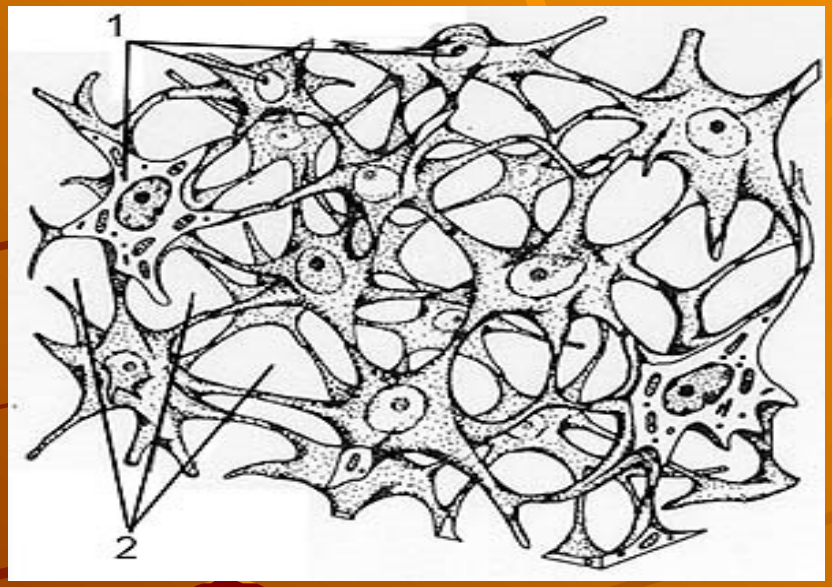
Pojivová tkáň

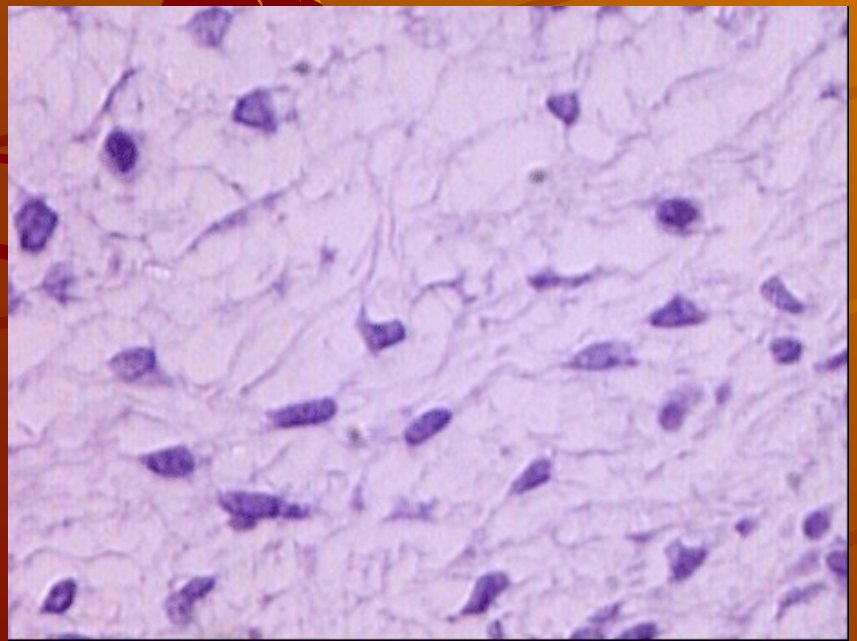
Vazivo

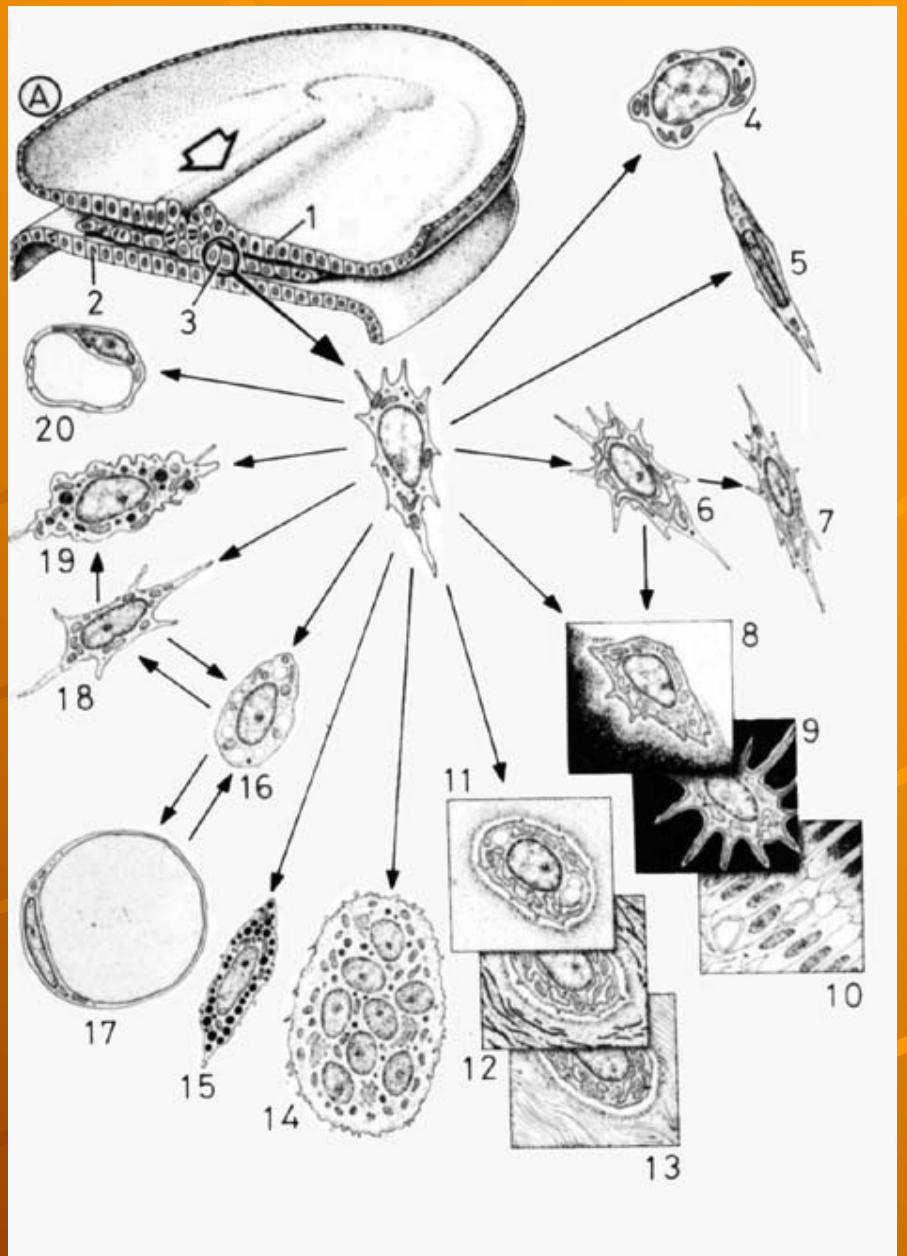
Chrupavka

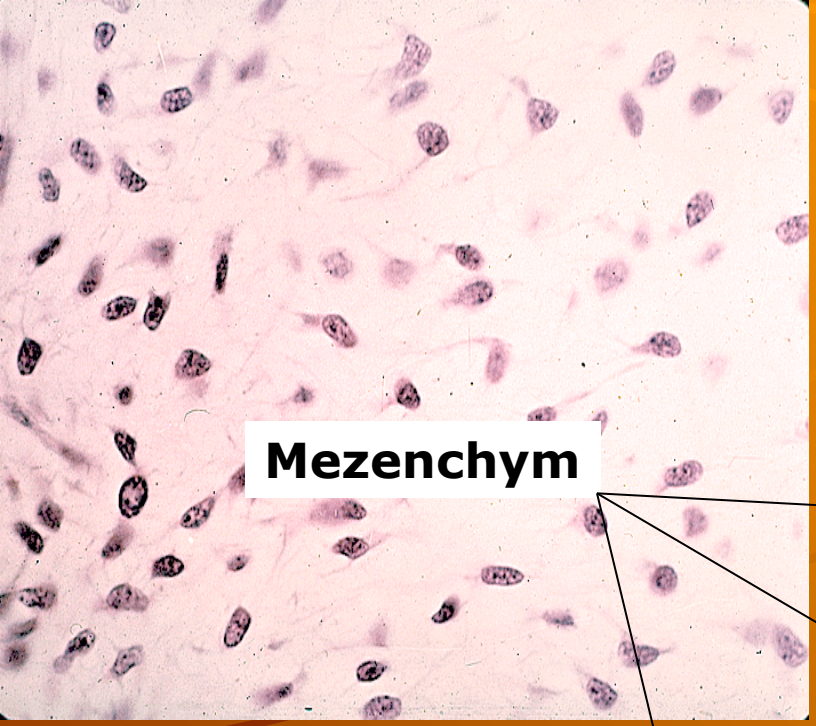
Kost

Mezenchym



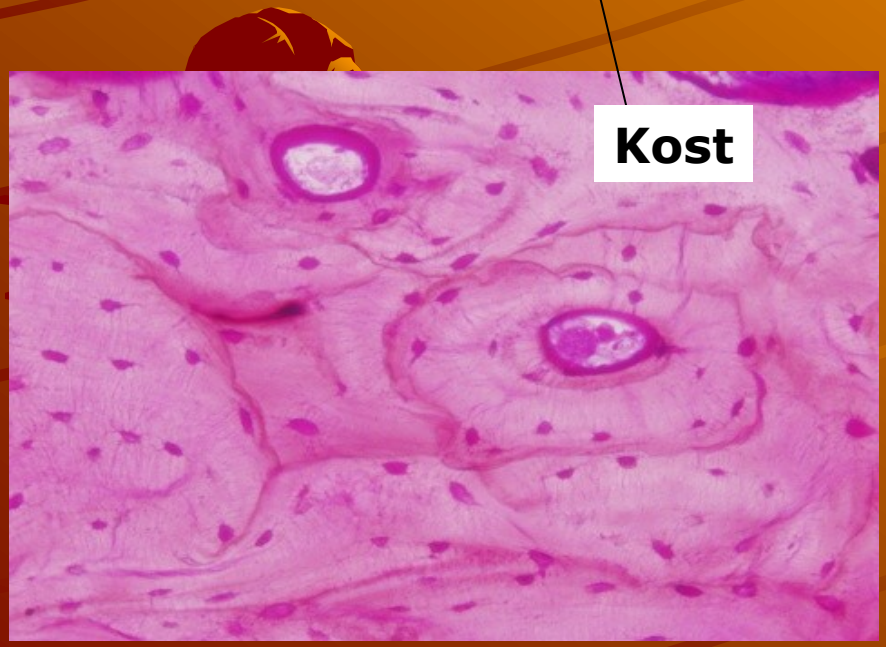





Mezenchym


Vazivo


Chrupavka

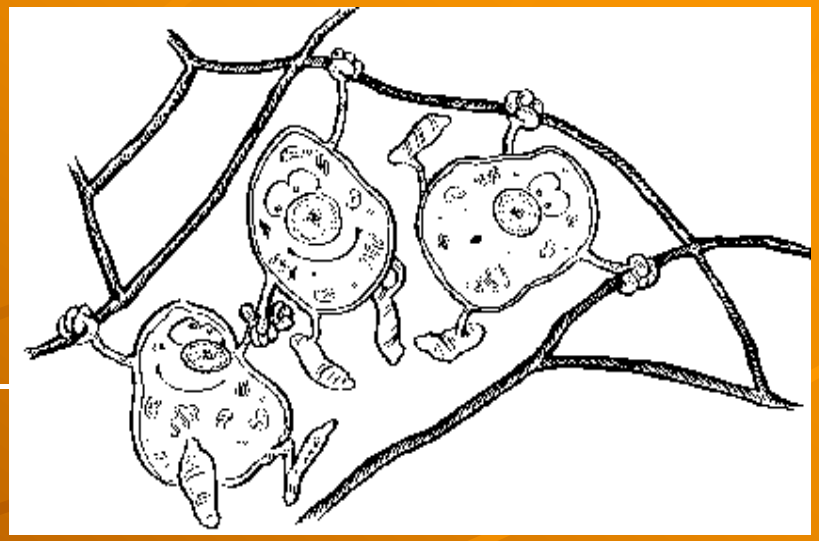

Kost

Původ a funkce

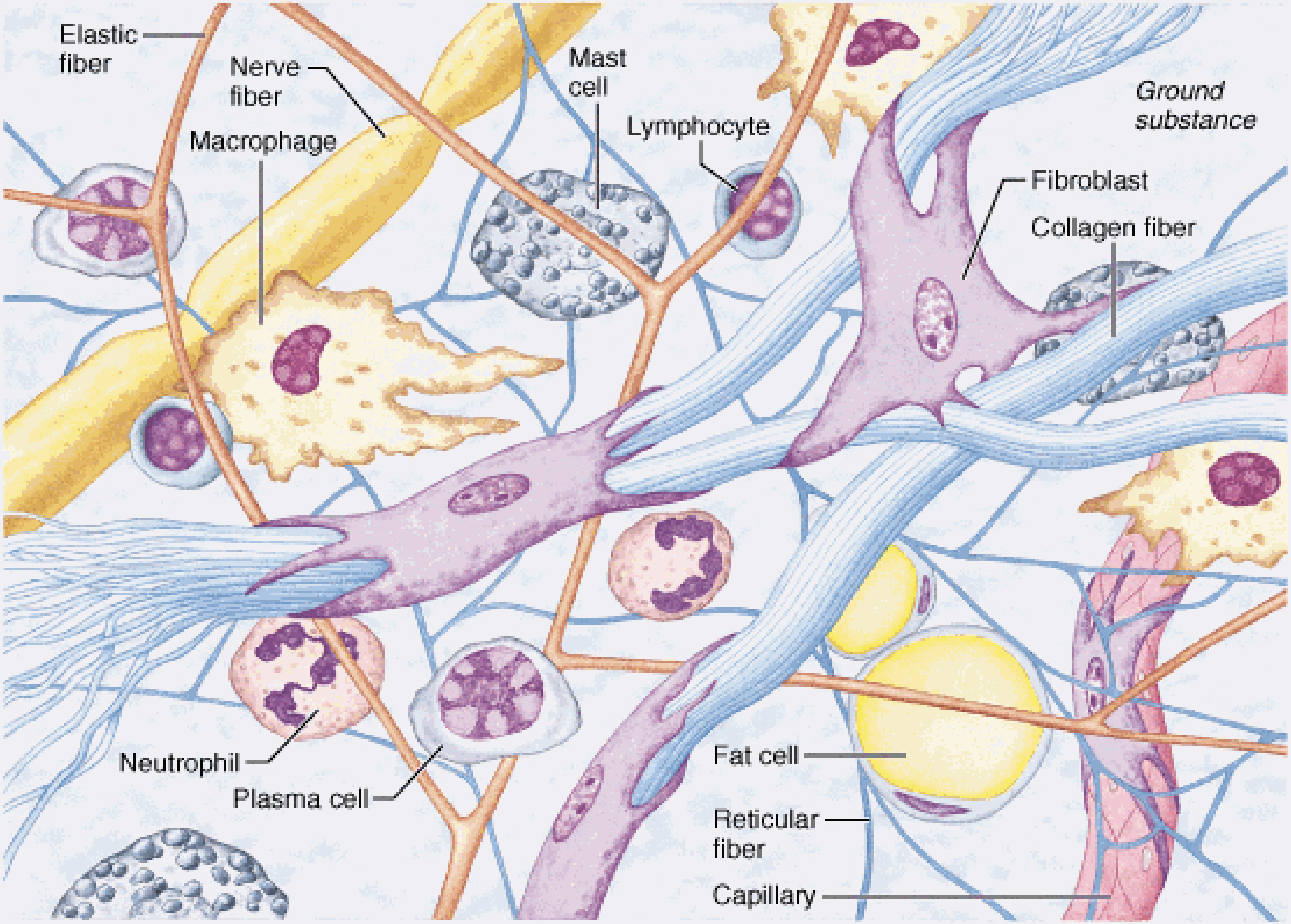
- Původ – mezenchym
- Funkce:
  - nutritivní (krevní cévy, difuze živin)
  - protektivní – imunocompetentní buňky a produkce protilátek
  - pojivová – spojení tkání, výplň mezi orgány
  - mechanická (podpůrná a mechanická ochrana orgánů – *v lebce, v hrudním koši, v pánvi*)

Pojivová tkáň

- Vazivo
- Chrupavka
- Kost



- Obecná stavba:
  - buňky
  - mezibuněčná hmota → vlákna, základní amorfní substance



Vazivo

- Buňky
  - fixní
  - volné (bloudivé)
- Vlákna
  - kolagenní
  - elastická
  - retikulární
- Základní amorfní hmota

