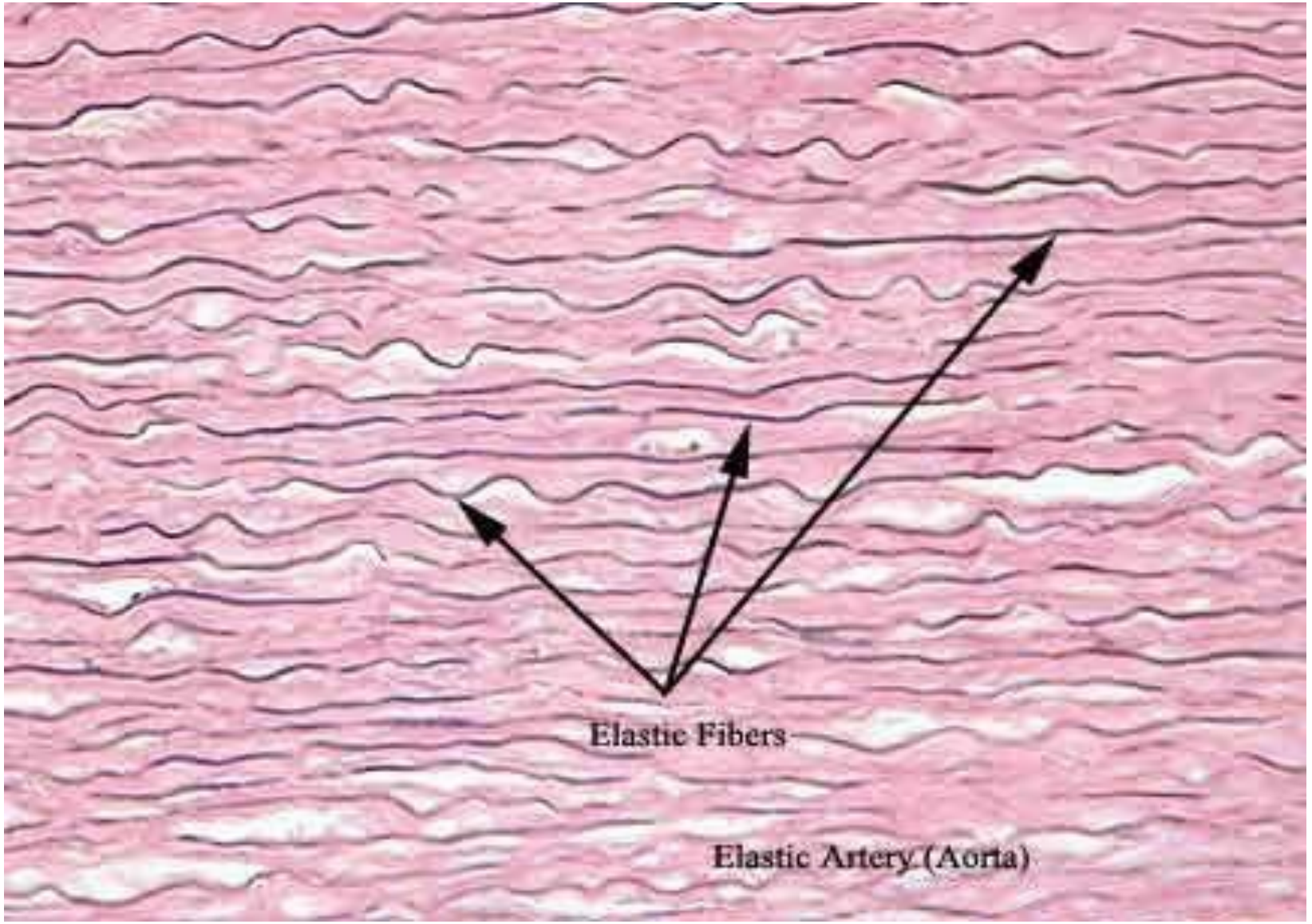
elastic fibers are found usually where we have stretching. ex :blood vessels (aorta mainly) , dermis, lung tissue

This section is for a blood vessel



this is a special stain for elastic fibers where it appear blackish

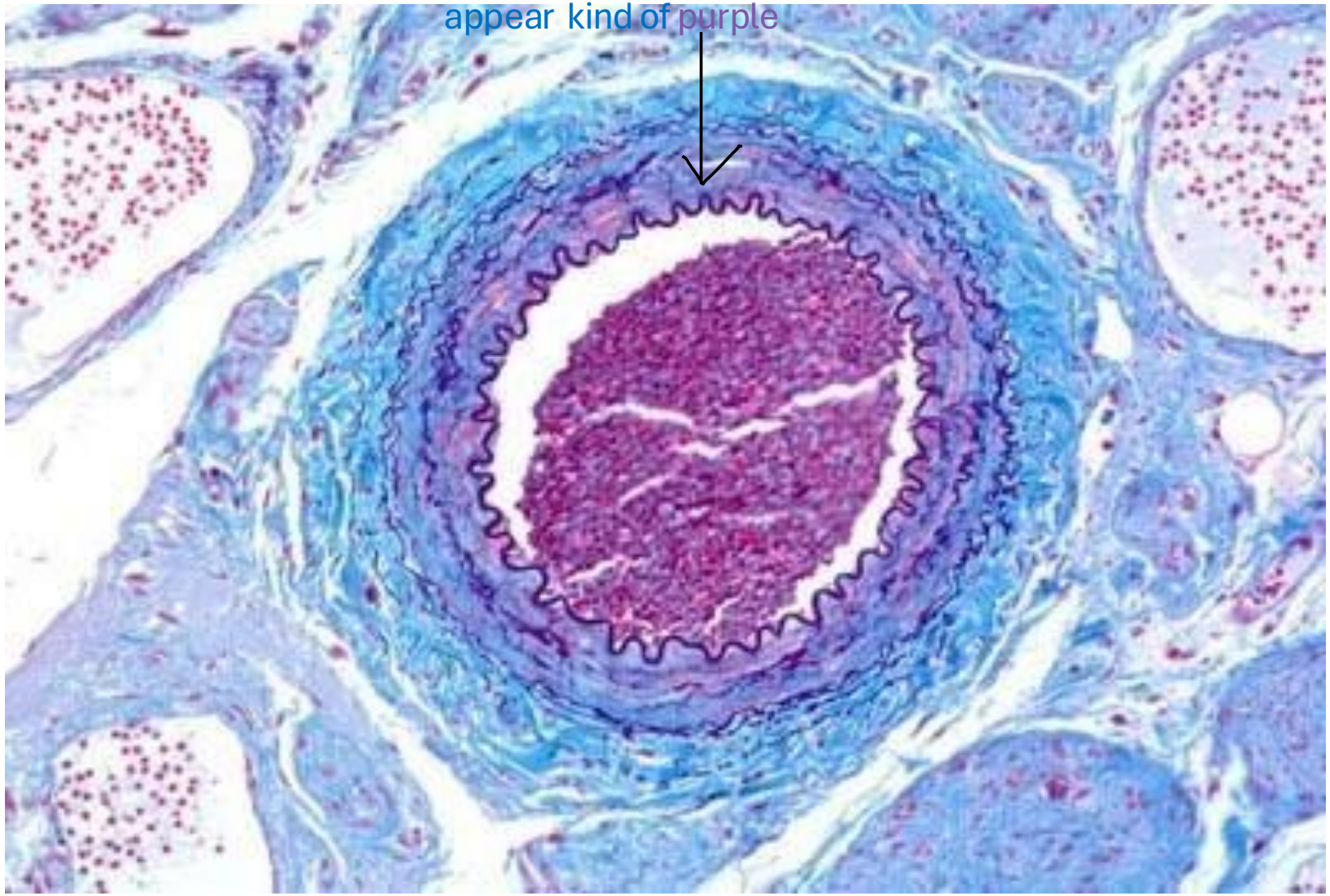
collagen fibers & smooth muscles fibers appear pinkish.