Vazivo - buňky

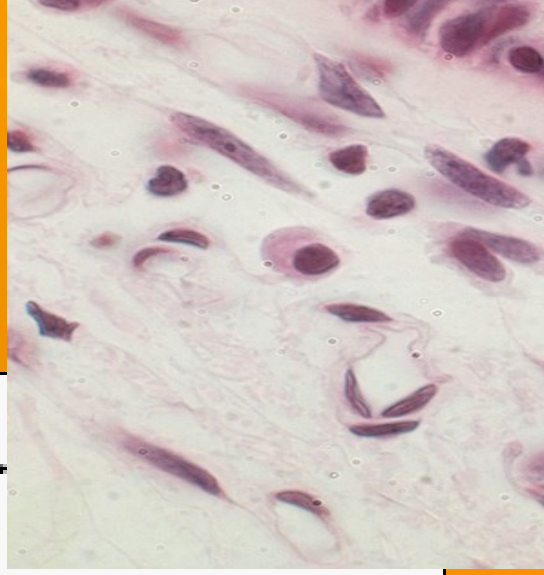
FIXNÍ BUŇKY

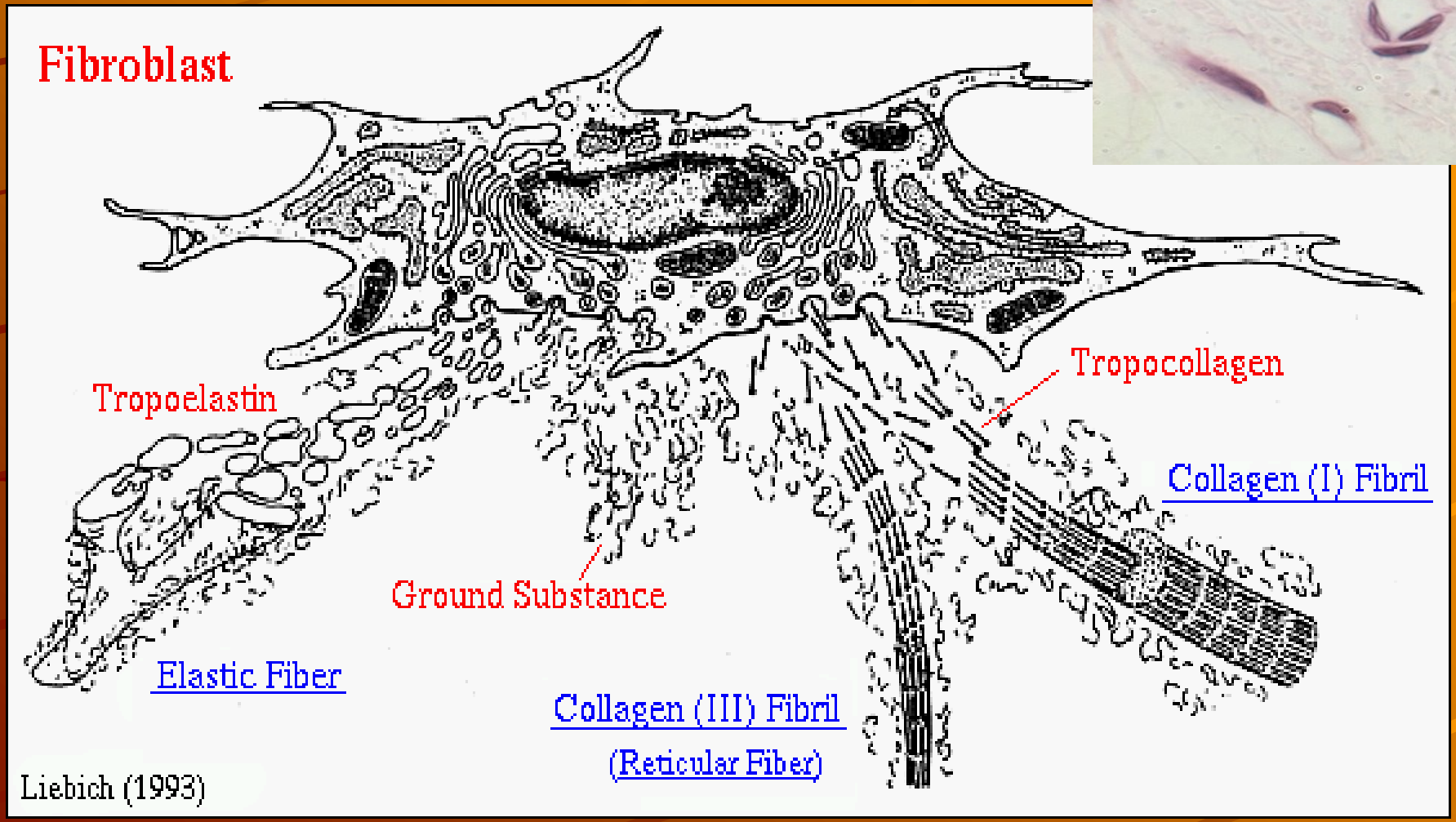
- Fibroblasty, fibrocyty
- Retikulární bb.
- Tukové bb.
- Pigmentové bb.
- Nediferencované bb.

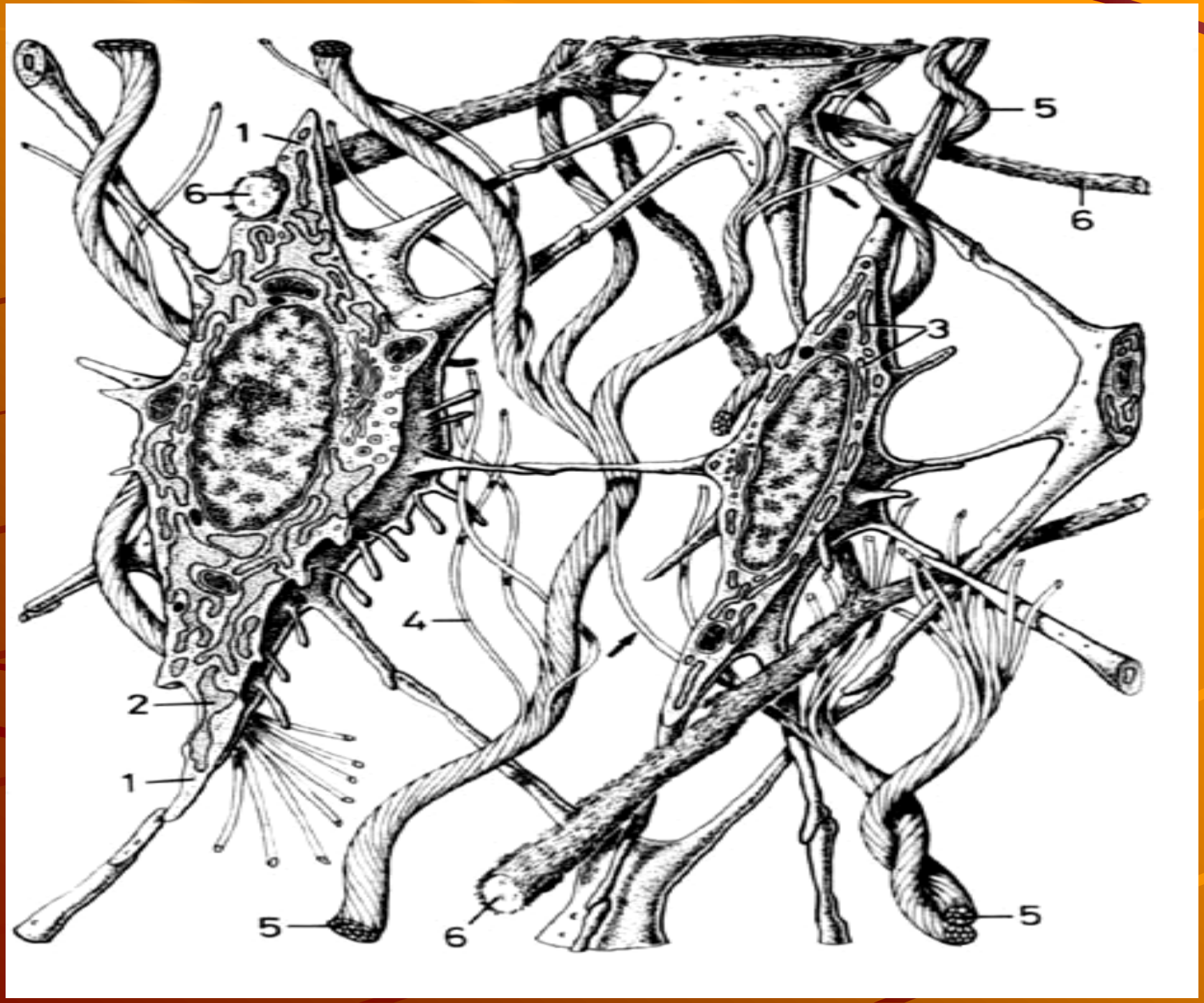
MOBILNÍ BUŇKY

- Histiocyty
  [redacted]akrofagy
- Žírné bb. (heparinocyty)
- Plazmatické bb.
- Leukocyty

Fibroblasty, fibrocyty



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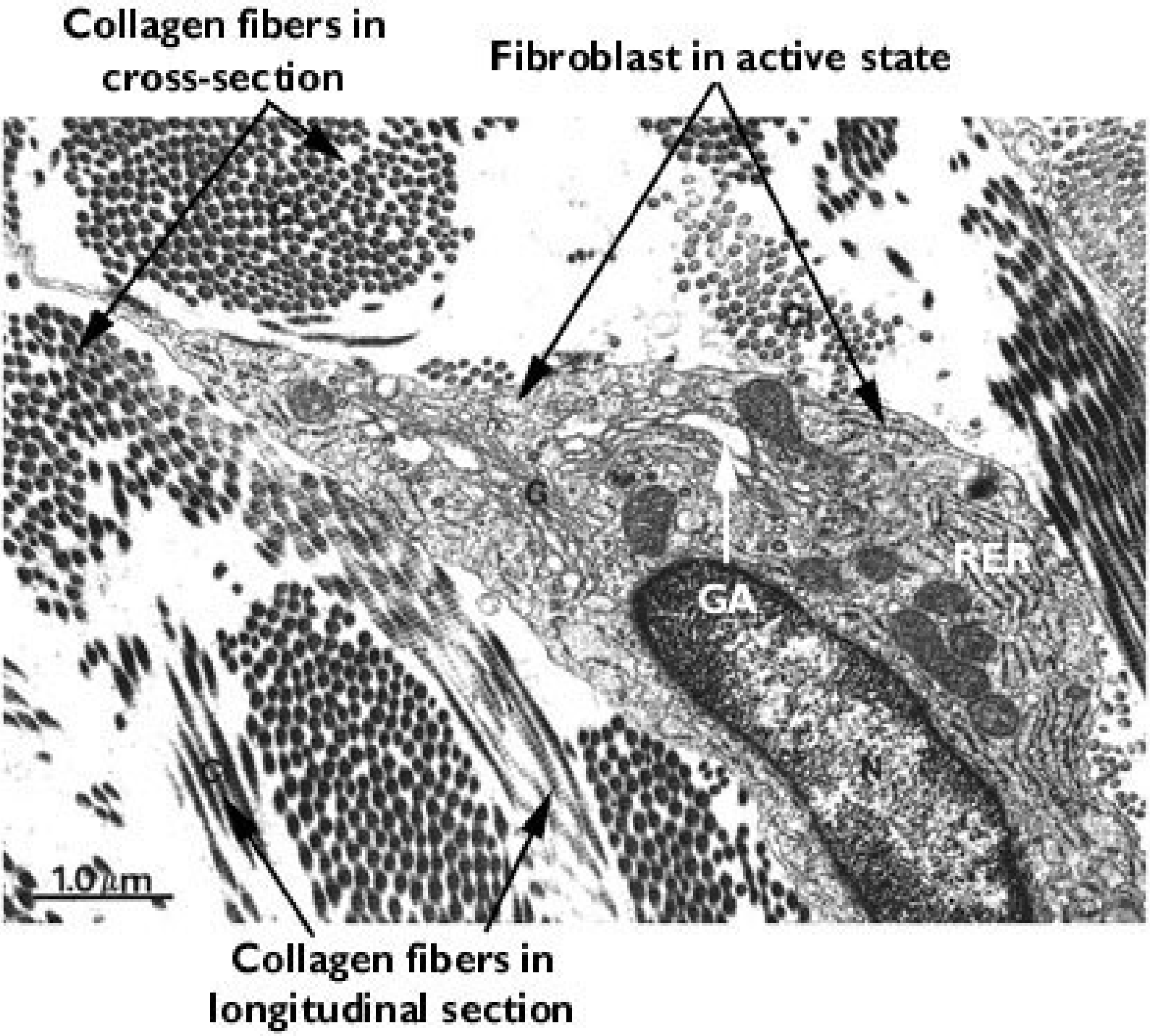
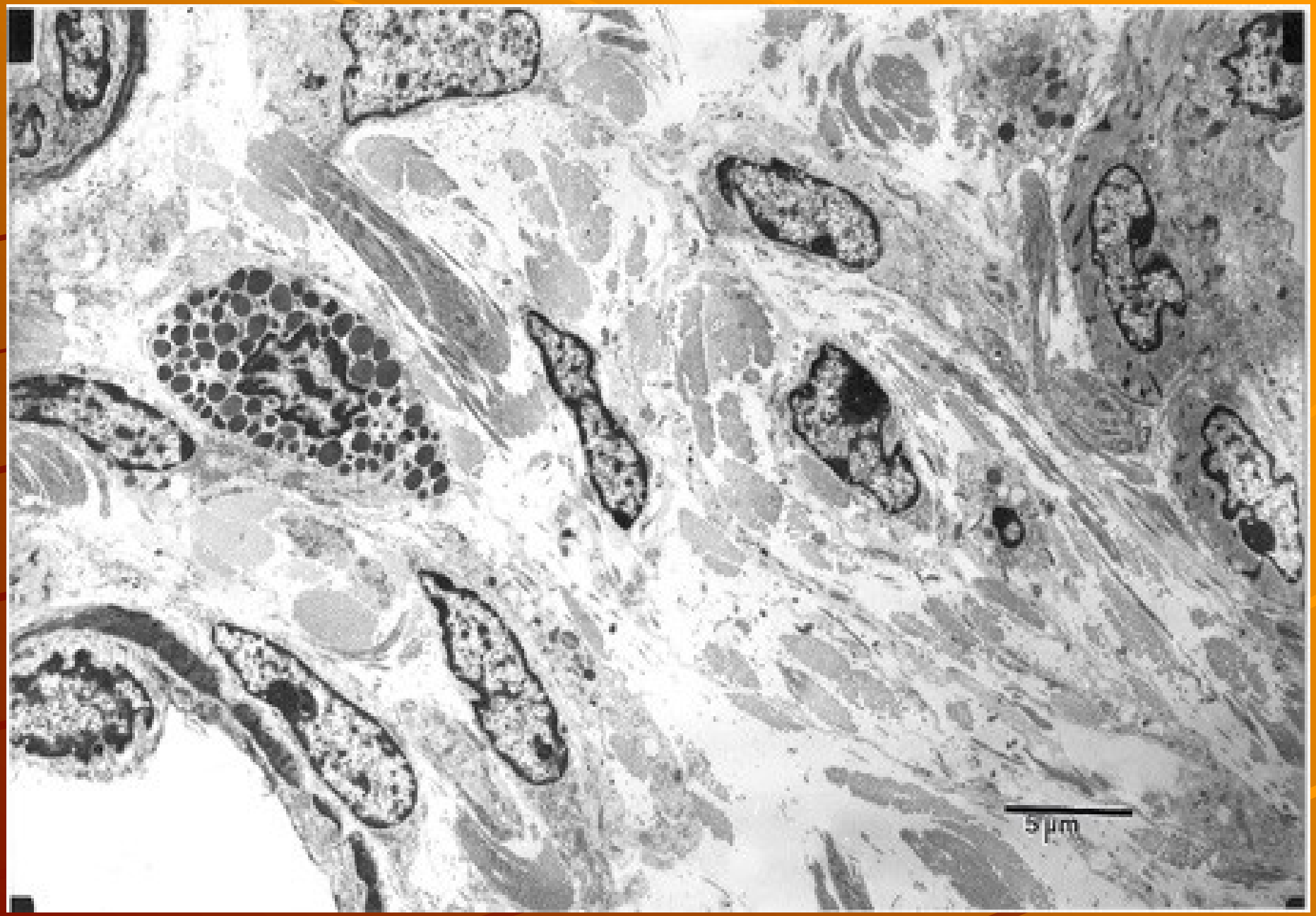
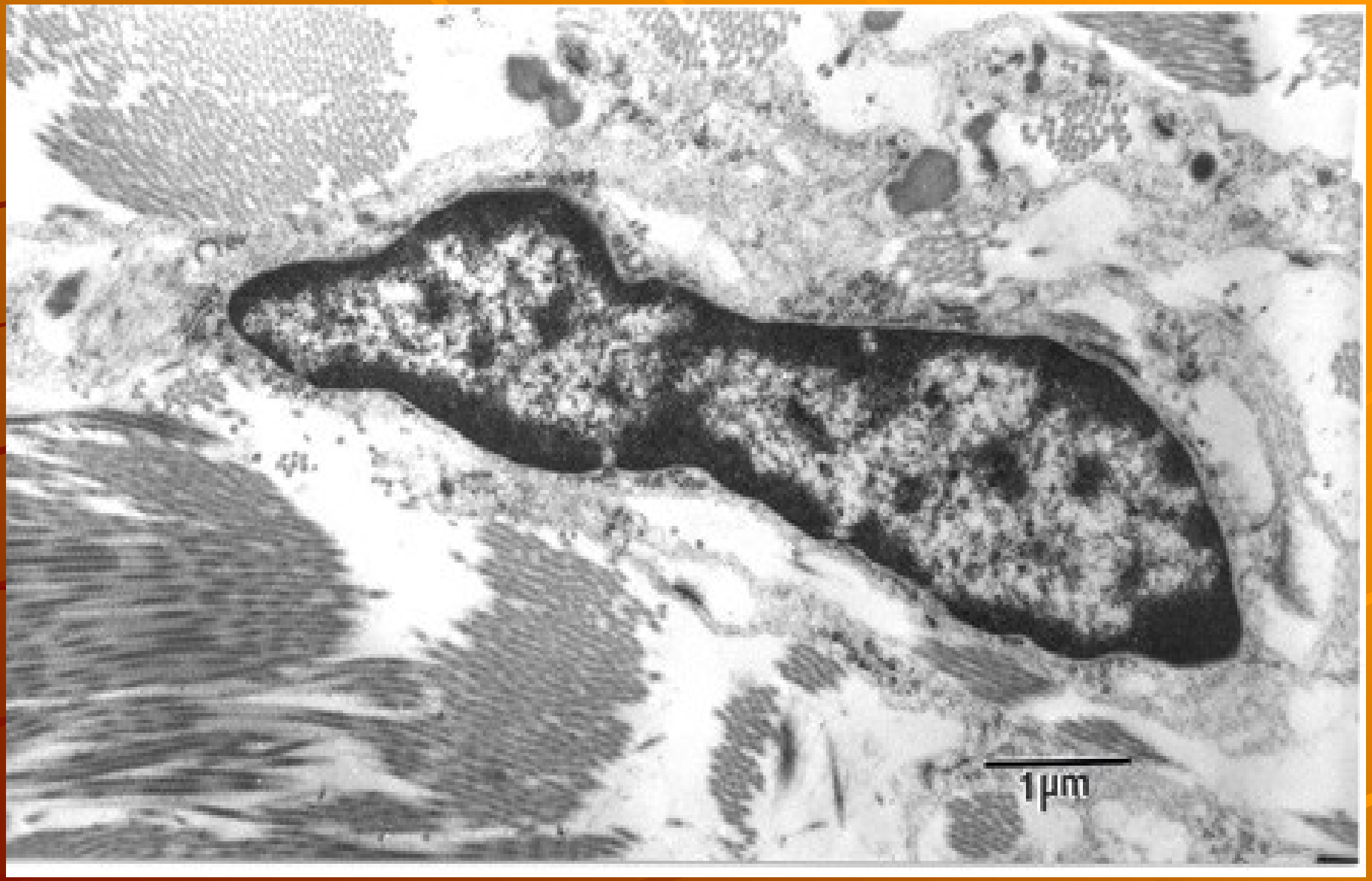