Identify the stain? Trichrome staining

collagen fibers stains blue

wavy structures are elastic fibers
appear kind of purple

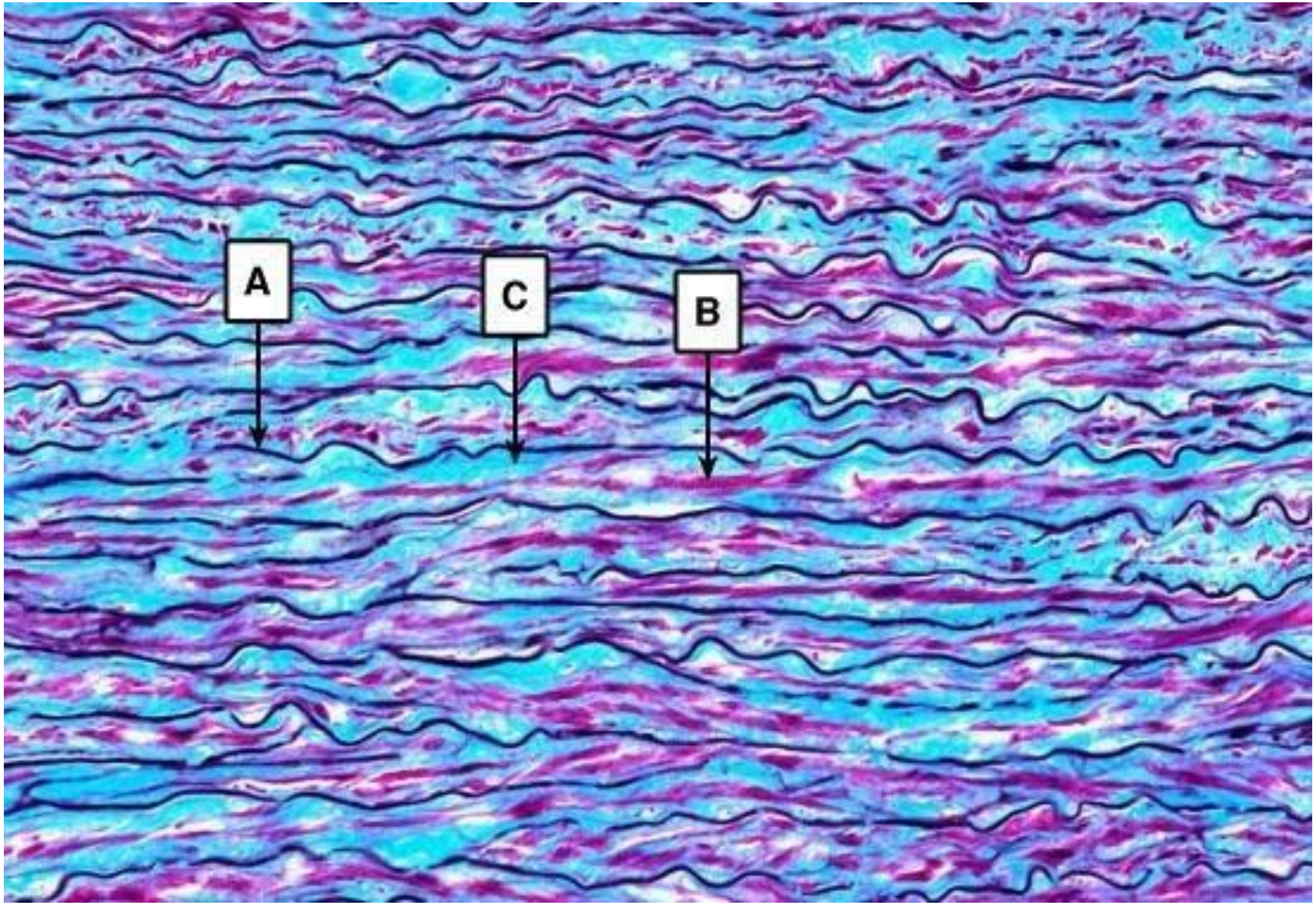


This section was taken from a blood vessel