Collagen fibers in cross-section
Fibroblast in active state
GA
RER
1.0 µm
Collagen fibers in longitudinal section

Fibroblasty a žírná buňka



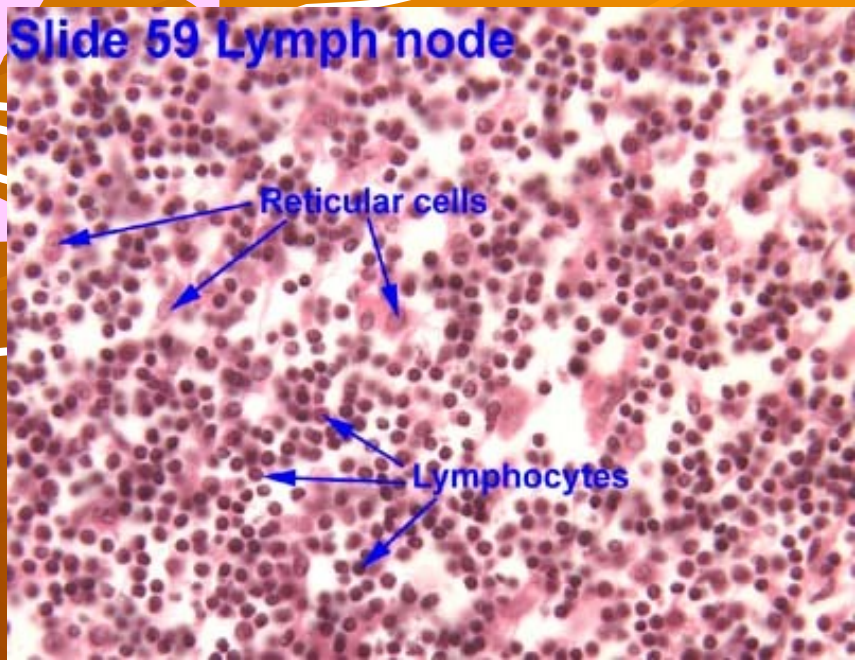
Fibroblast

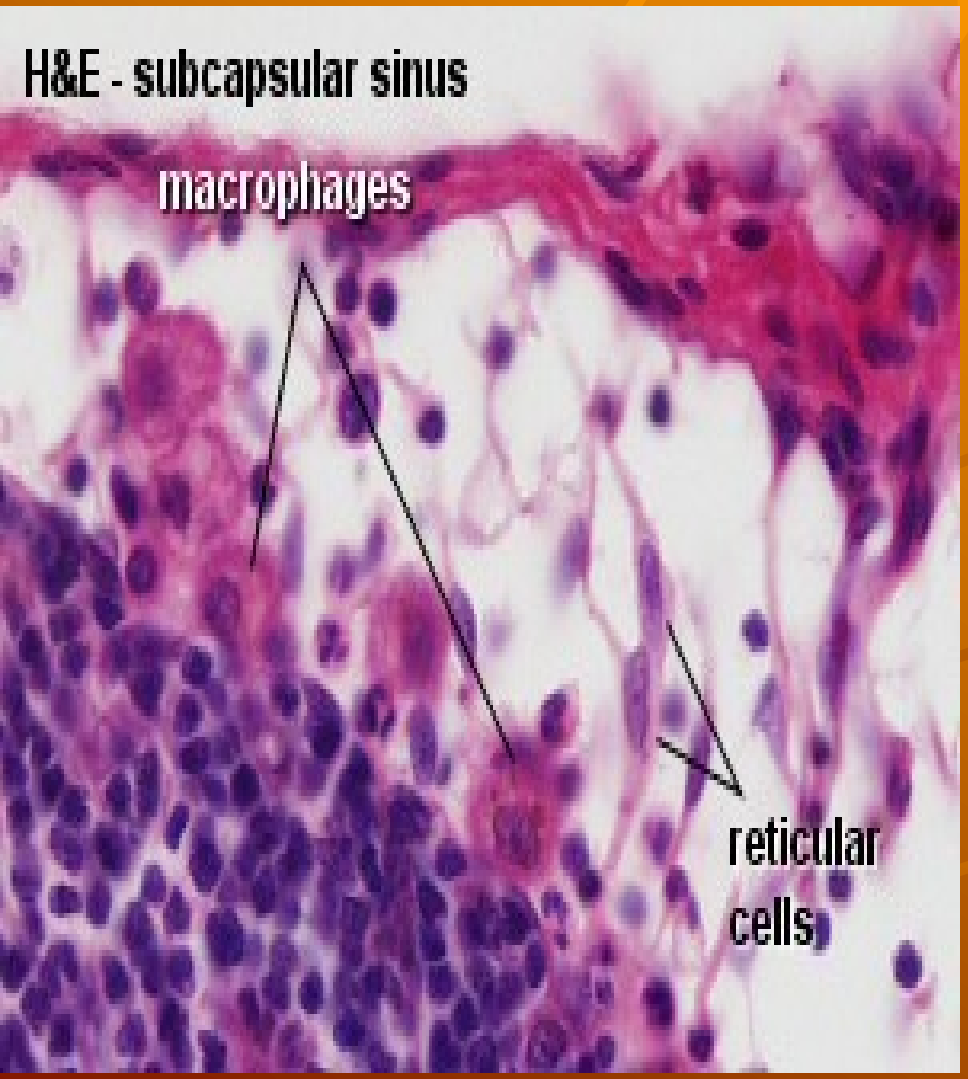


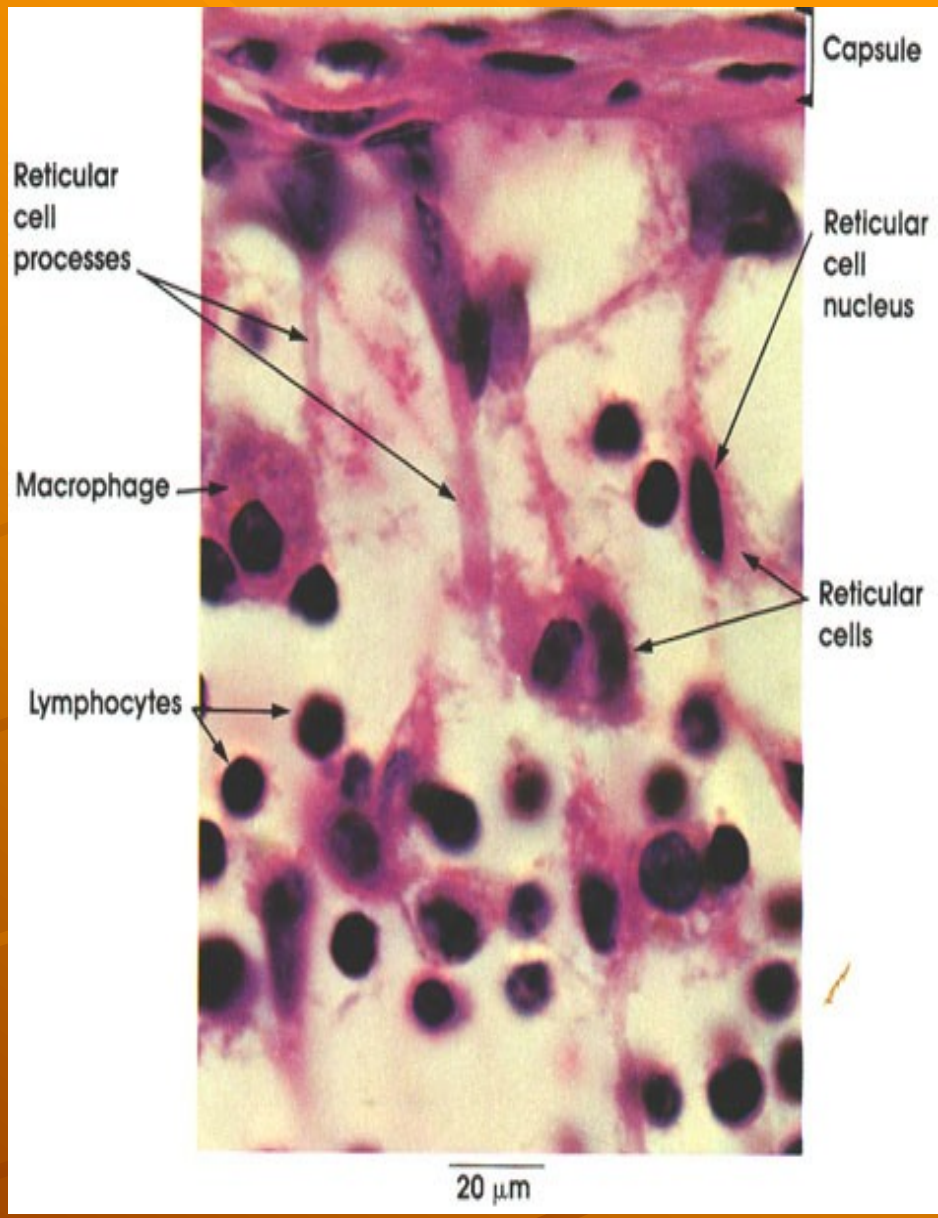
Retikulární buňka

Síť výběžků buněk +
retikulárních vláken

kolagen III




H&E - subcapsular sinus
macrophages
reticular
cells


Capsule
Reticular
cell
processes
Reticular
cell
nucleus
Macrophage
Reticular
cells
Lymphocytes
20 μm

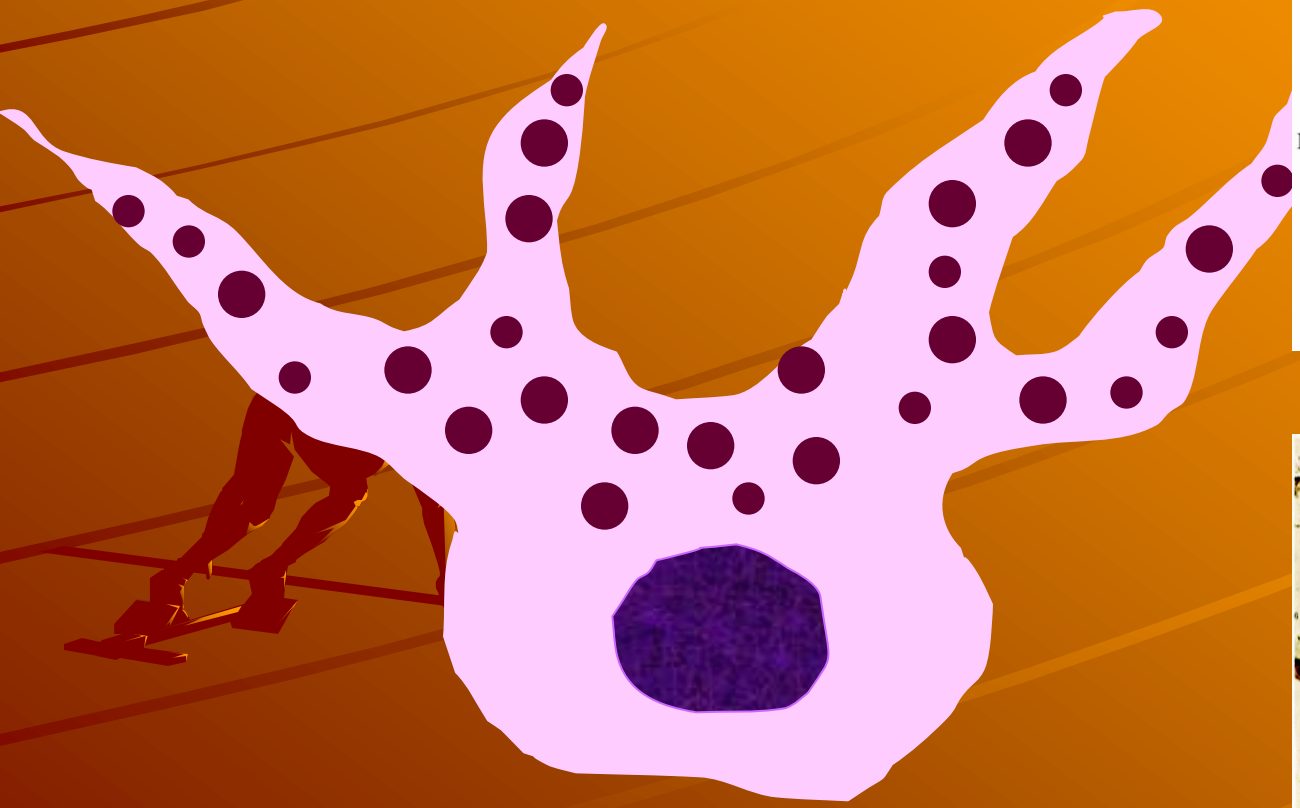
Tukové buňky

univakuolární
(bílá tuk. tkáň)

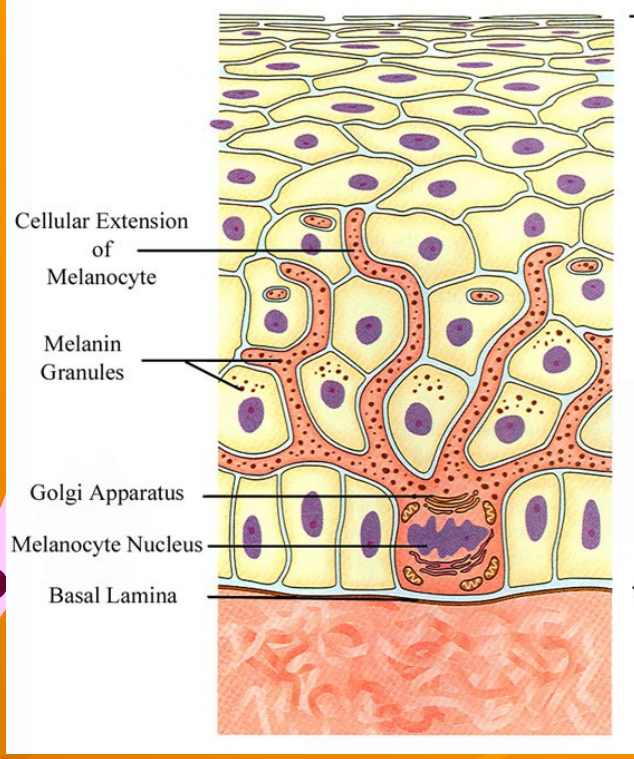
multivakuolární
(hnědá tuk. tkáň)

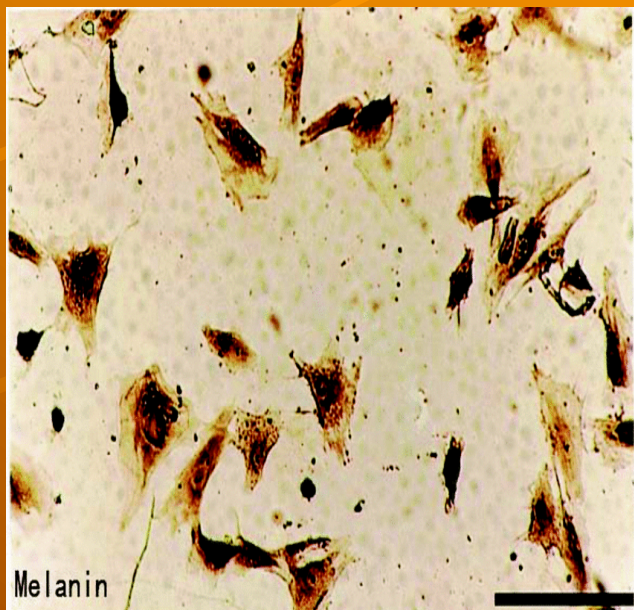
Lipidové kapky

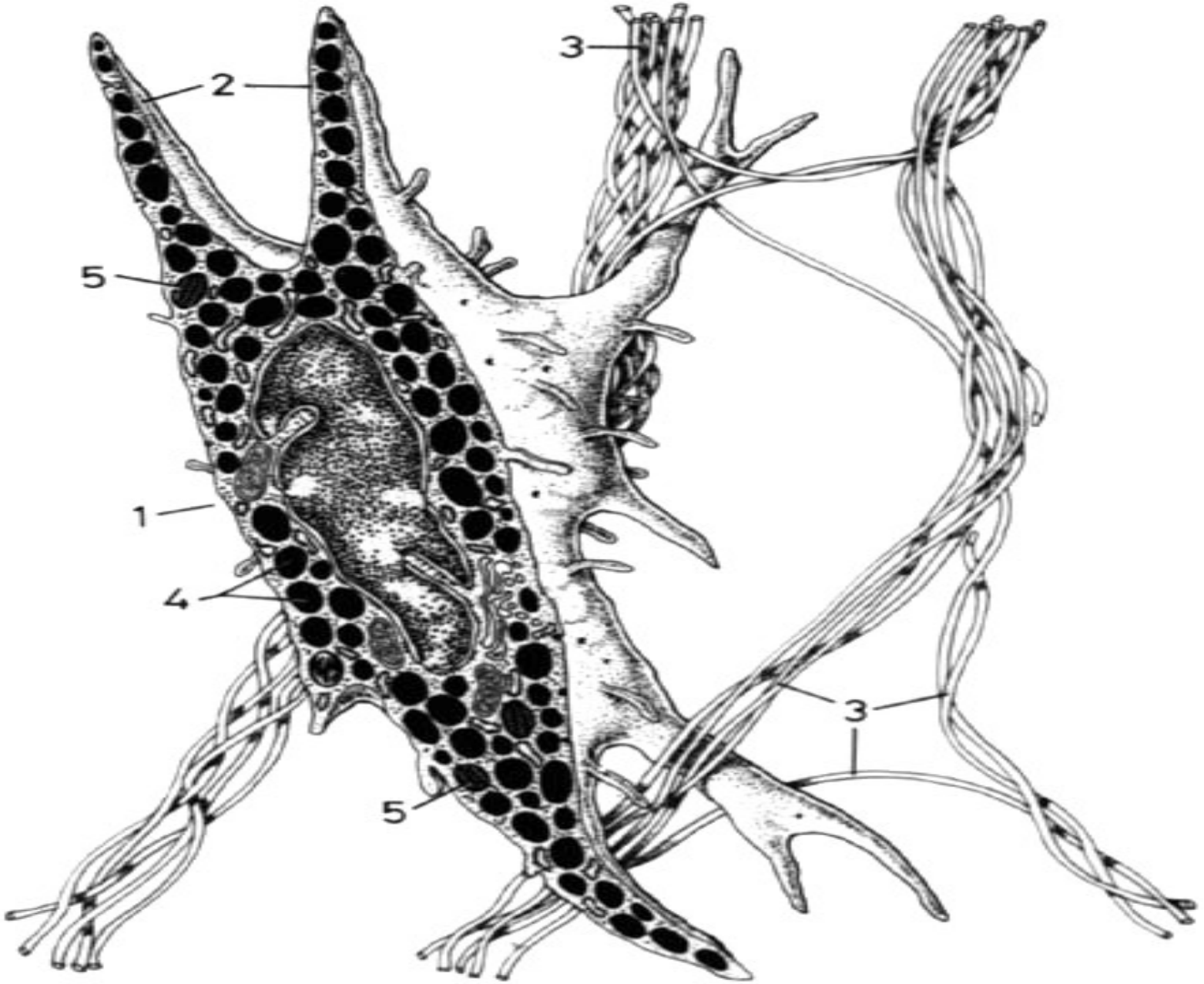
Pigmentové buňky



neuroektodermový původ



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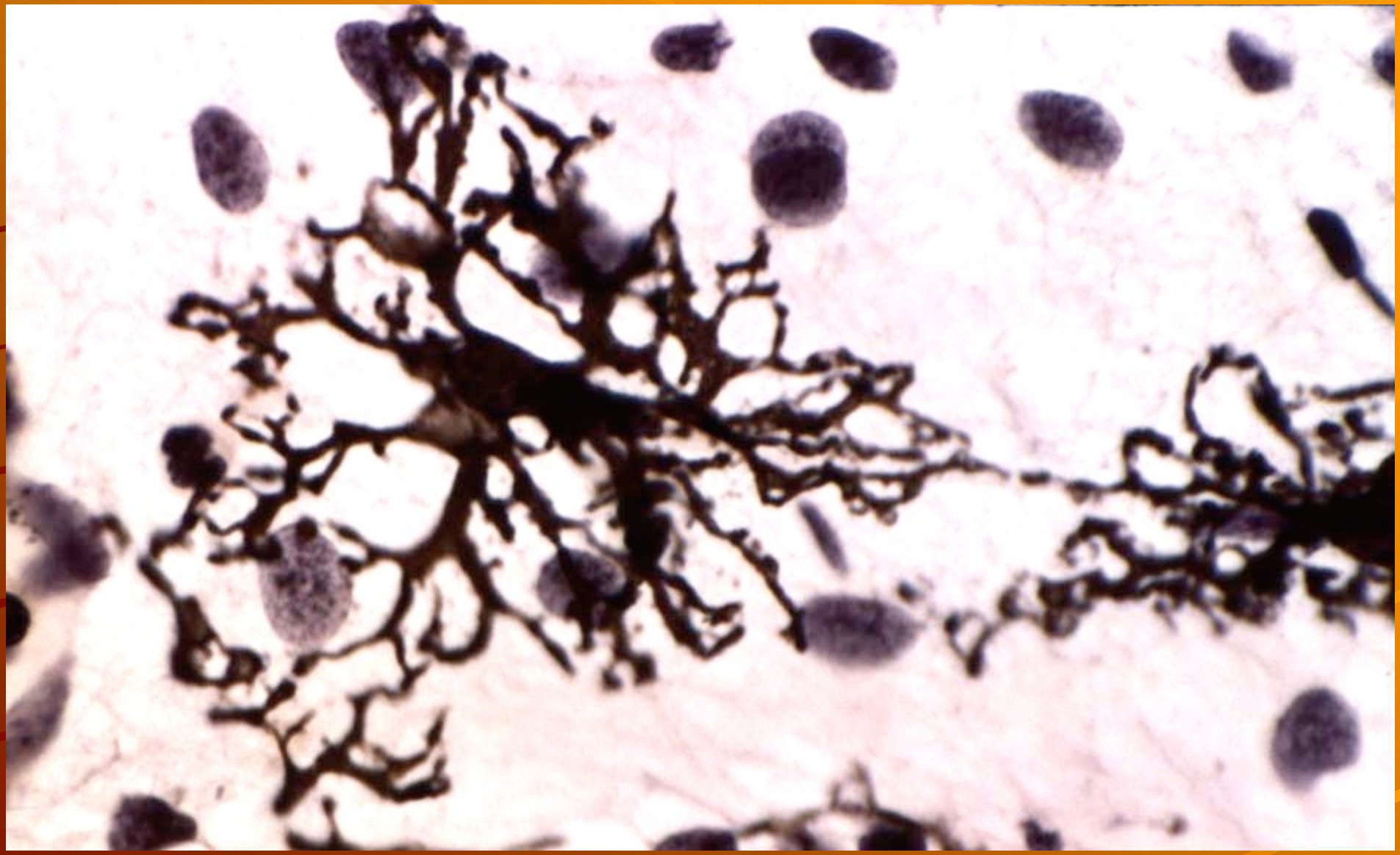
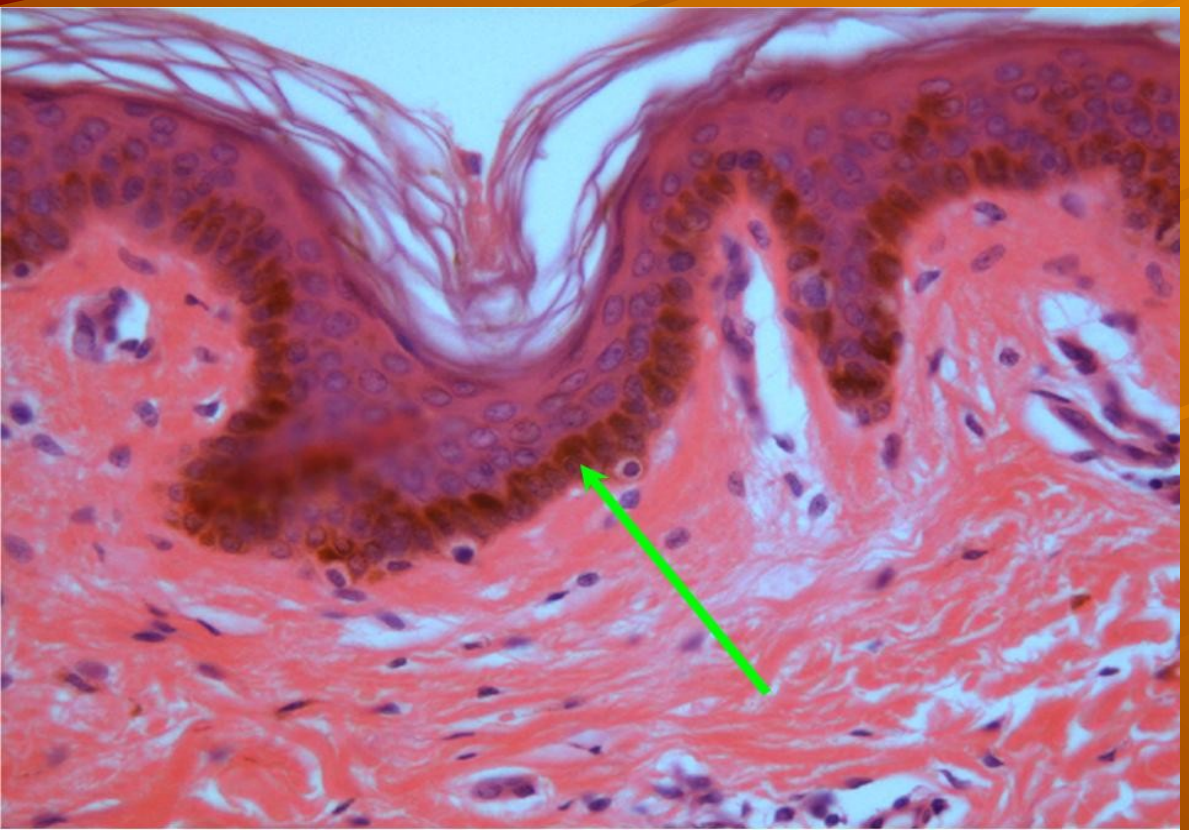
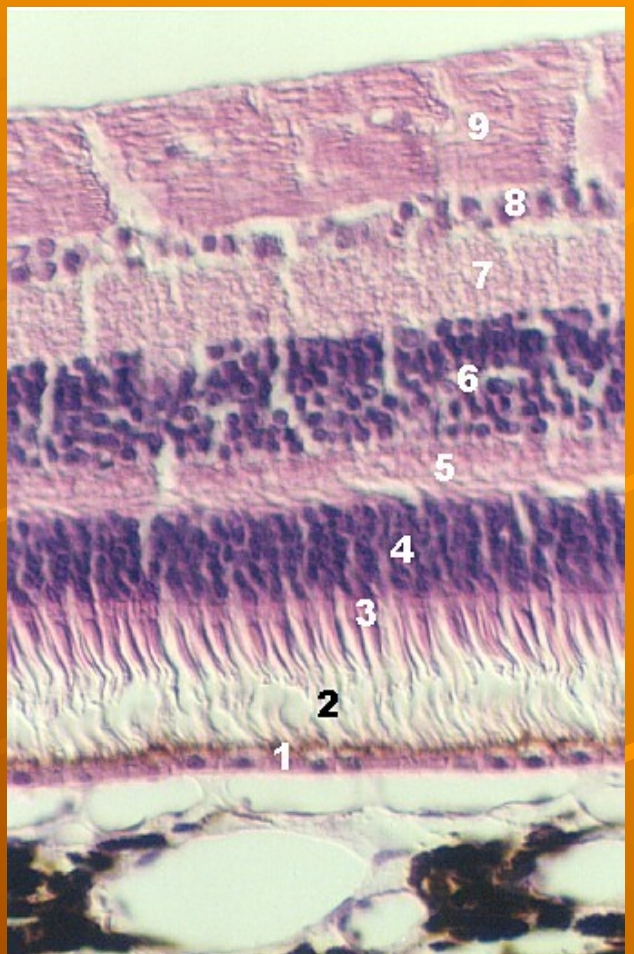


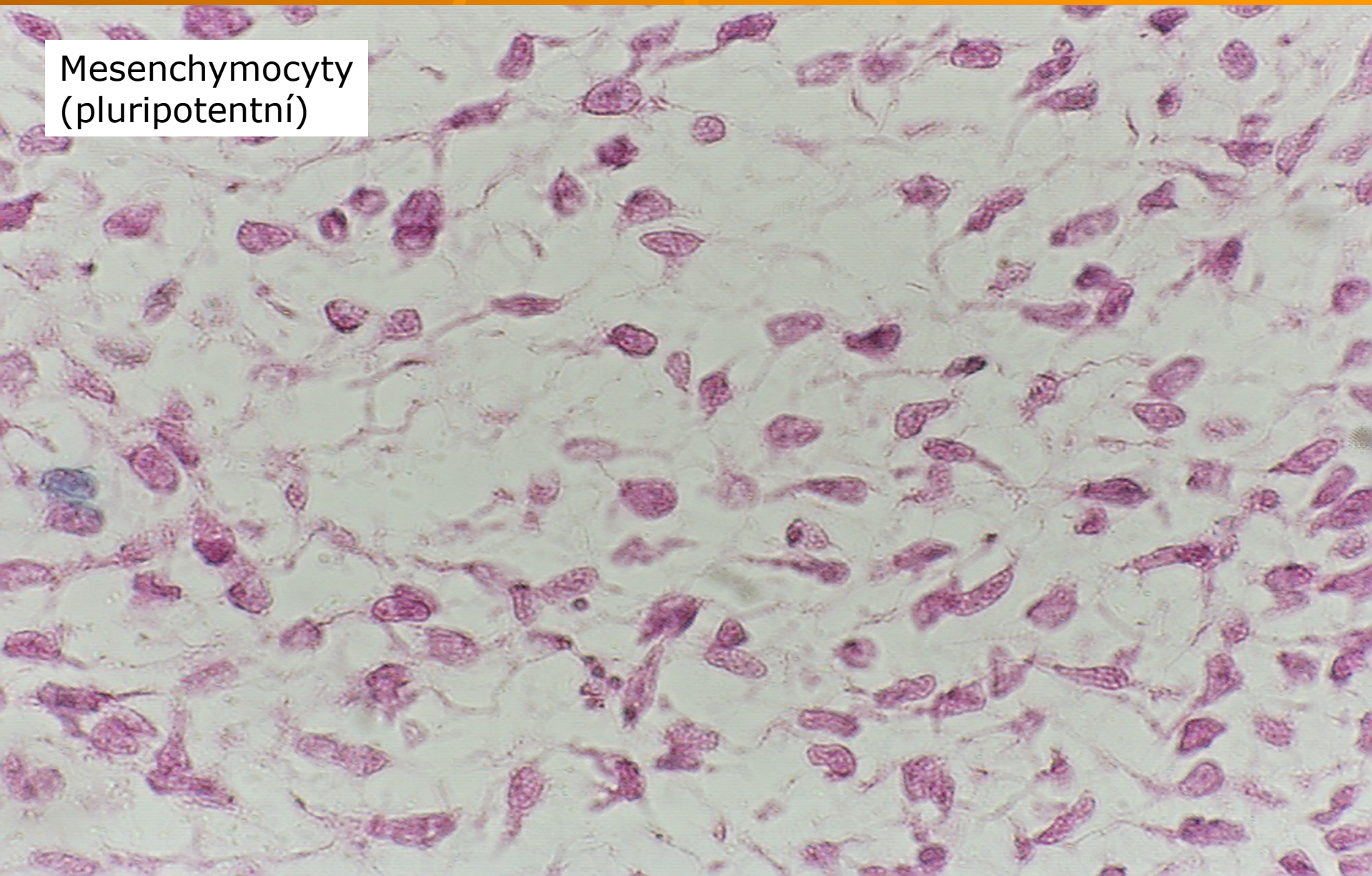
Pigmentové buňky

- Melanocyty s melanosomy
- Neuroektodermového původu
- Duhovka, cévnatka...