A: elastic fibers

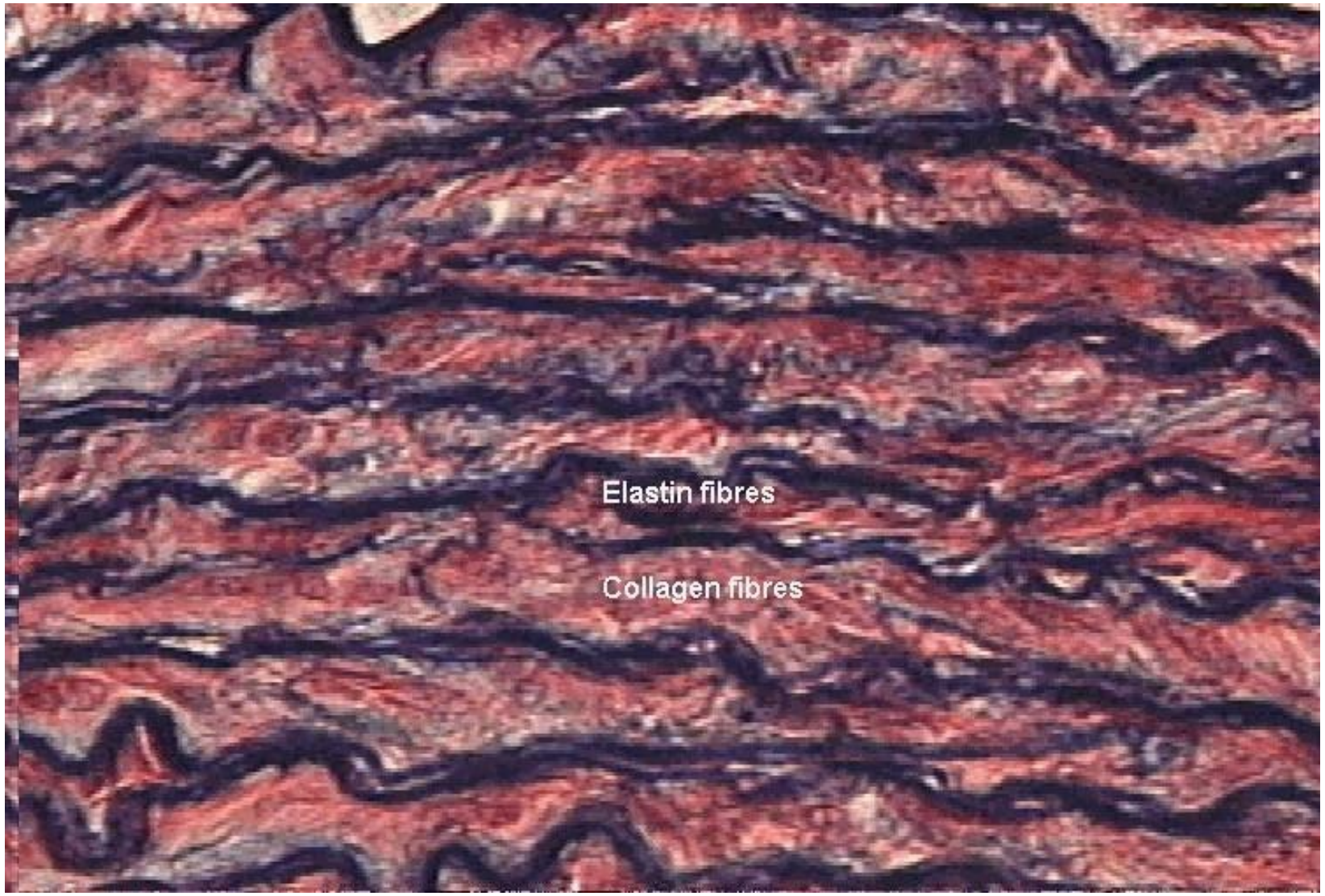
B: smooth muscle fibers

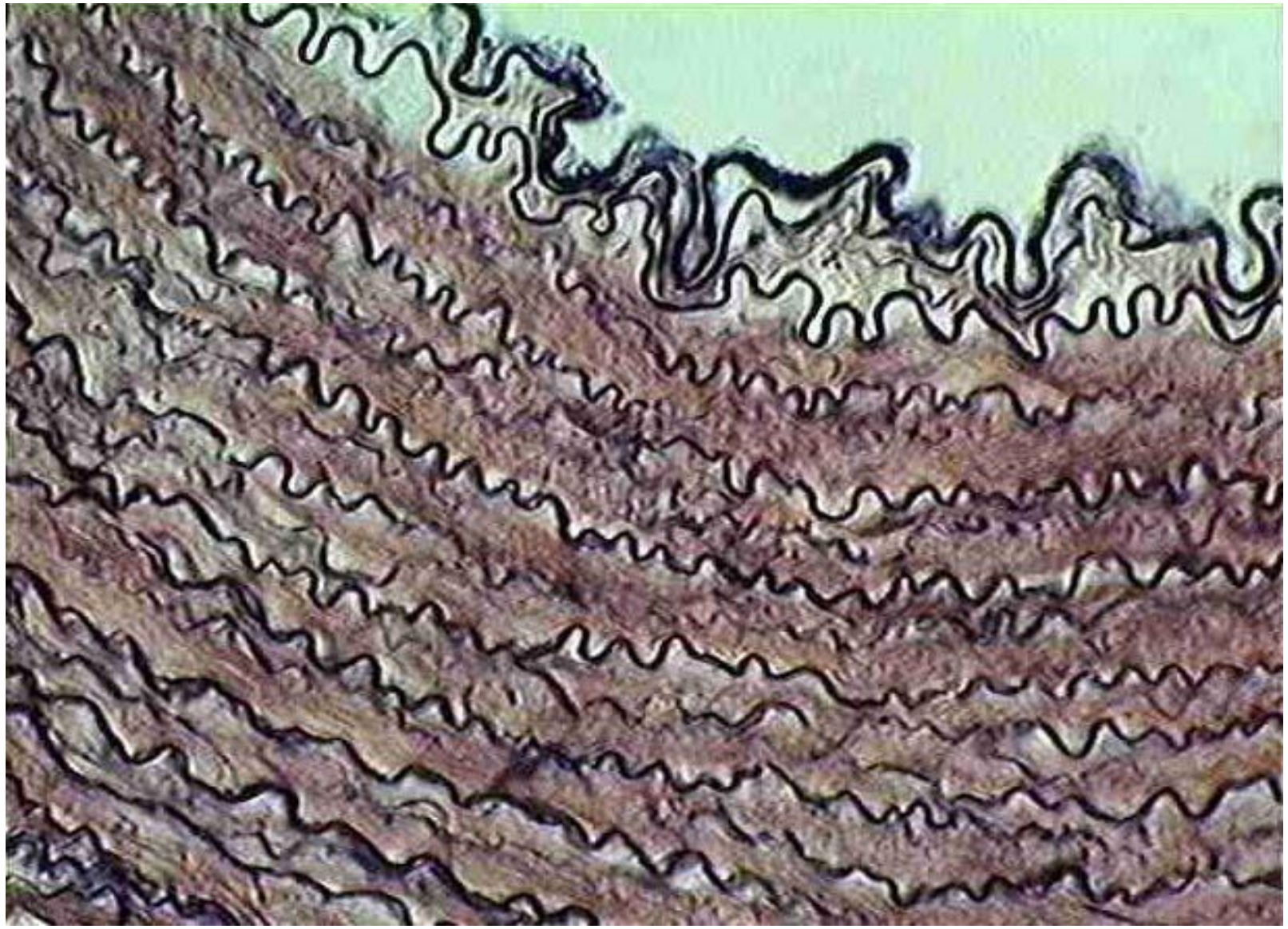
C: collagen



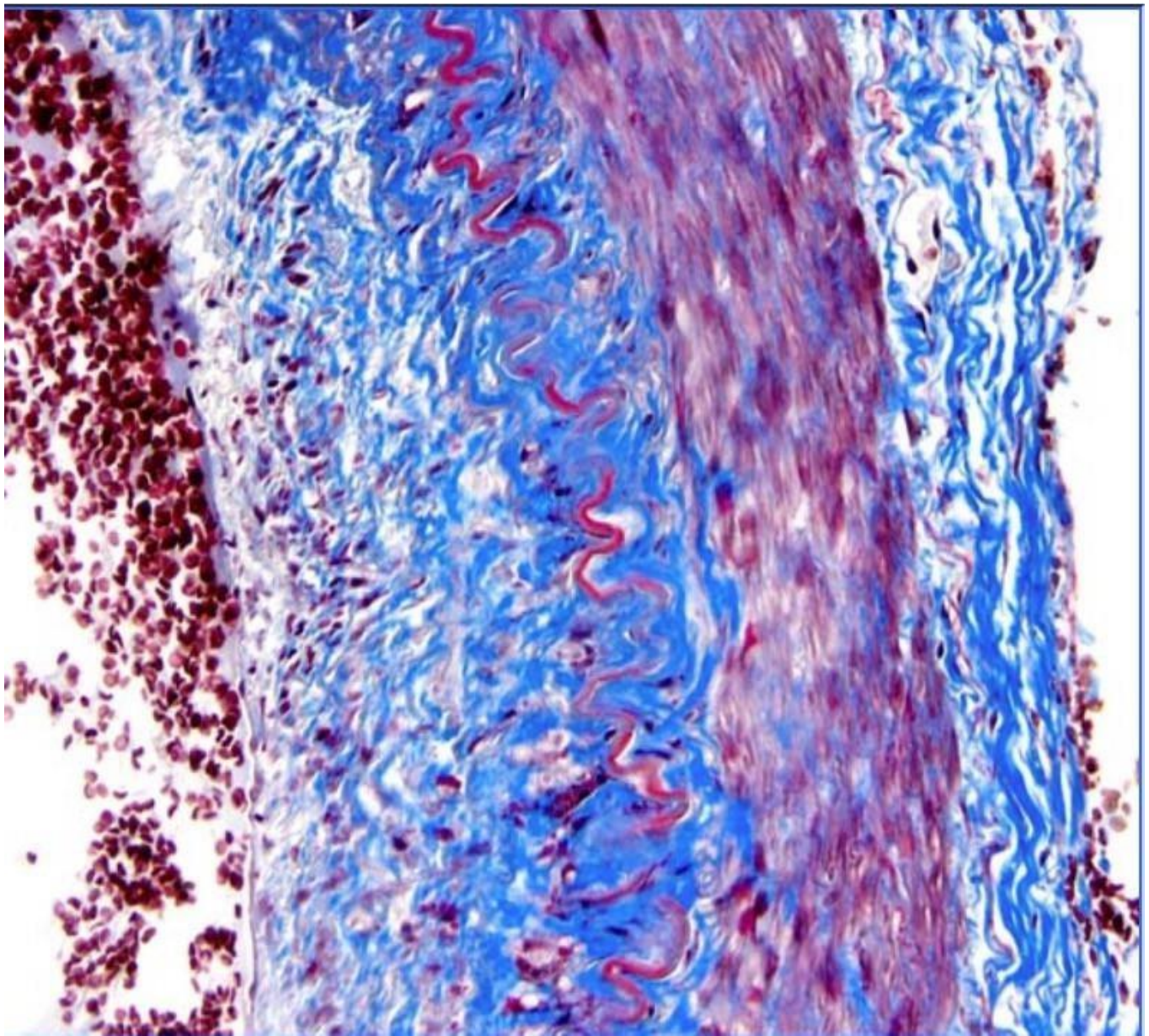
section through blood vessel , Trichrome staining