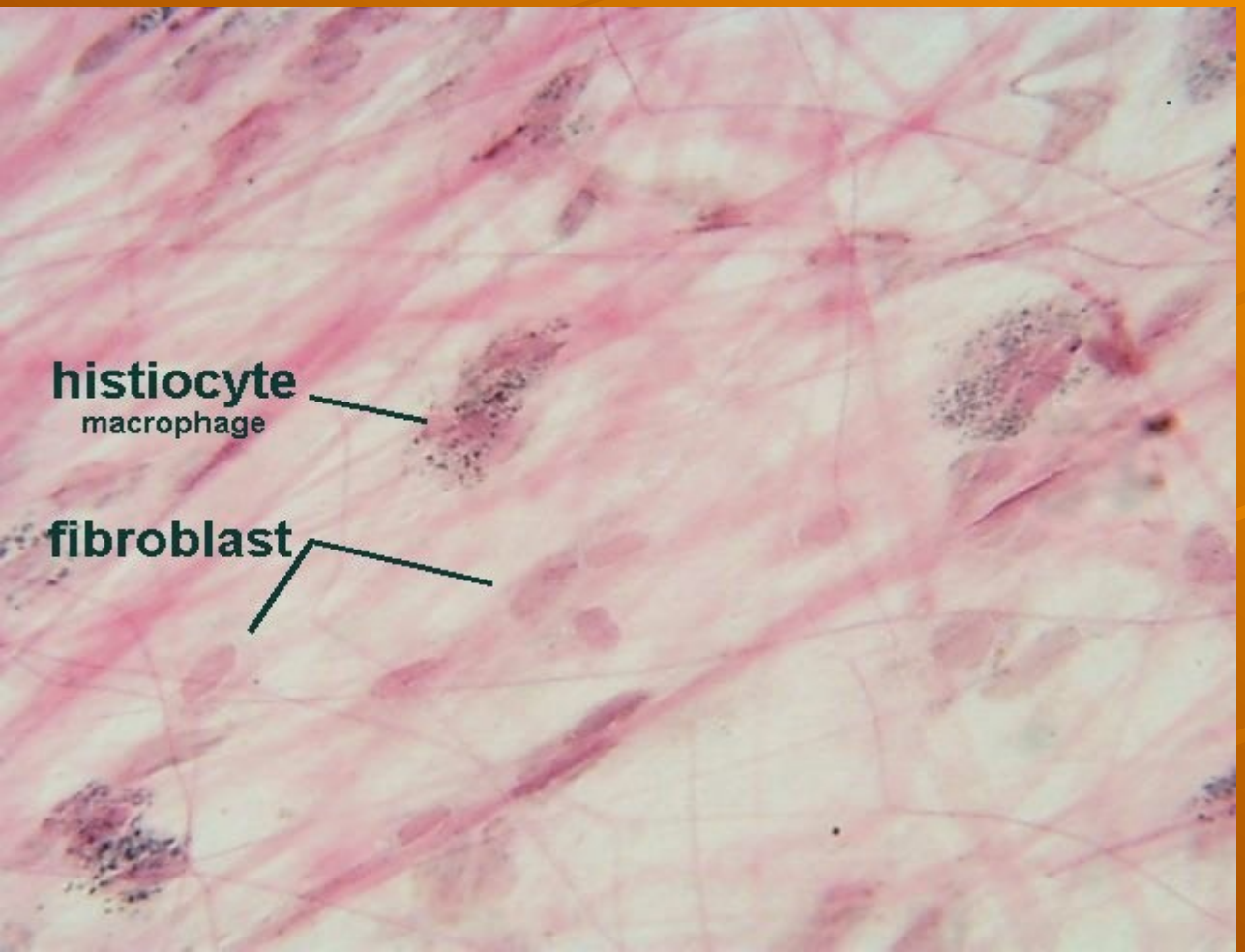


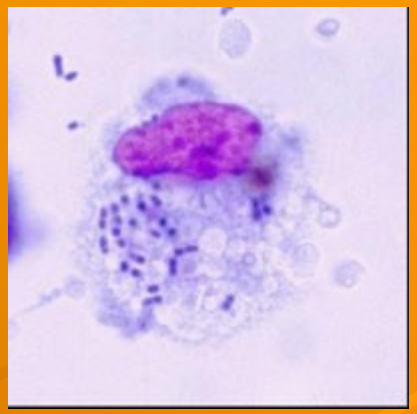
Mezenchymové buňky

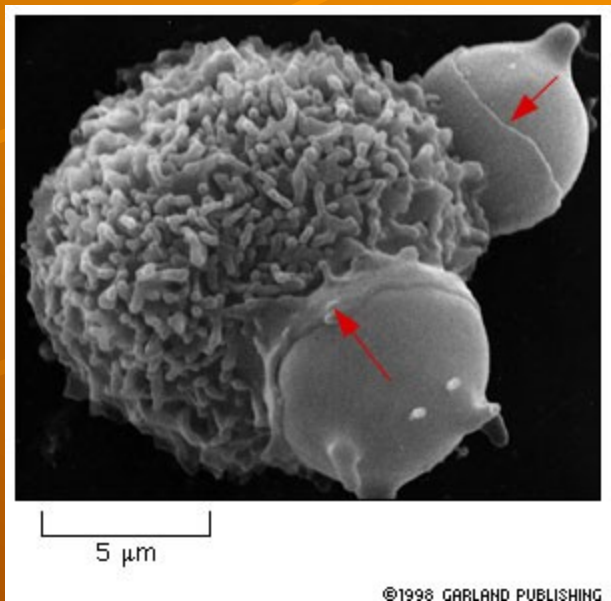


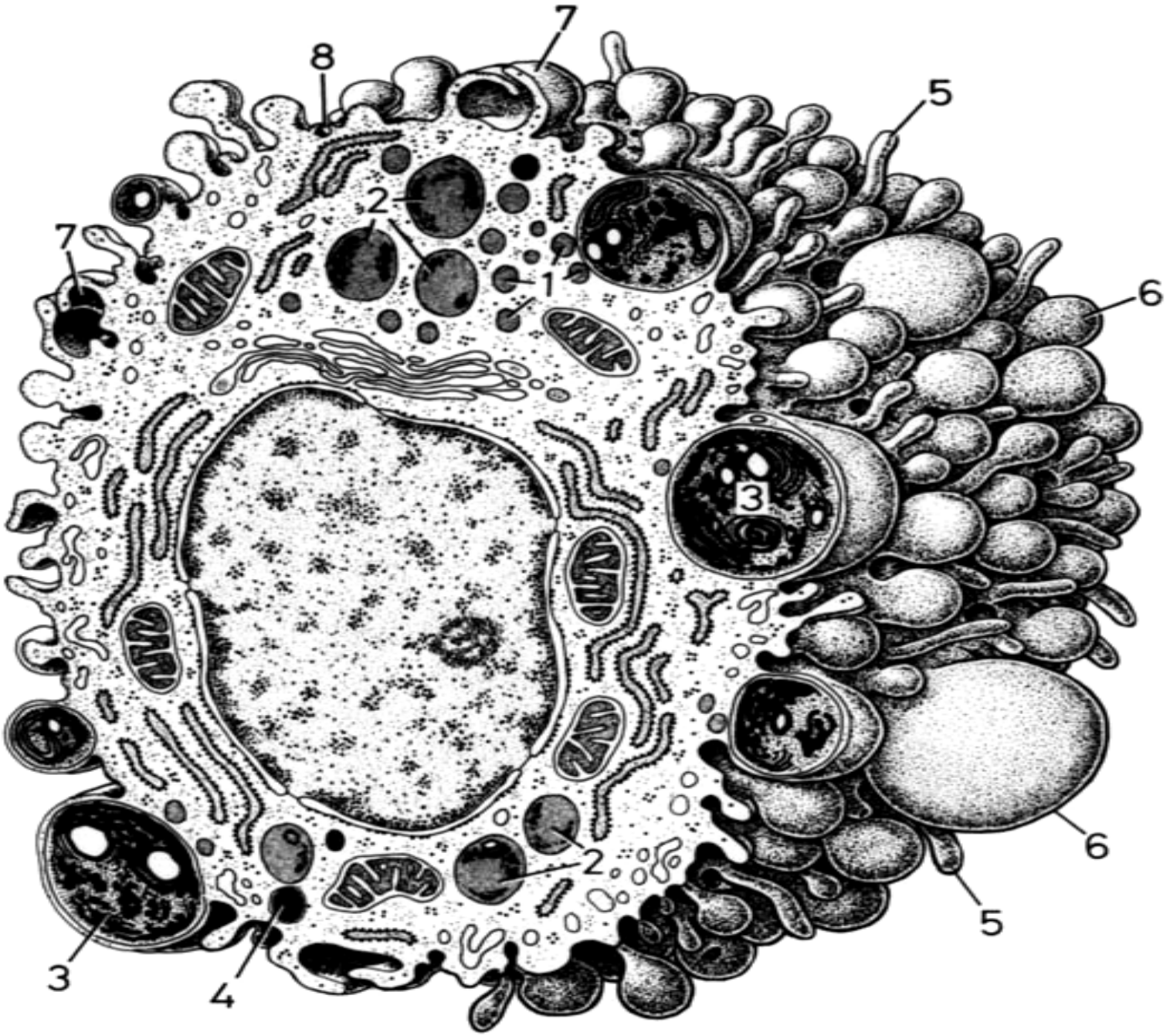
Histiocyty ⇨makrofágy
(patří k monocyto-makrofágovému systému)

fagocytóza





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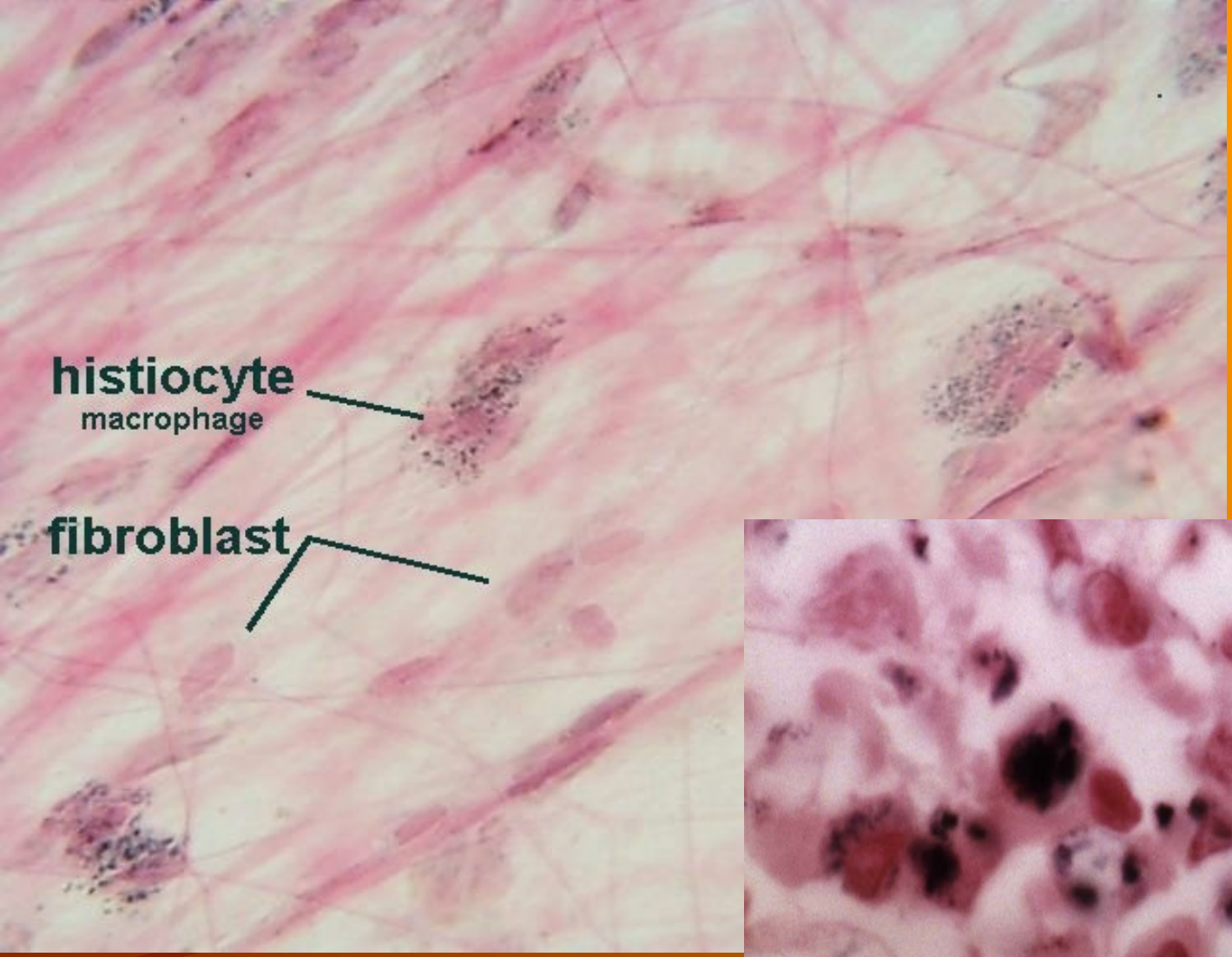
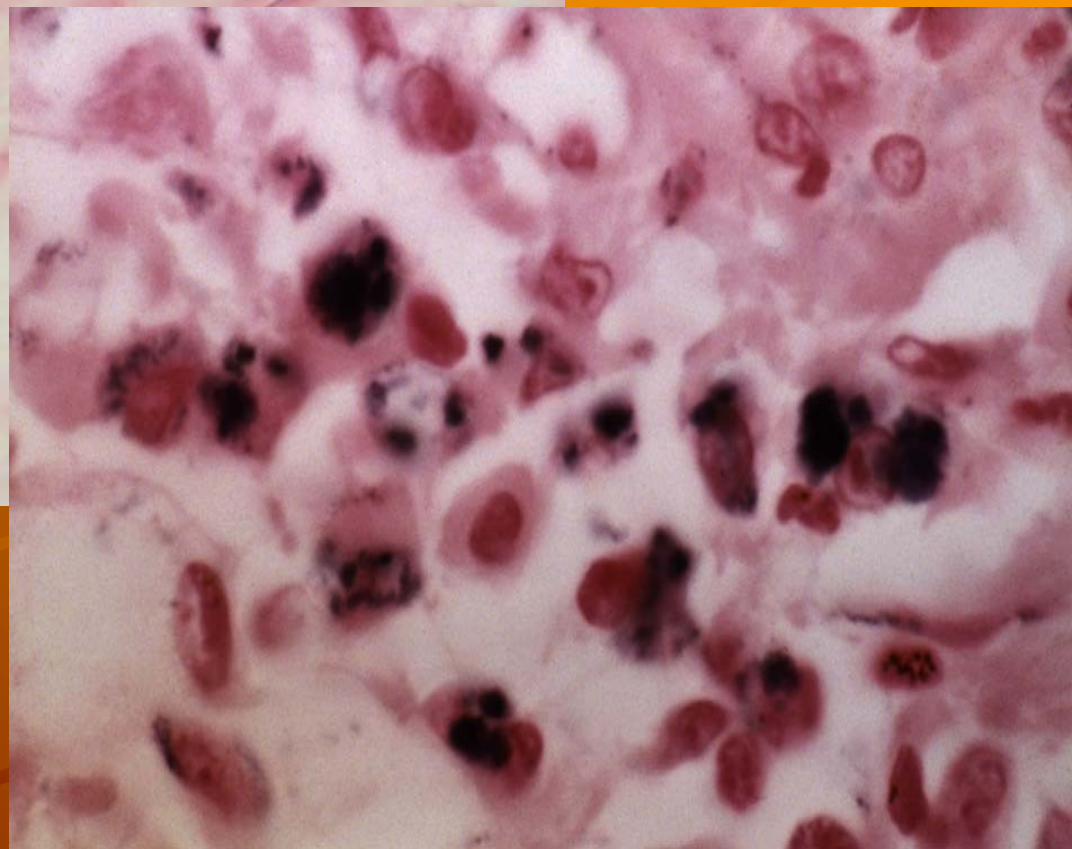
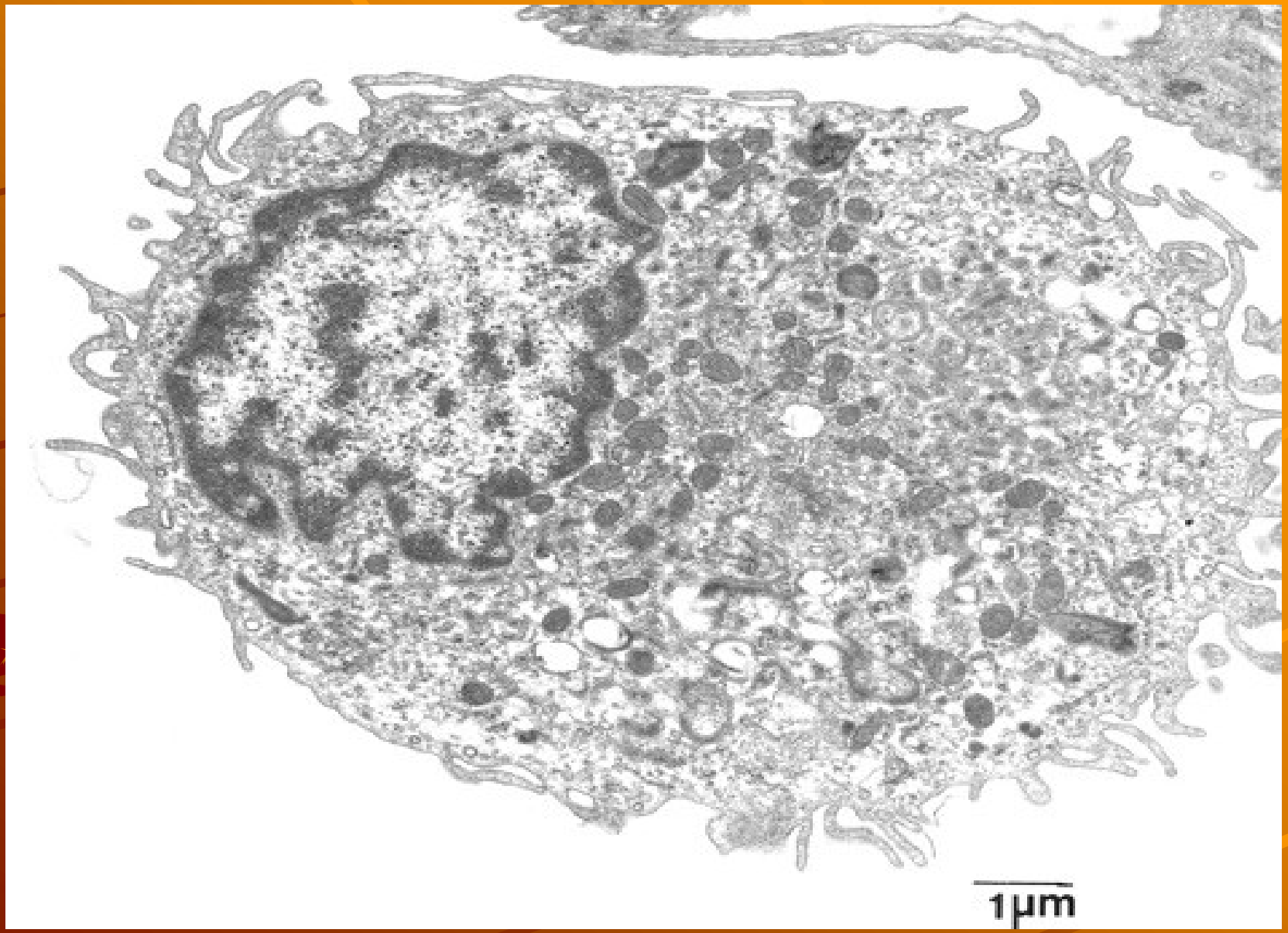

histiocyte
macrophage
fibroblast

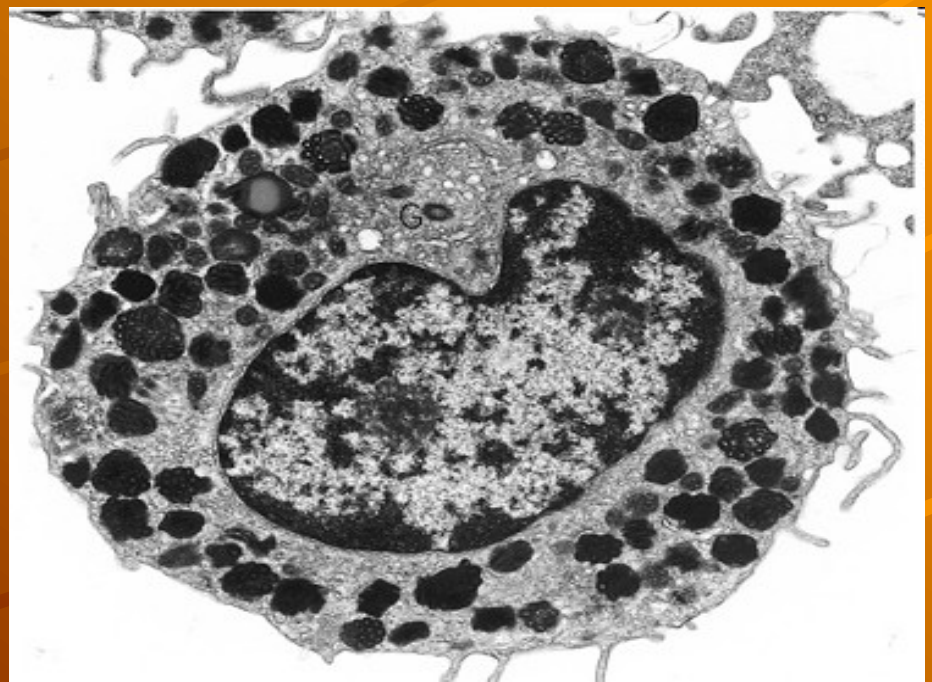


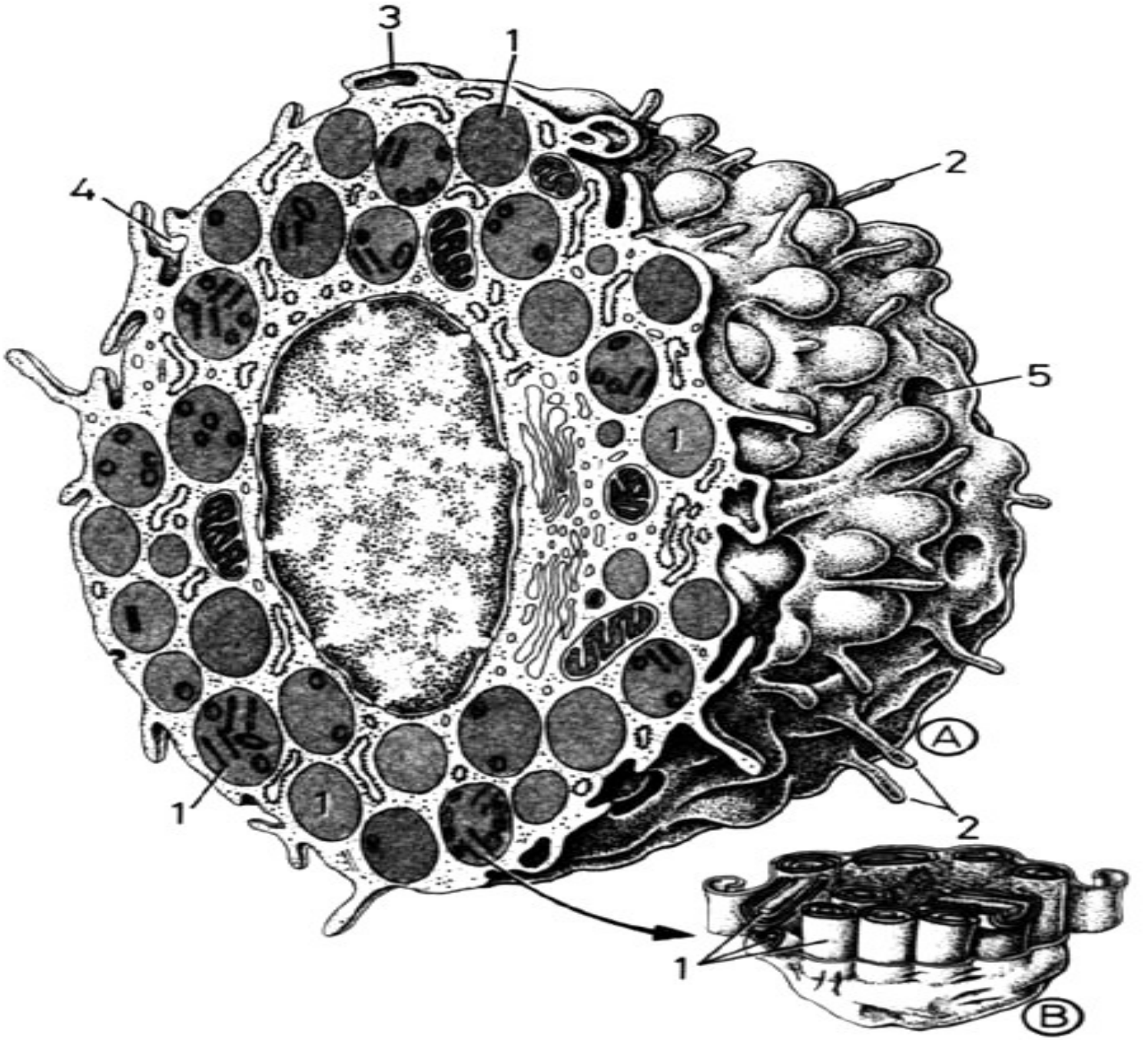
Makrofág (plíce)



Žírné buňky

heparin, histamin
– mediatory zánětu

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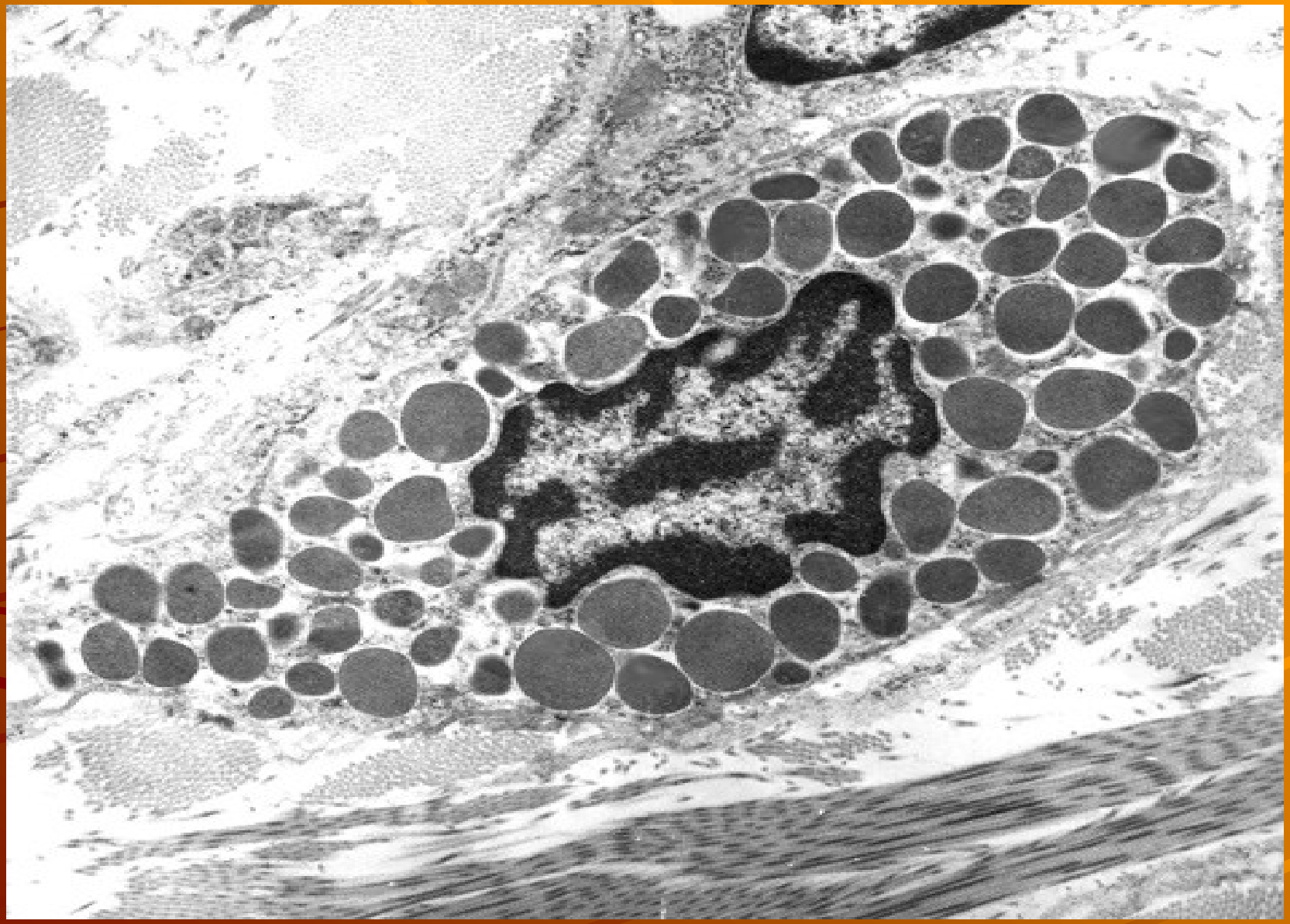
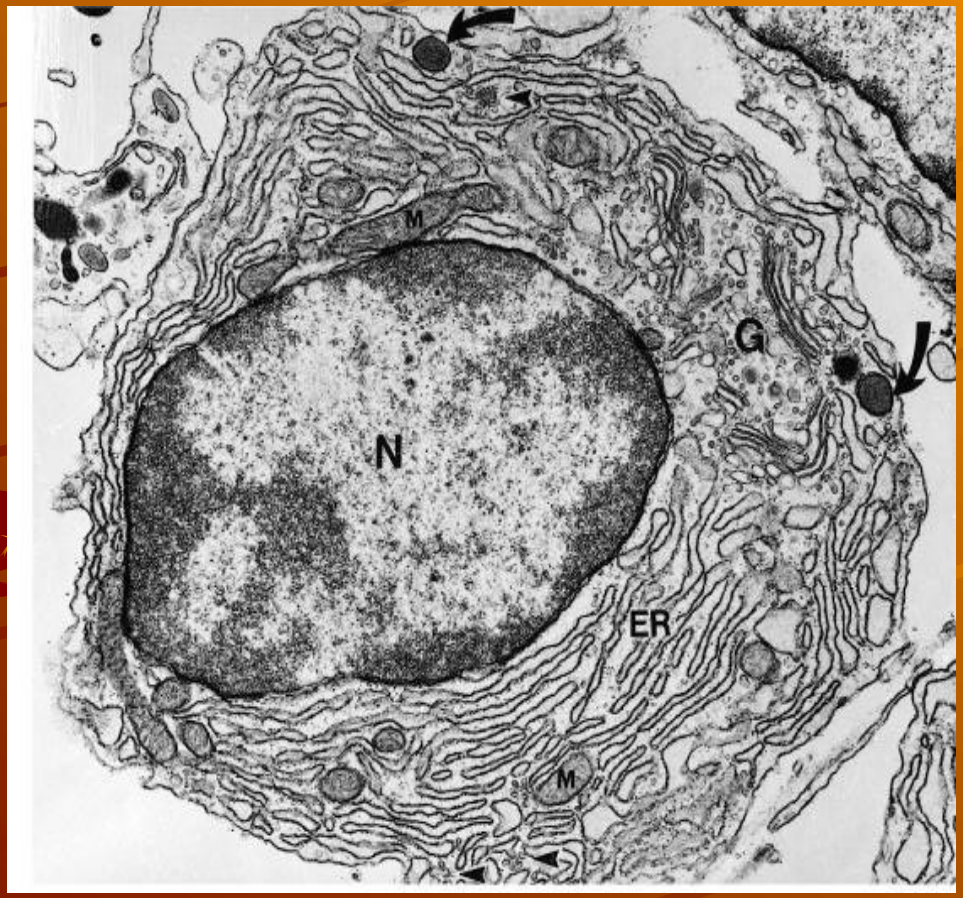
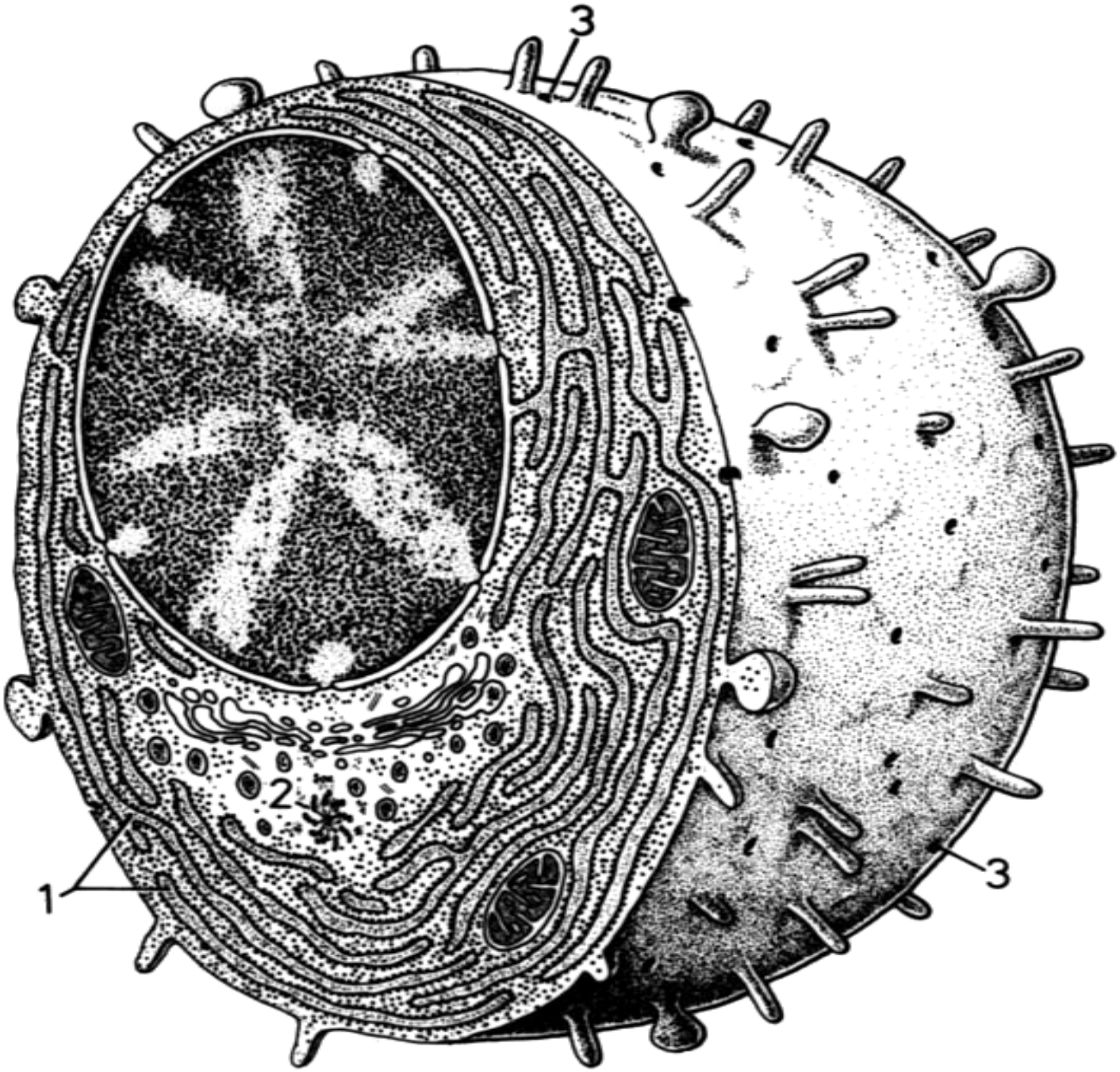
Žírná buňka



Plazmatické buňky
(vznikají z B-lymfocytů)

Tvoří protilátky (imunoglobuliny)

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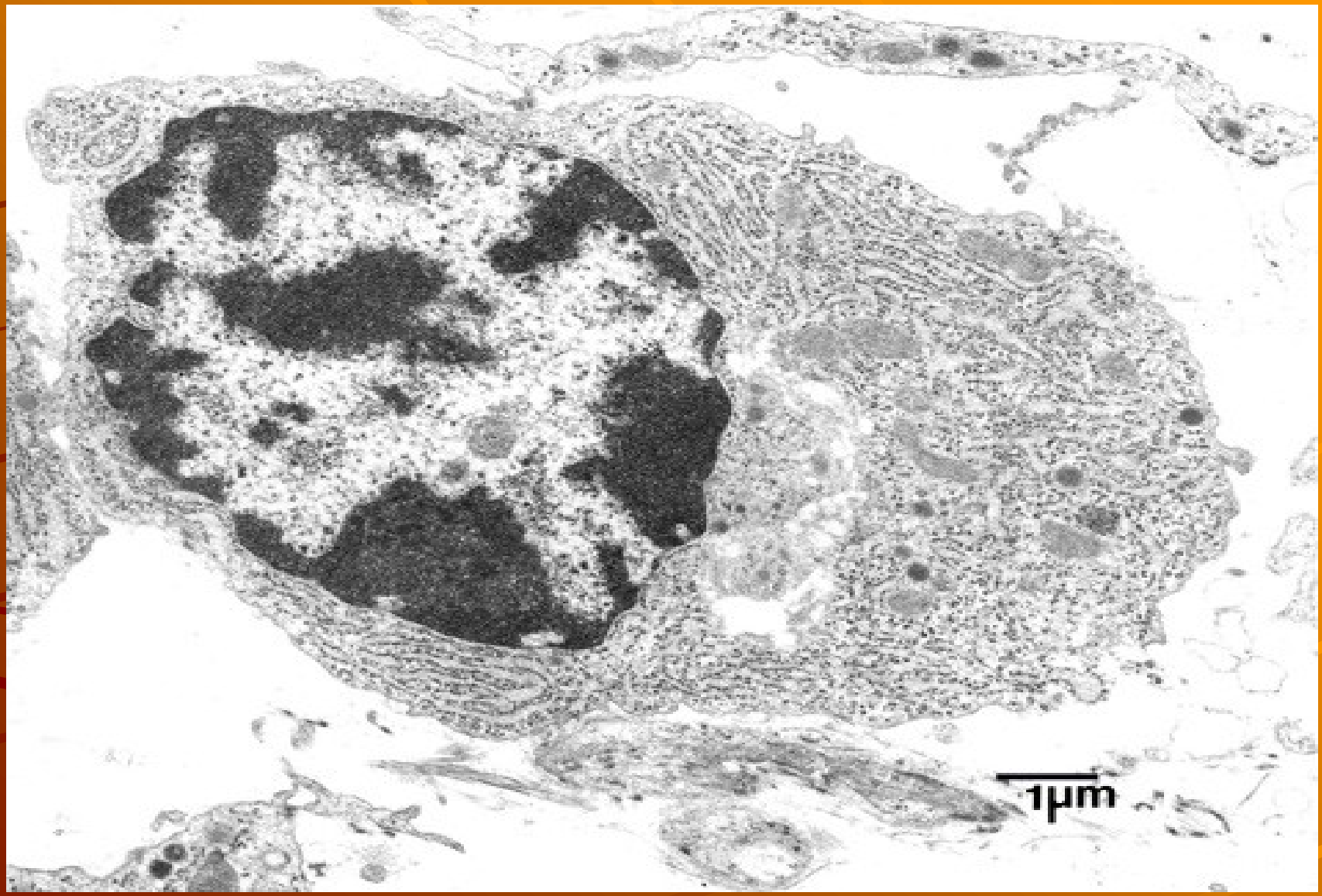
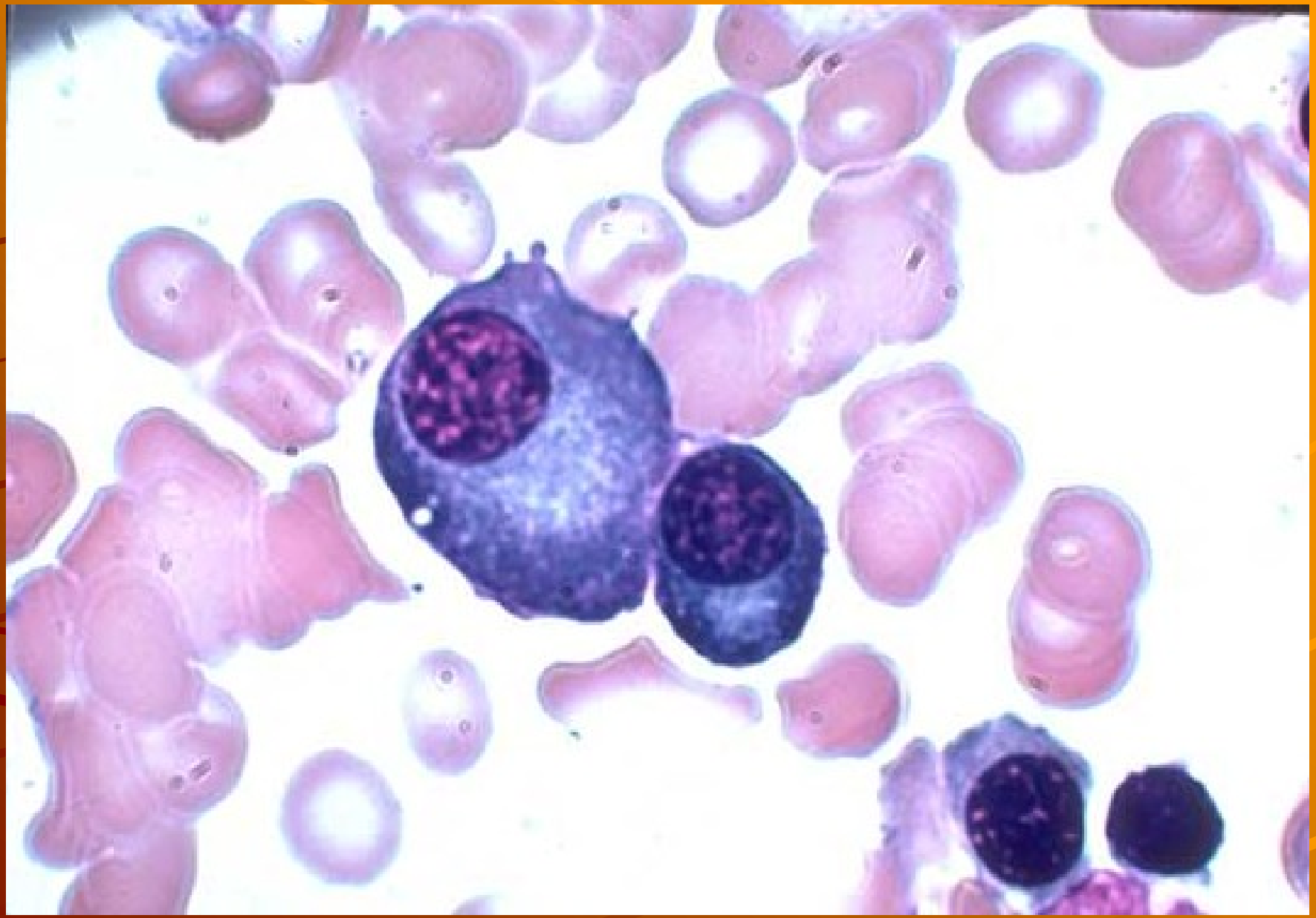
Plazmatická buňka