lots of elastic fibers
concentrated together , this is called elastic lamellae

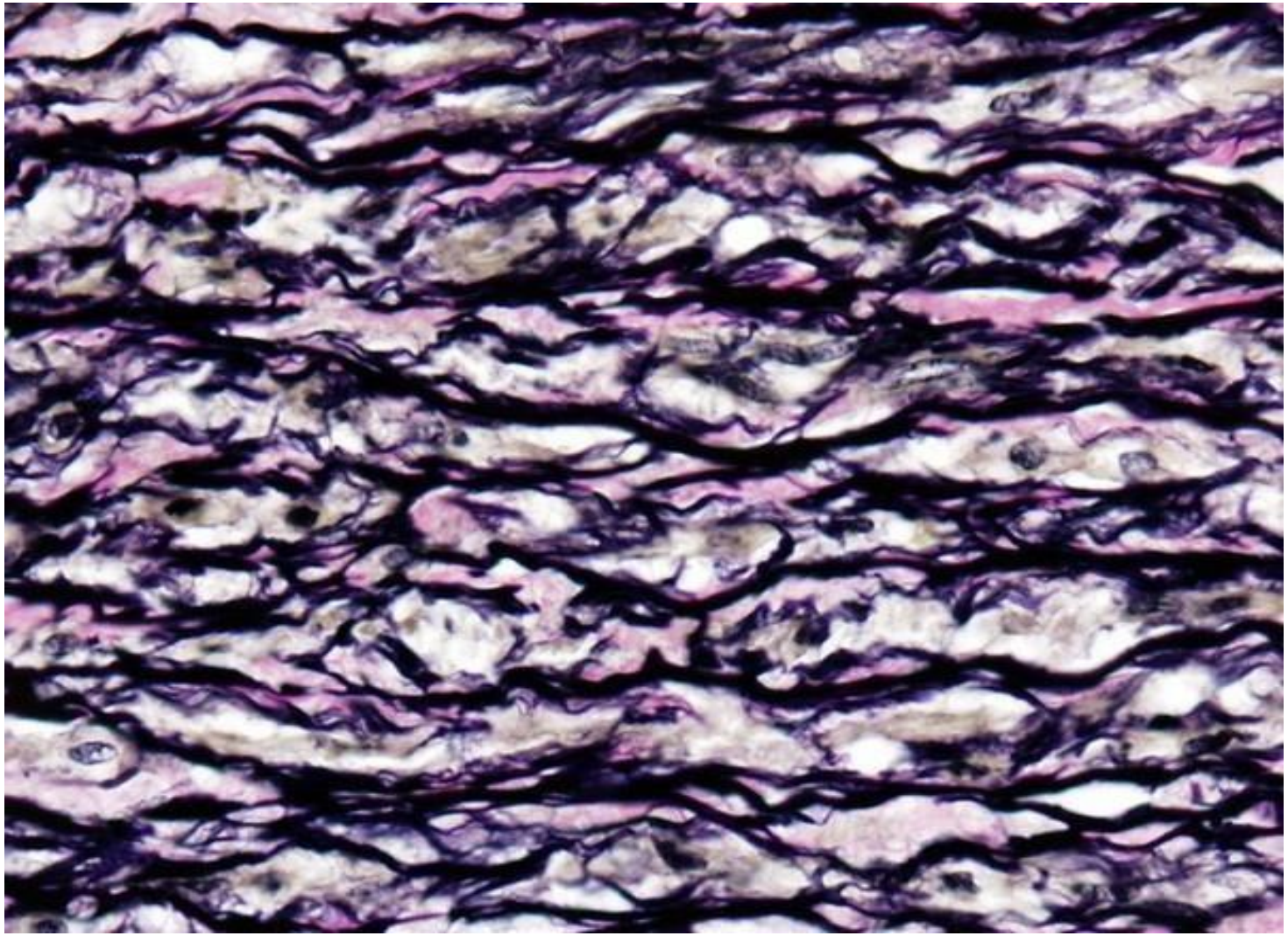




Gomori's one step Trichrome stain

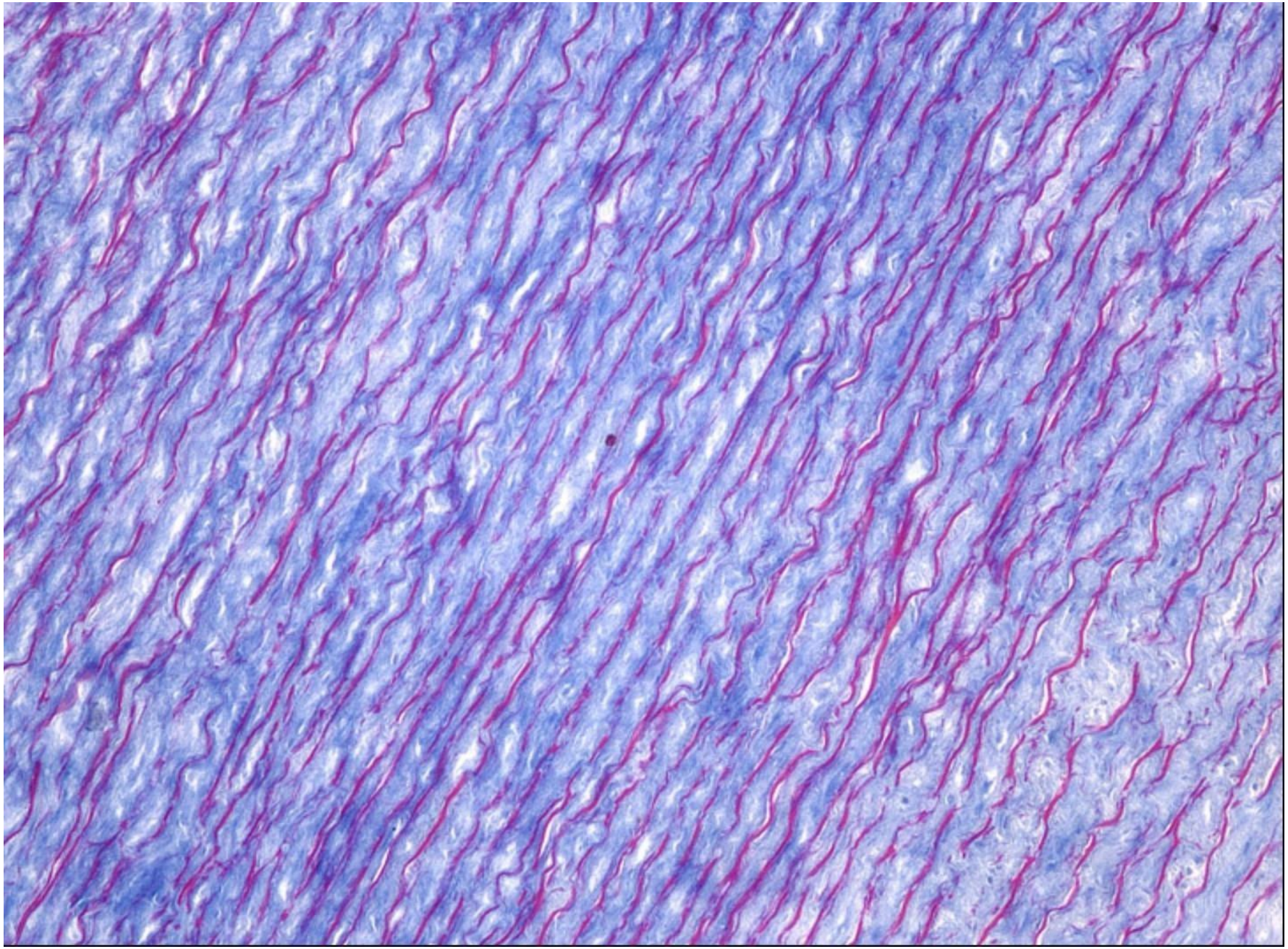


Verhoeff-van Gieson