Základní amorfní substance

Homogenní, bezbarvá, transparentní, rosolovitá

- glykosaminoglykany (kys.hyaluronová, chondroitinsulfát, dermatansulfát, keratansulfát, heparansulfát)
- proteoglykany (syndecan, fibroglycan, agrecan)
- glykoproteiny (fibronektin, laminin, chondronektin, osteonektin, osteopontin)
- H_2O, ionty

GLYKOSAMINOGLYKANY (kyselé mukopolysacharidy)

- ***Lineární polymery hexosmaninů*** (glukosamin, galaktosamin) ***a uronových kyselin*** (kys.glukuronová)

- *Nesulfatované (kys. hyaluronová)*
- *Sulfatované (chondroitin 4- a 6- sulfát, dermatansulfát, keratansulfát, heparansulfát)*

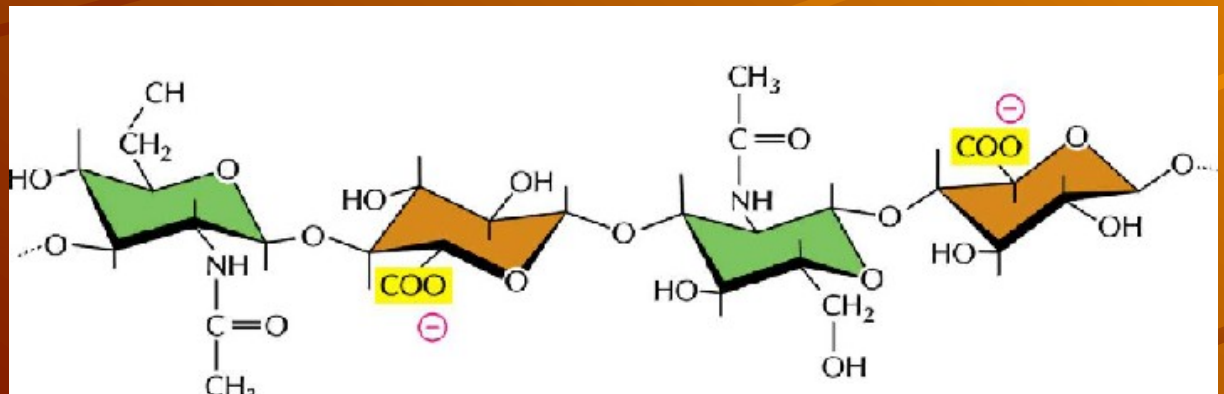
Glykosaminoglykany nesulfatované

- HYALURONOVÁ kyselina

N-acetylglukosamin a glukuronová kys.

Výskyt:

- Rosolovité vazivo pupečníku
- Komorový mok
- Synoviální tekutina



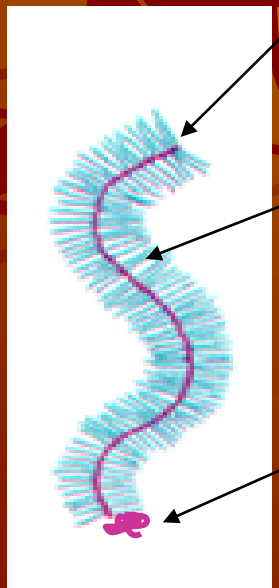
Glykosaminoglykany sulfatované

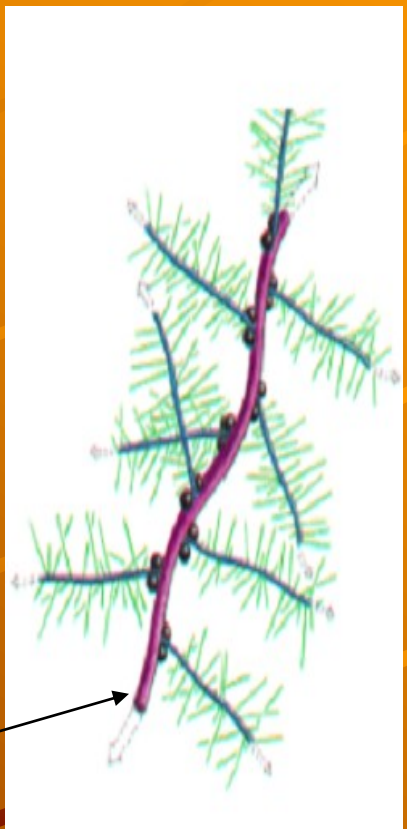
- Chondroitin 4-sulfát
  Chondroitin 6-sulfát
  - Chrupavka, kost, velké cévy

- Dermatansulfát
  - Kůže, šlachy, srdeční svalovina
- Keratansulfát
  - Typ I – stroma rohovky
  - Typ II – chrupavka a disci intervertebrales

PROTEOGLYKANY

- Bílkovinné jádro + sulfatované GAG
  - Aggrecan - chrupavka
  - Syndecan
  - broglycan





GLYKOPROTEINY

liší se strukturně od proteoglykanů

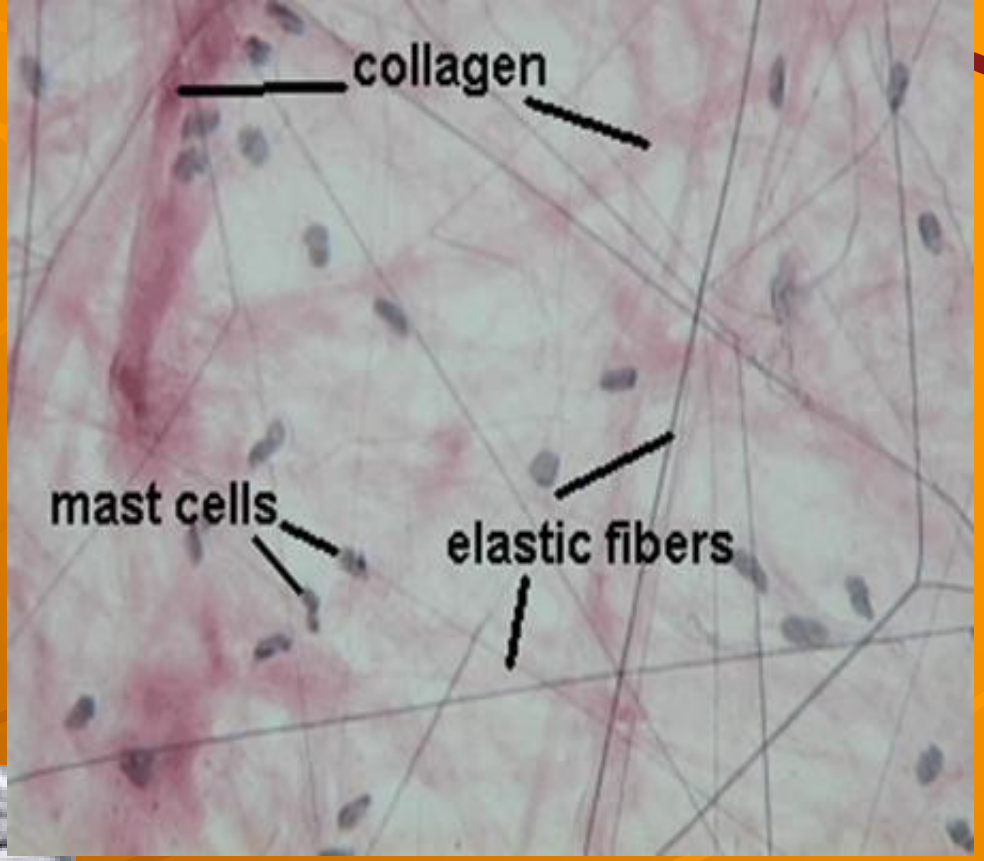
proteinové jádro + oligosacharidy

- Fibronektin
- Chondronektin
- Laminin
- Osteokalcin, osteopontin

Vlákna

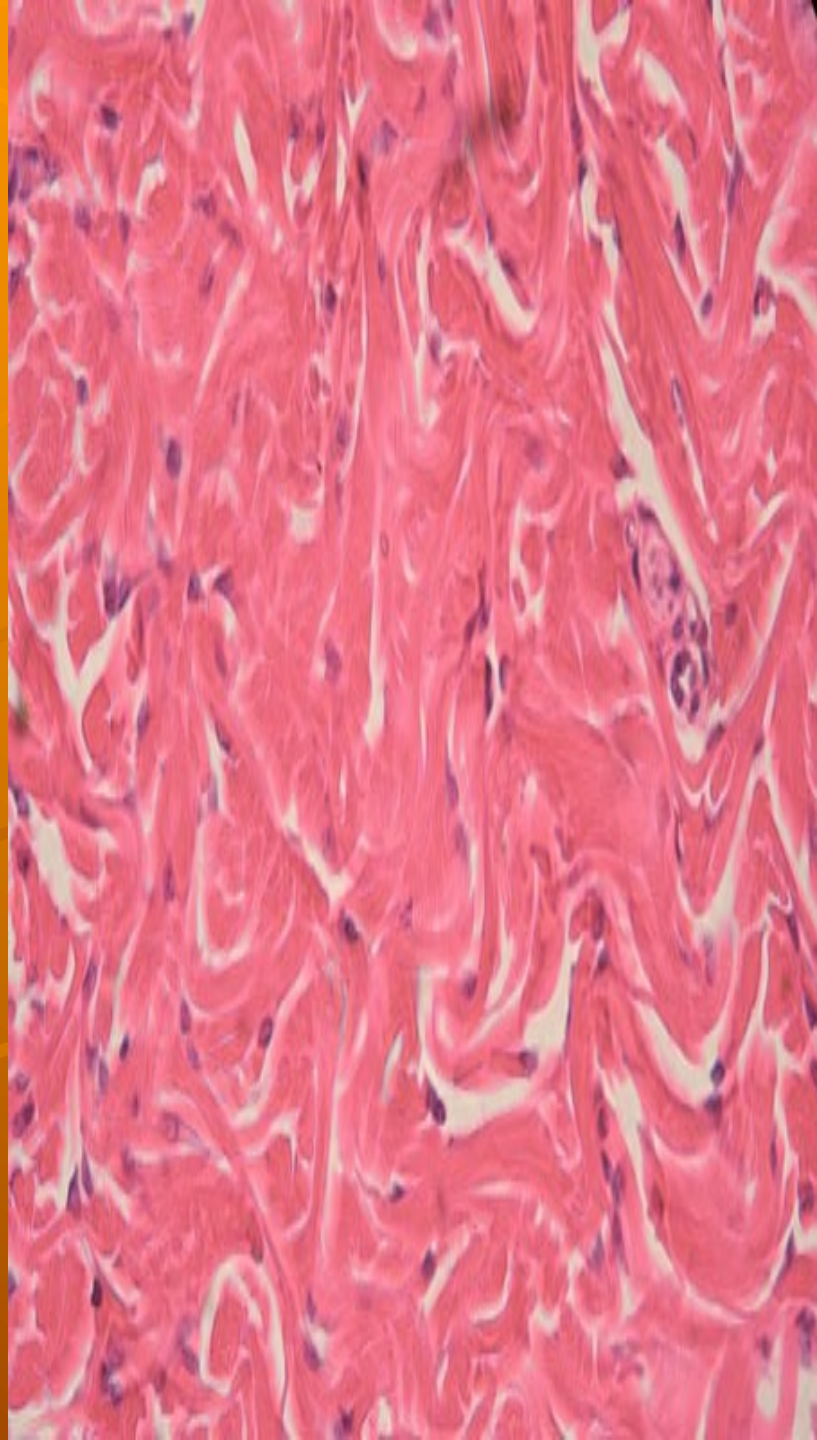
polypeptidové řetězce

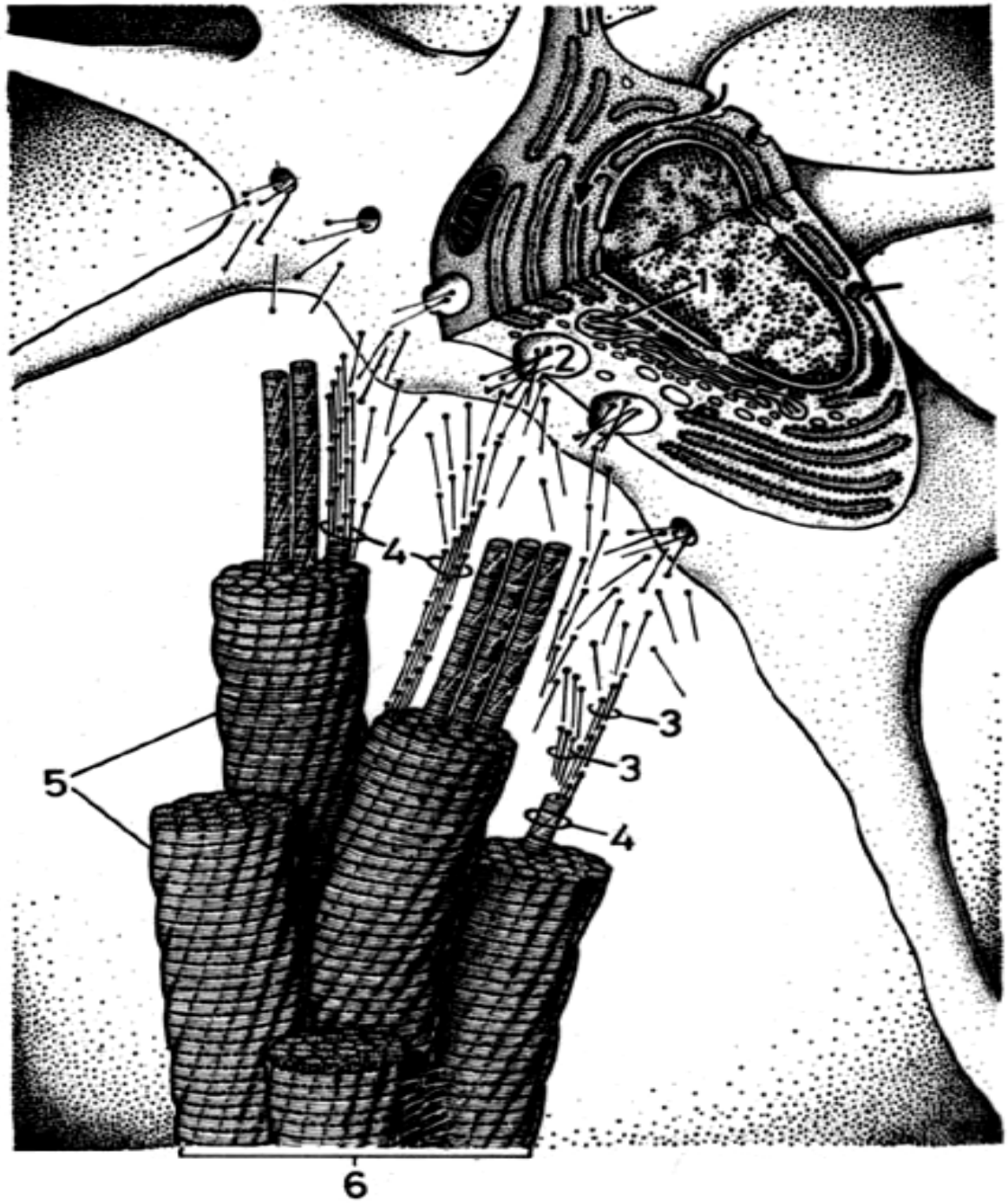
- kolagenní
- retikulární
- elastická



Kolagenní vlákna

- „bílá“, pevná a silná, nepružná
- 1 – 20 [redacted]m Ø
- kolagen
- ve svazcích
- kolagenáza – digestivní enzym
- varem denaturují - klih
- acidofilní (HE – růžově, kyselý fuchsin – červeně, šafrán – žlutě, anilinová modř – modře)