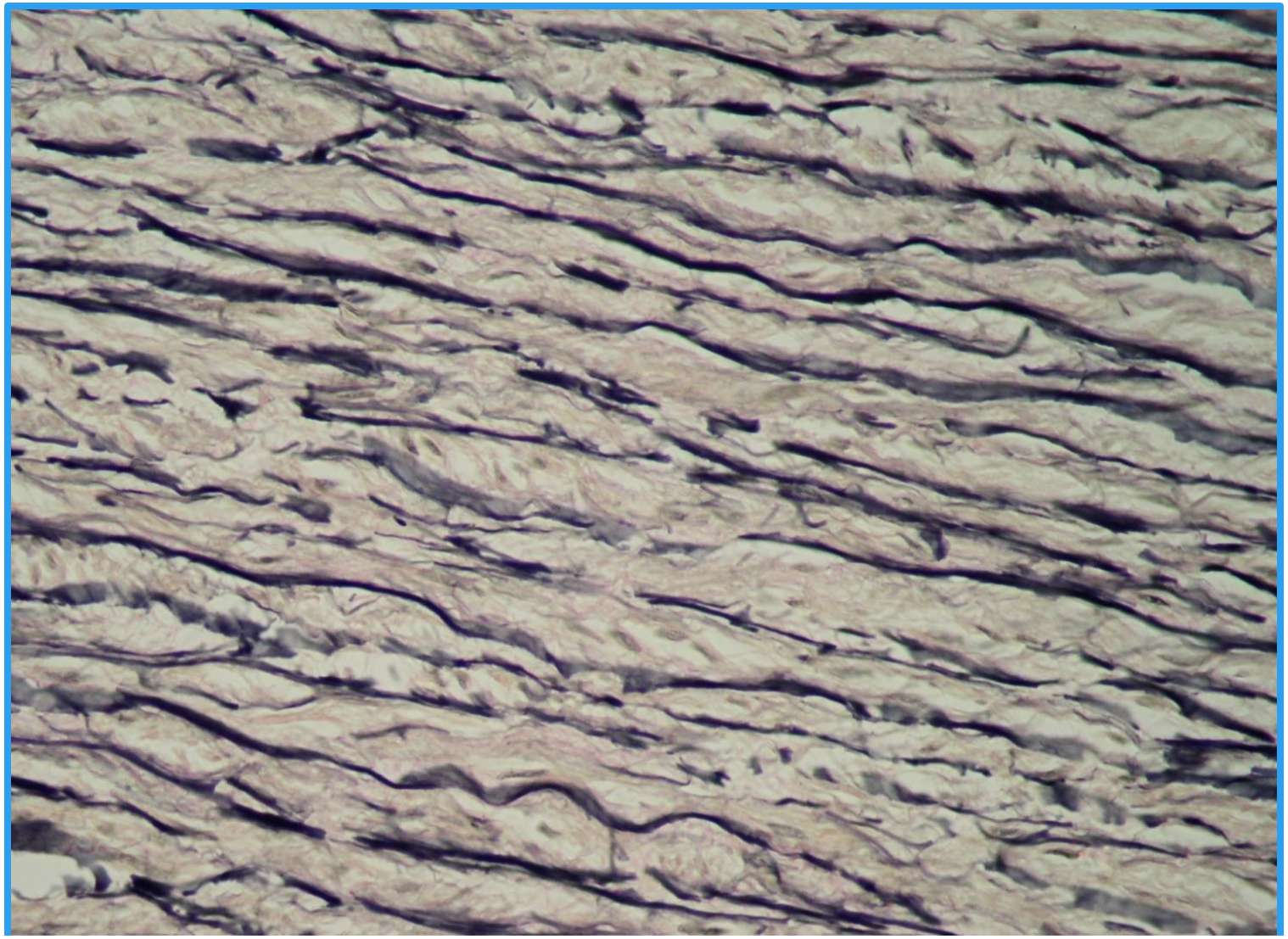
pinkish - reddish :
elastic fibers

bluish-purplish :
collagen fibers



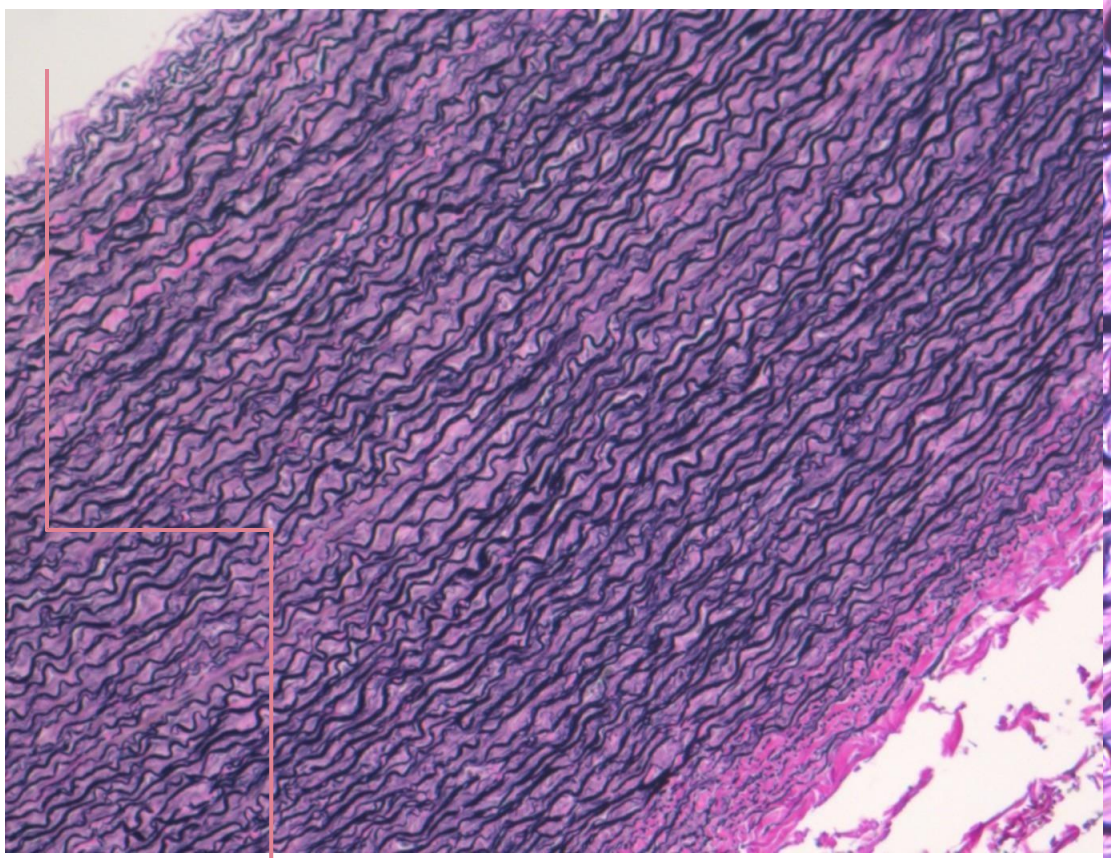
Elastic fibers-Orscein

Using this stain elastic fibers appear blackish wavy structures .

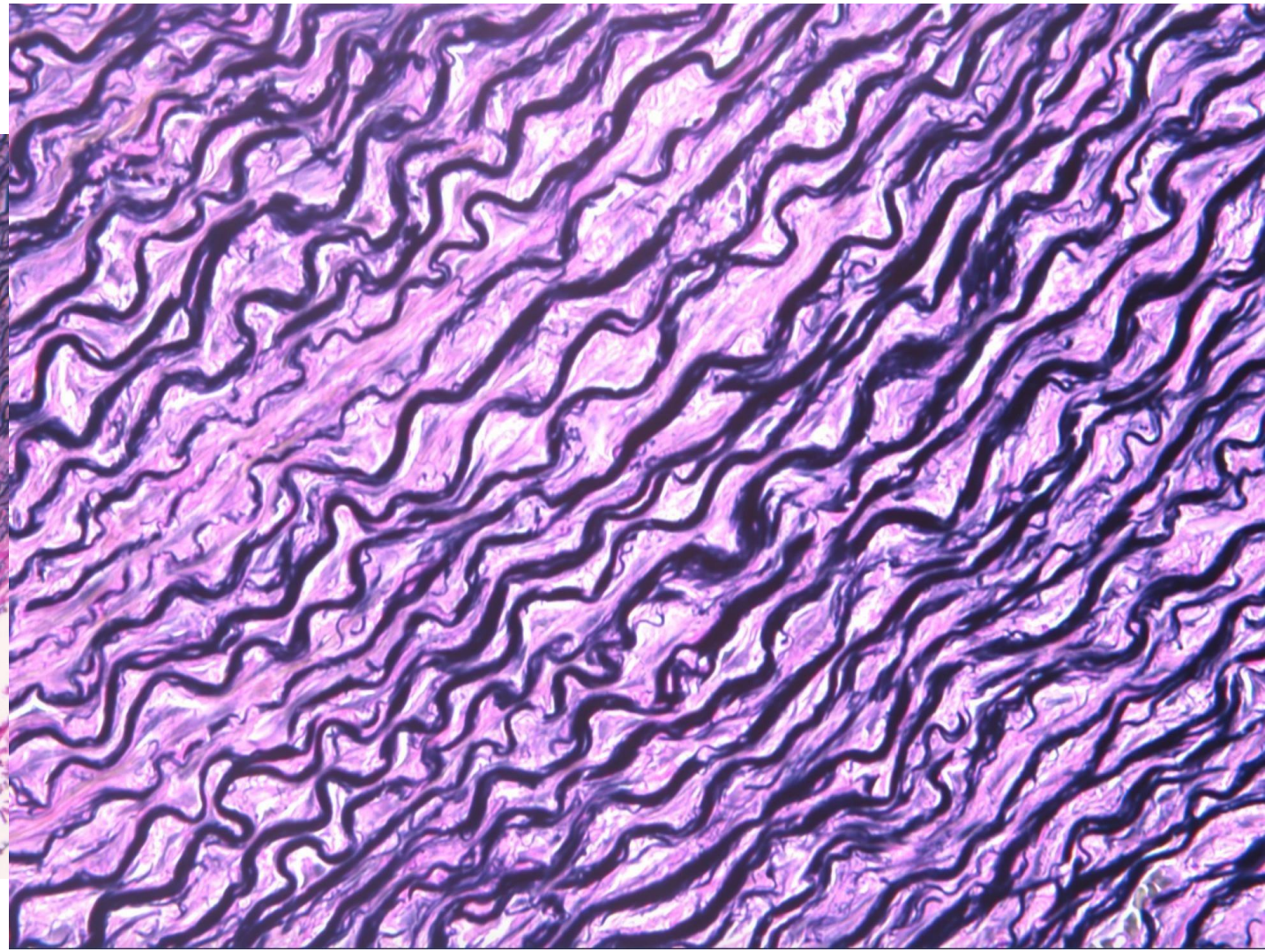


Elastic- VERHOEFF VAN GIESON

This section is through the Aorta

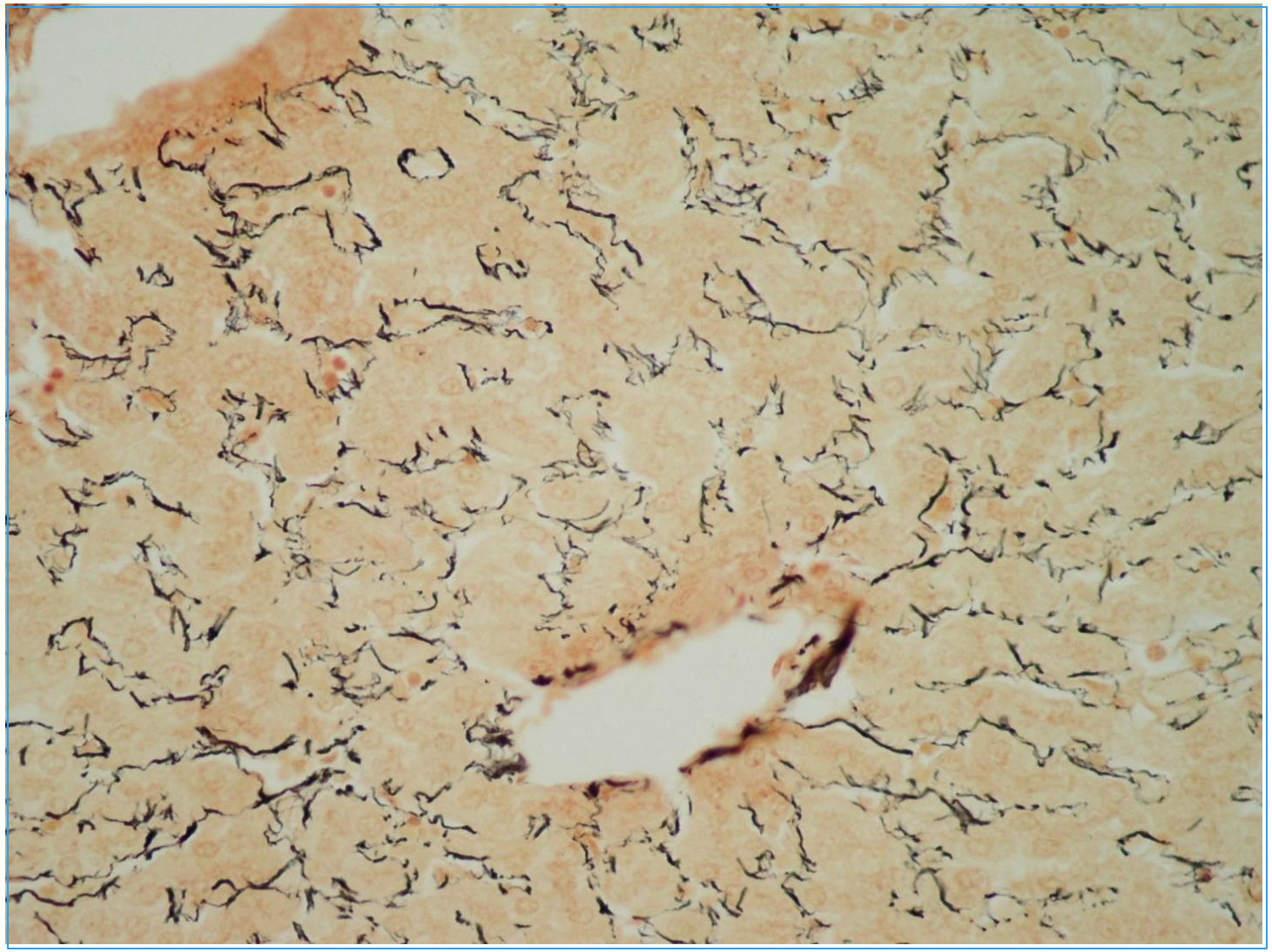


Endothelium of the Aorta



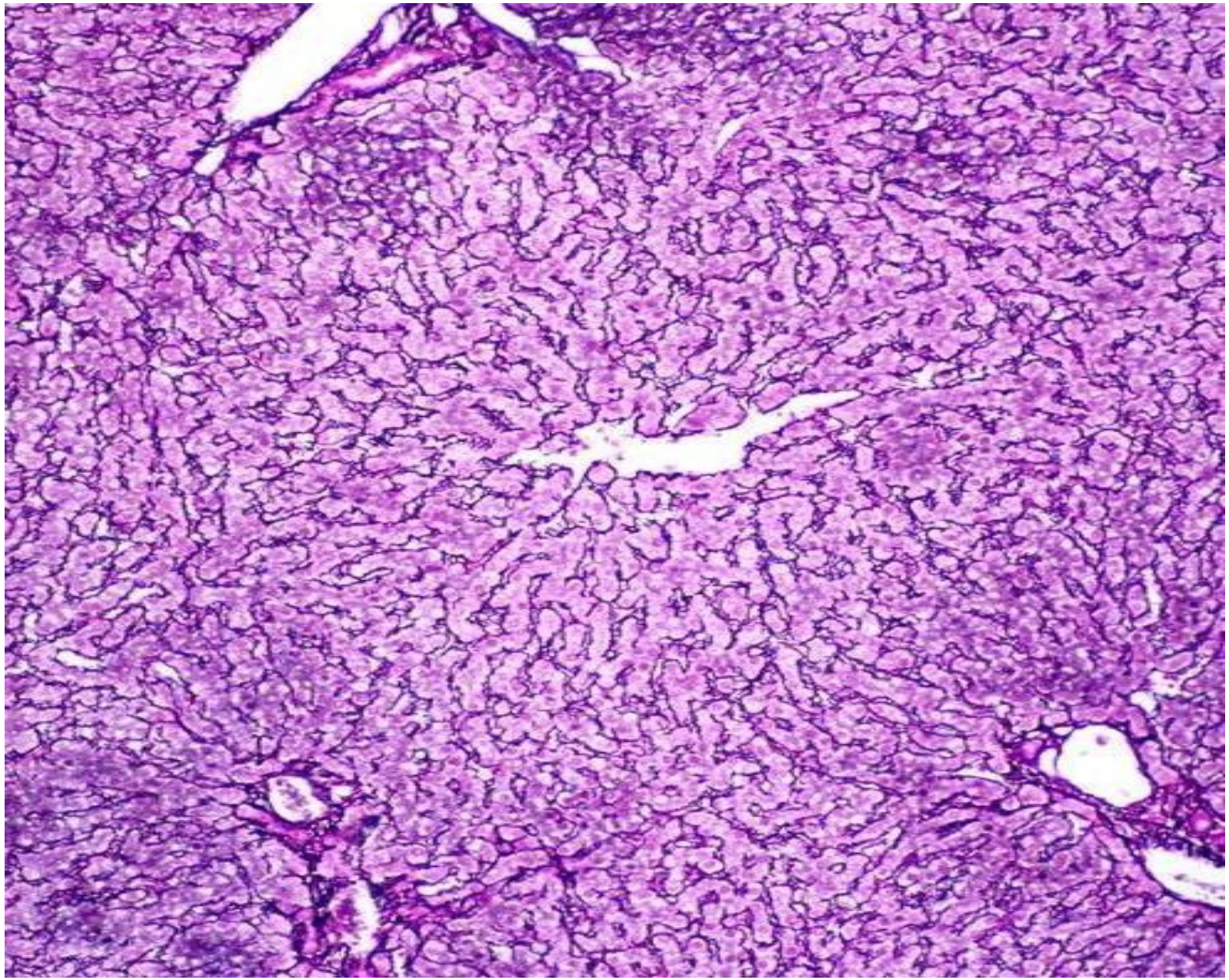
Reticular fibers -liver

staining used : silver salt staining

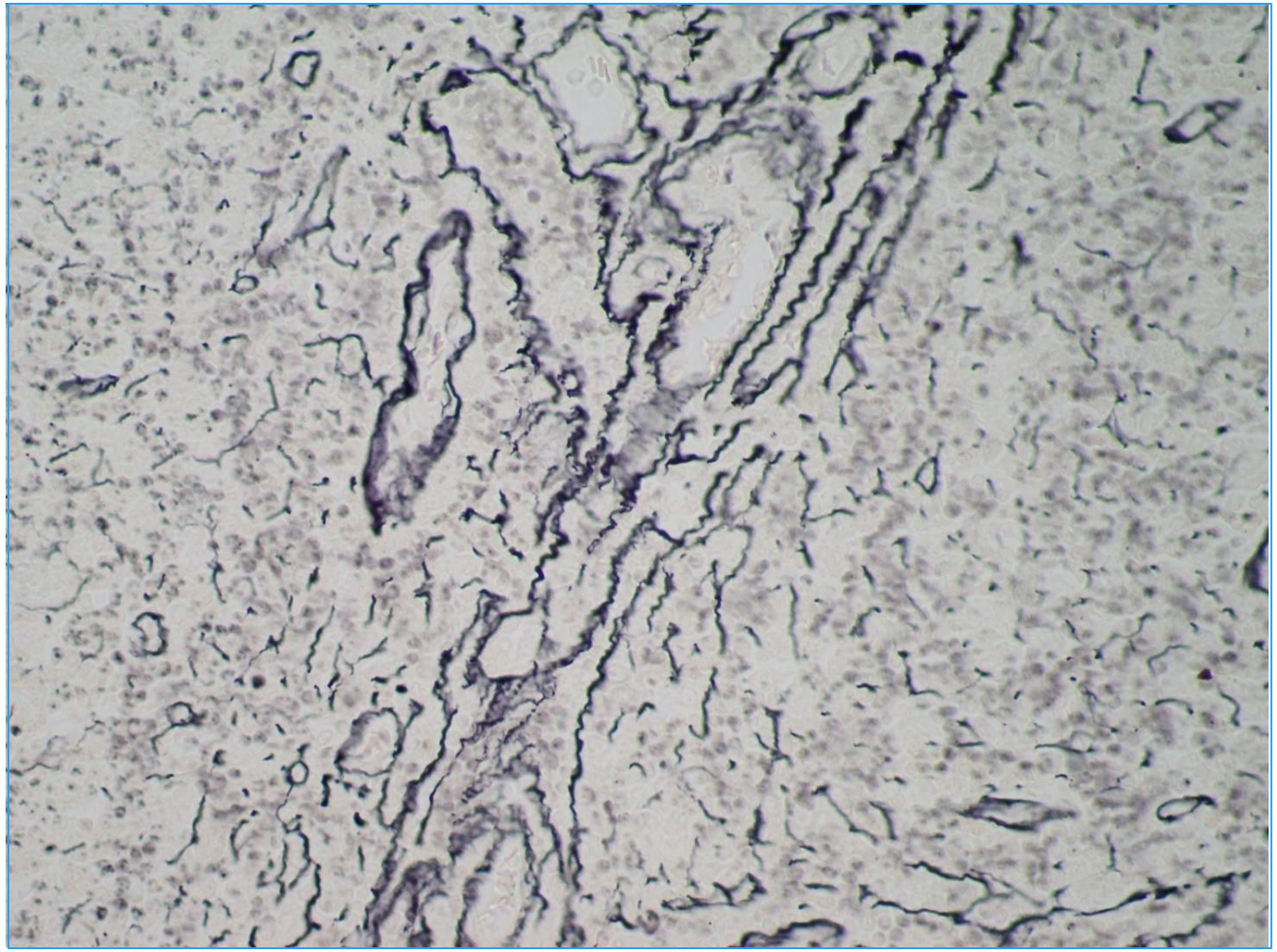


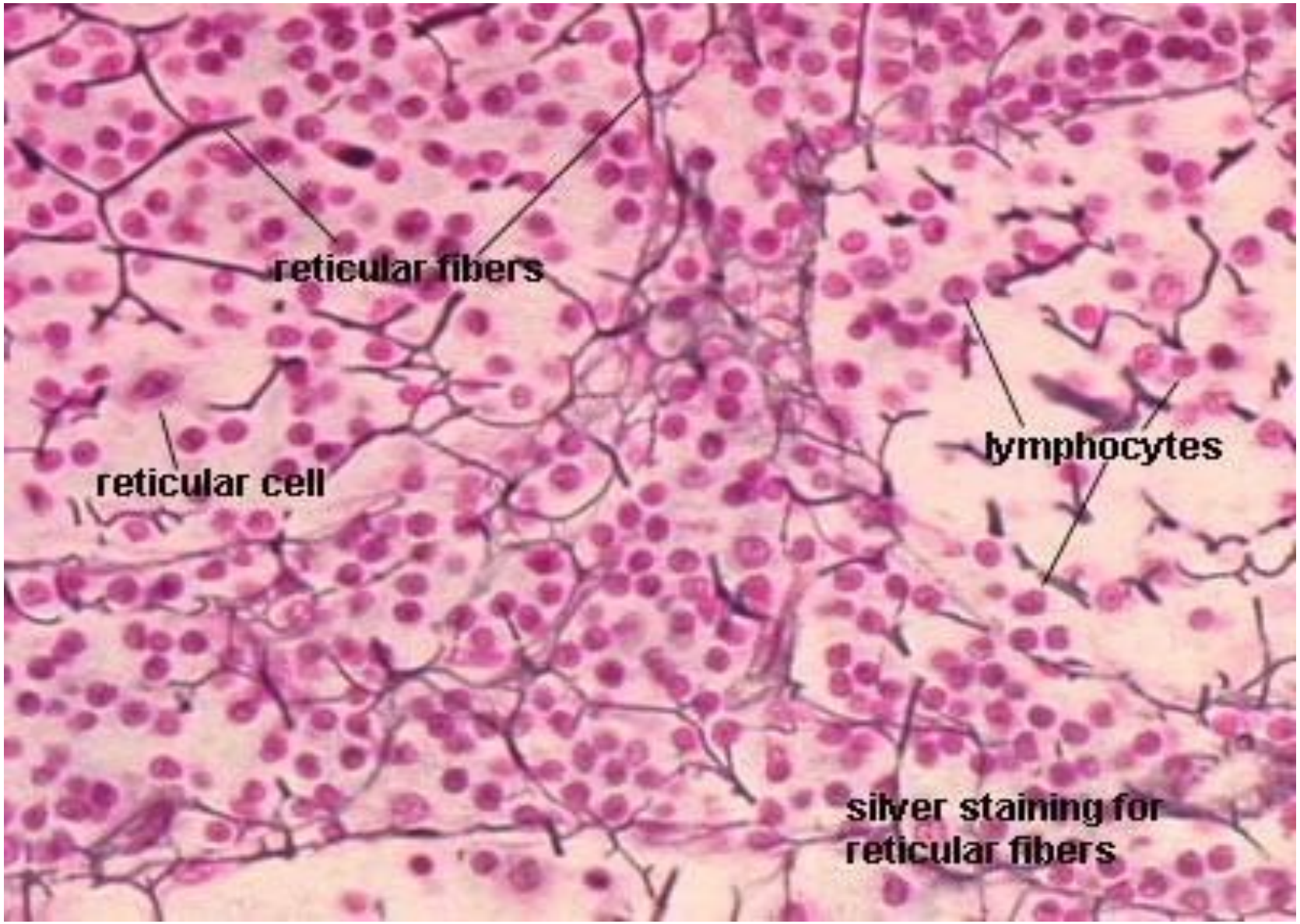
Reticular fibers in the liver , they form a network that surround and protect delicate cells in the liver (hepatocytes)

Staining used here is : eosin& silver salts



reticular





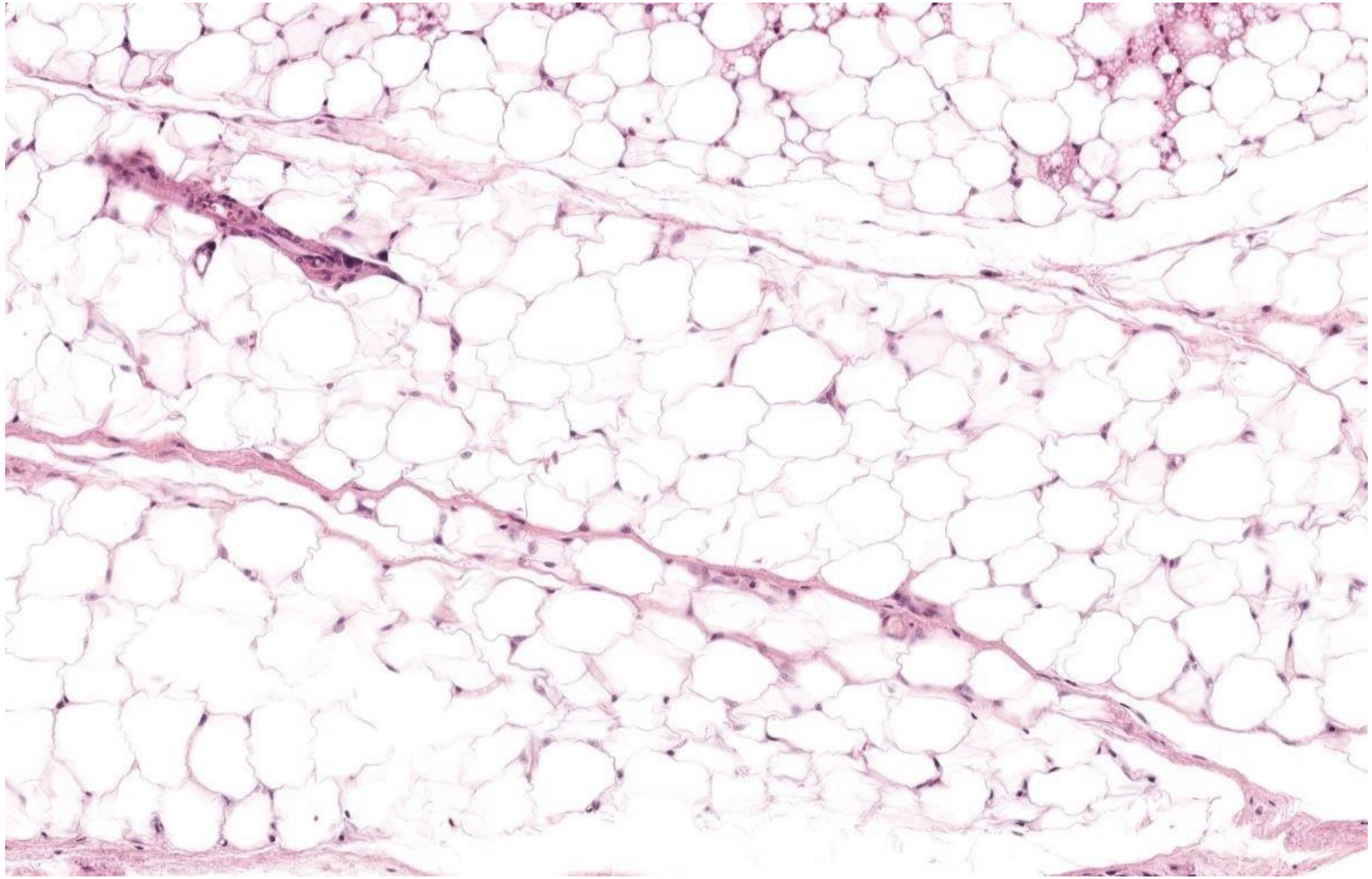
Reticular fibers surrounding & protecting delicate lymphocytes

White adipose CT

Adipose CT: loose CT that is very rich with adipocytes

we know it is white type
because of :

1. **signet ring appearance**
2. **unilocular (has one fat vacuole)**

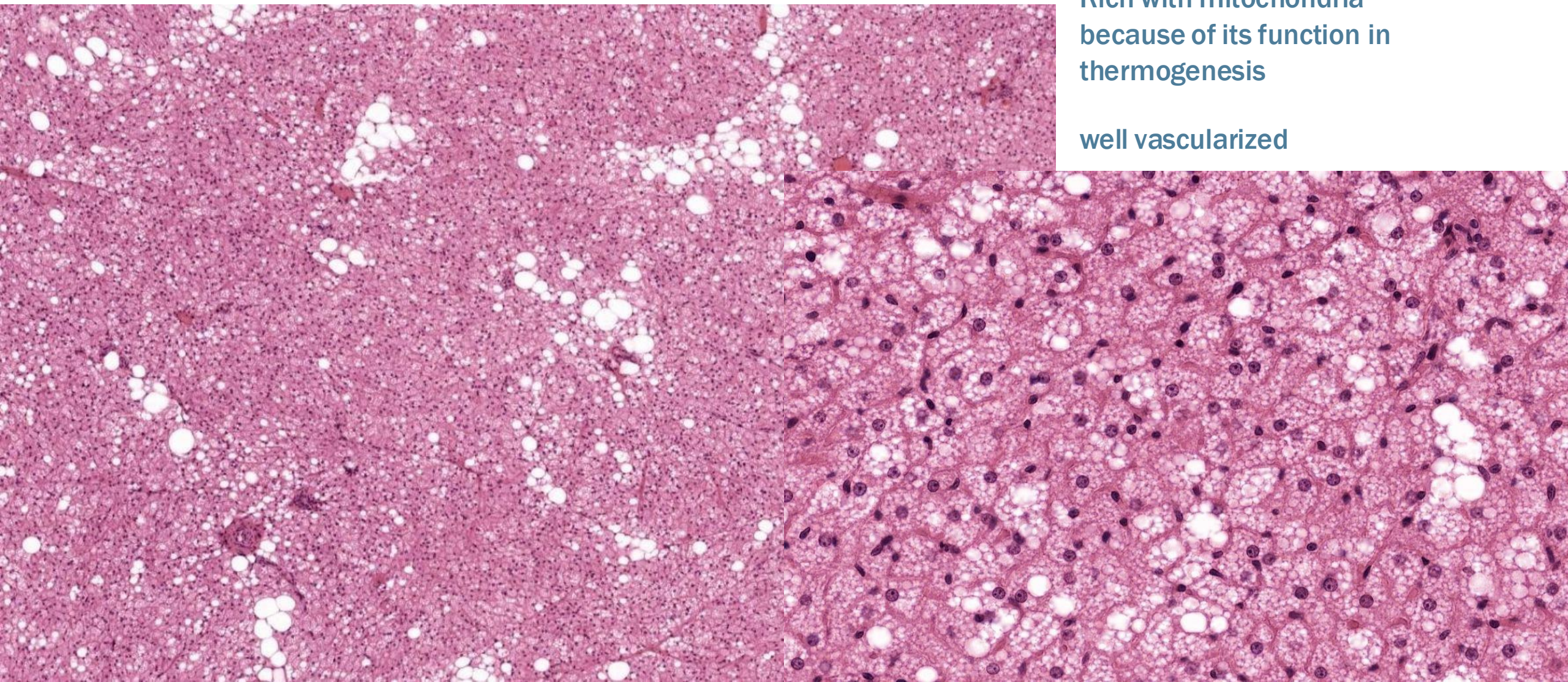


Brown adipose CT

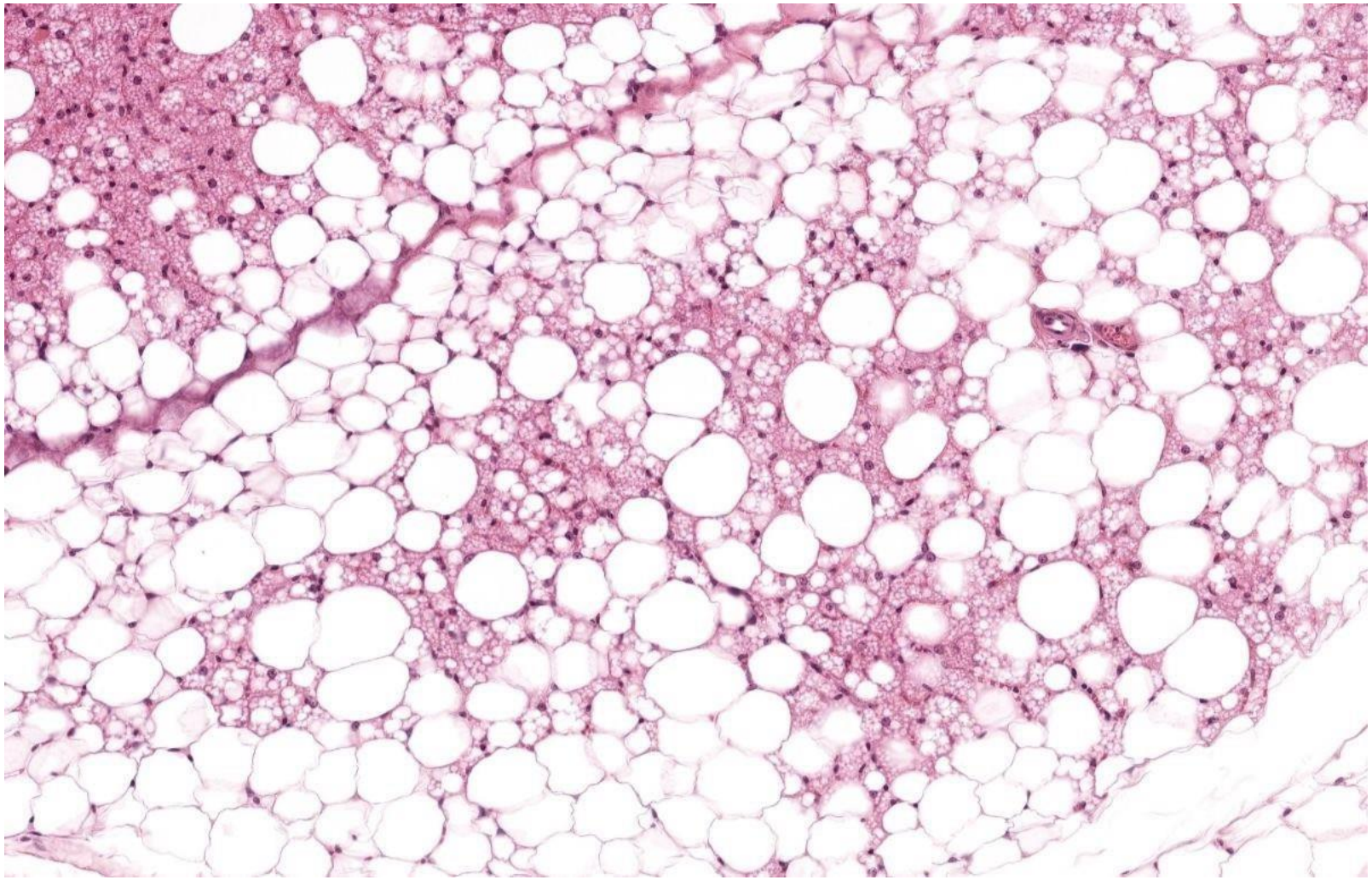
We know it is brown type because of :
1-multilocular (has many small fat vacuoles)
2-centrally located nucleus

brown fat is :
Rich with mitochondria
because of its function in thermogenesis

well vascularized



White and brown adipose CT



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			

رسالة من الفريق العلمي:

سبحان الله العظيم وبحمده، عدد خلقه، سبحان الله رضا نفسه، سبحان الله زنة عرشه ، سبحان الله مداد كلماته