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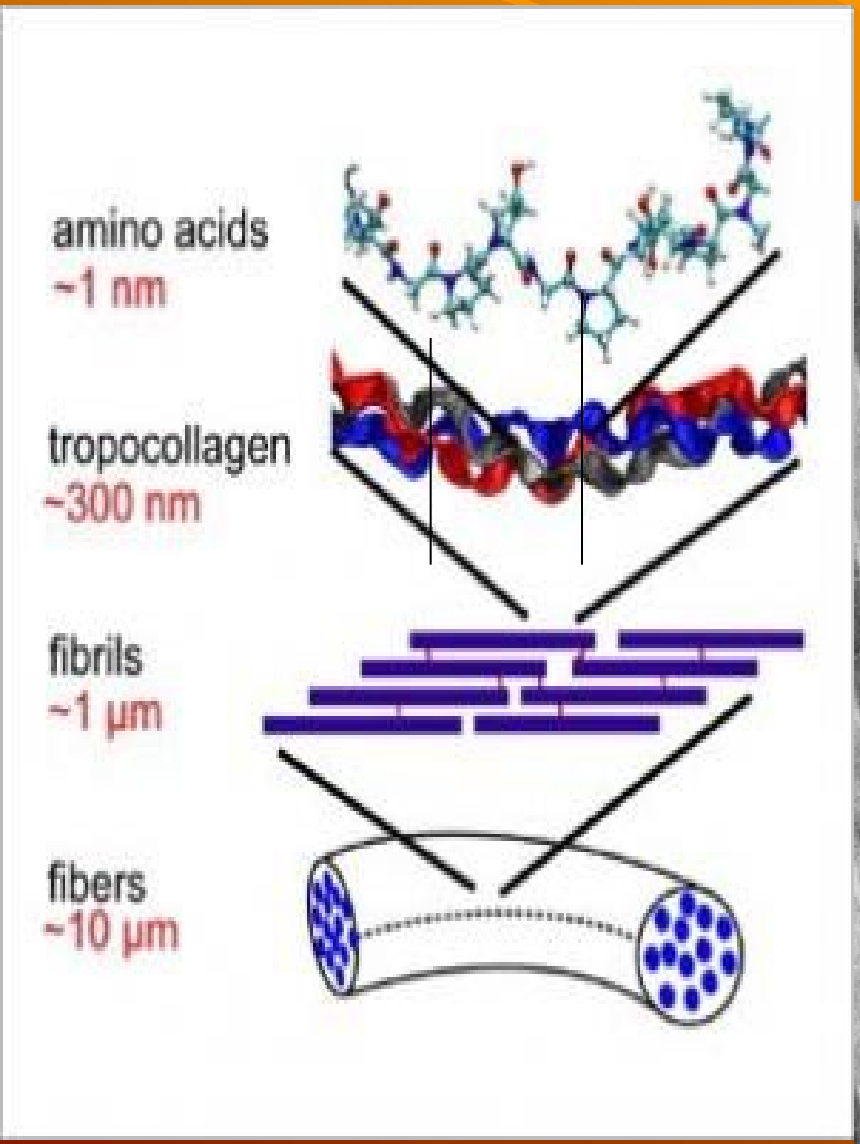
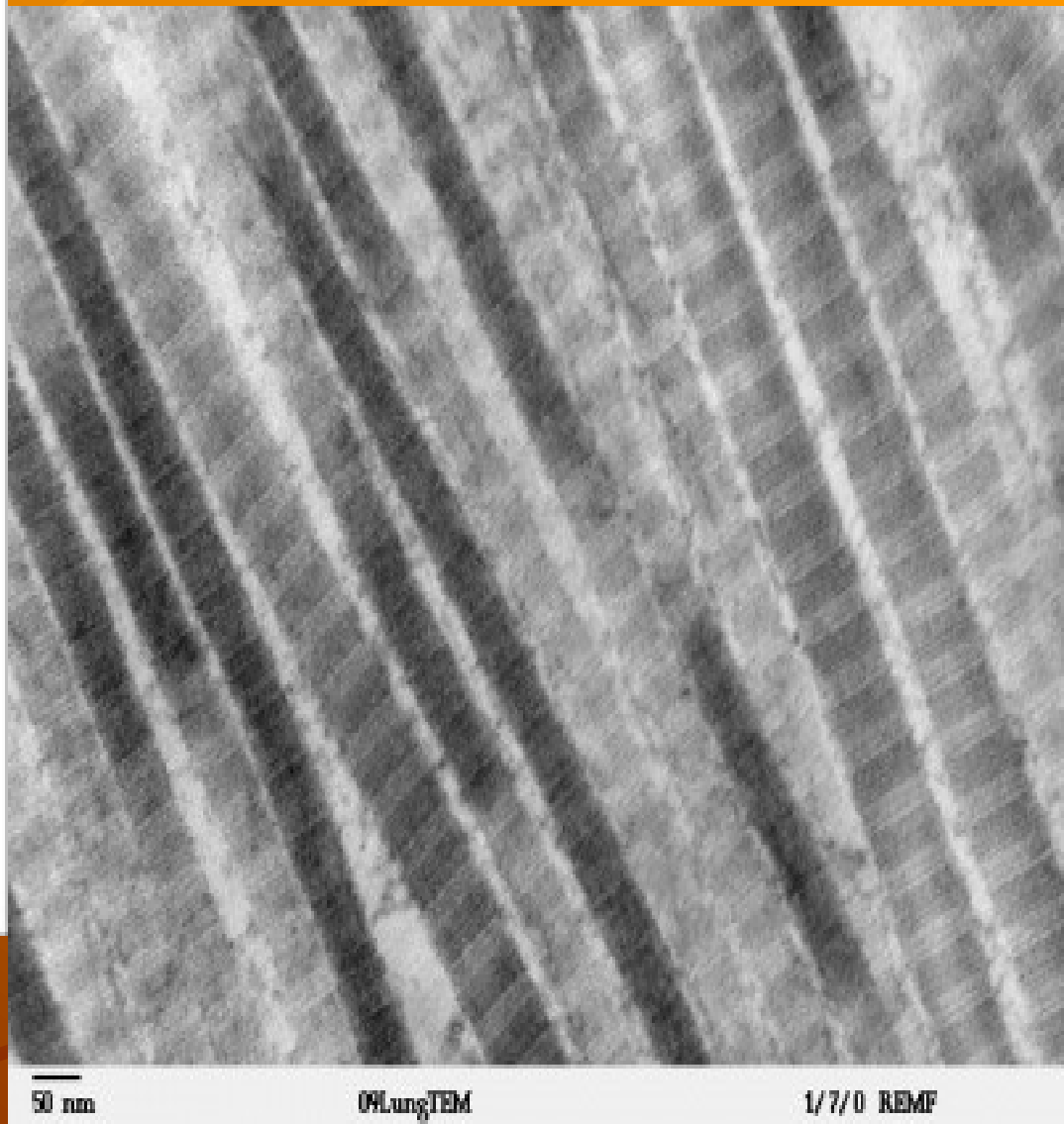
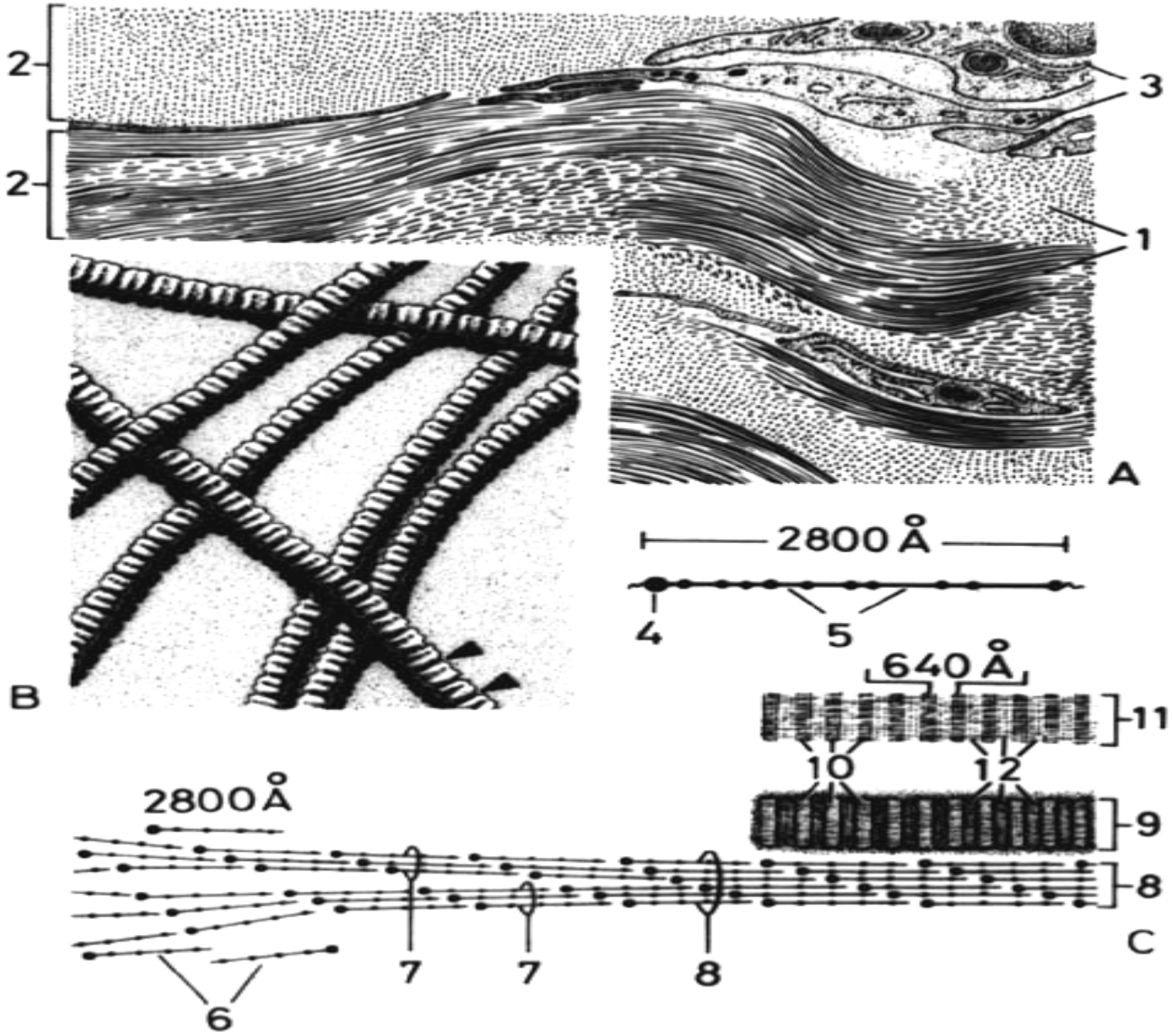
Kolagenní vlákna



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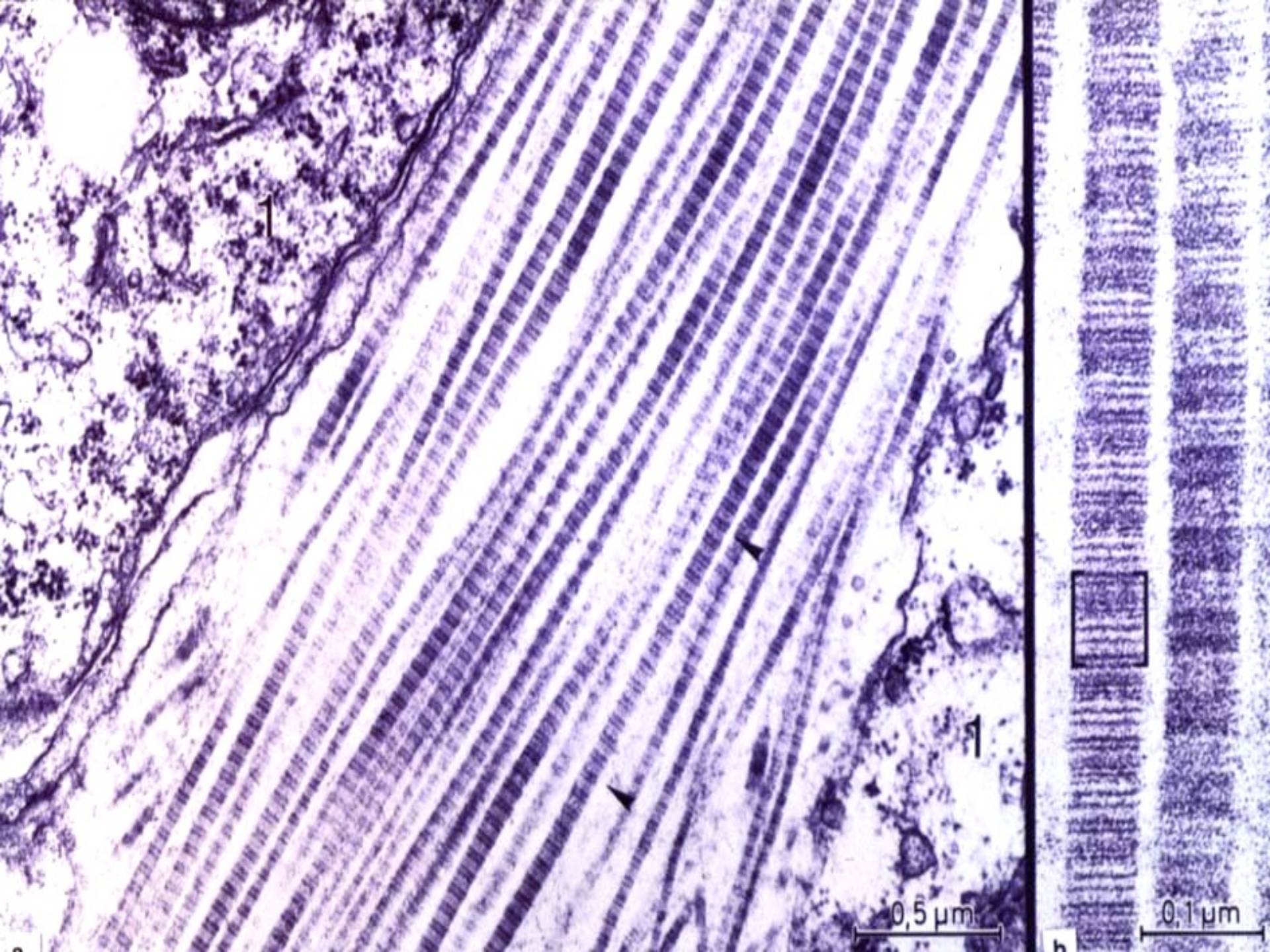

1
1
0,5 µm
0,1 µm

Typy kolagenu
výskyt a produkující buňky

I – nejčastější – fibroblasty, osteoblasty, odontoblasty

II – v chrupavce – chondroblasty

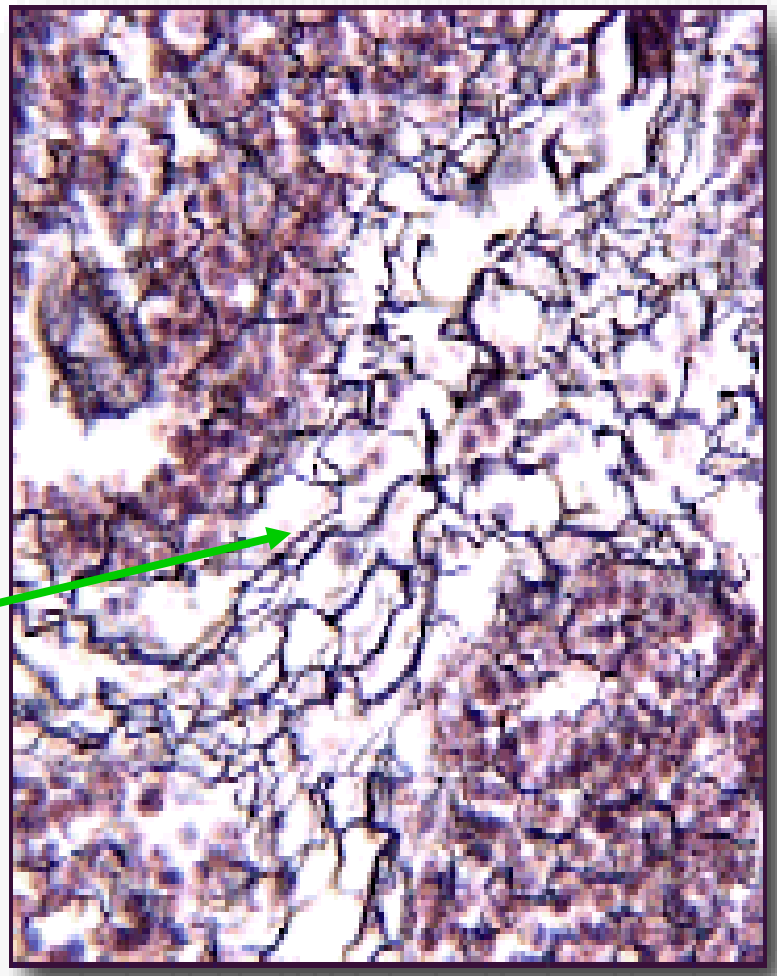
III – retikulární vlákna – retikulární bb.

IV – „amorfní“, netvoří vlákna – epitelové bb.

Cca 40 typů kolagenu

Retikulární vlákna

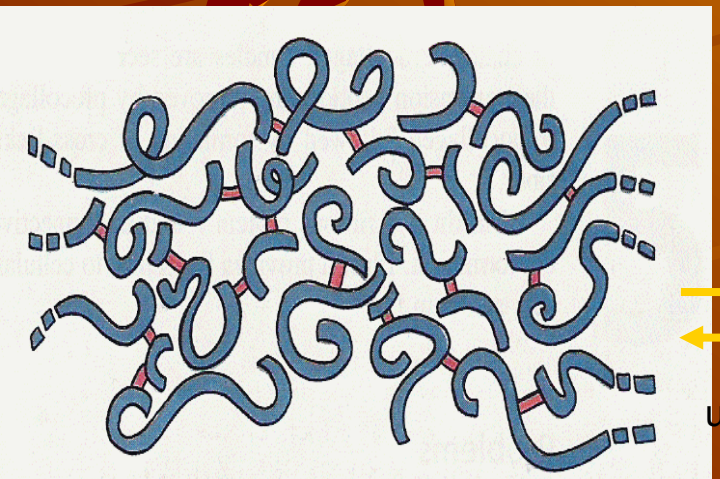
- kolagen III
- jemná síť (reticulum) = podpůrná složka měkkých tkání a síť pro jiné buňky (játra, kostní dřeň, lymfatické orgány
- argyrofilie (impregnace solemi Ag)
- 0.5 – 2 [redacted]m Ø

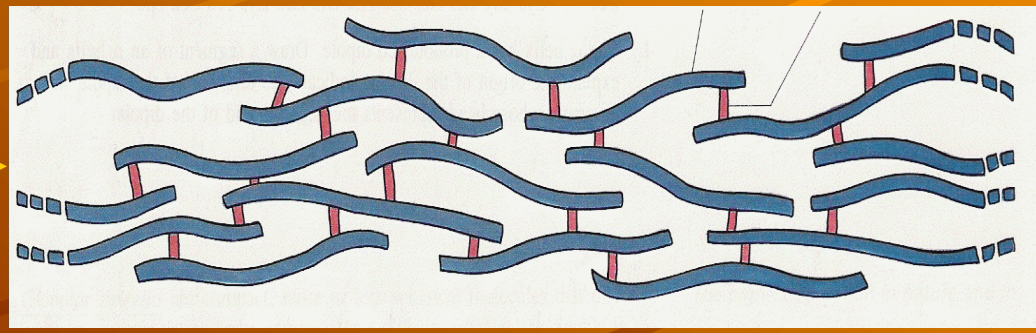


Retikulární vlákna (játra)

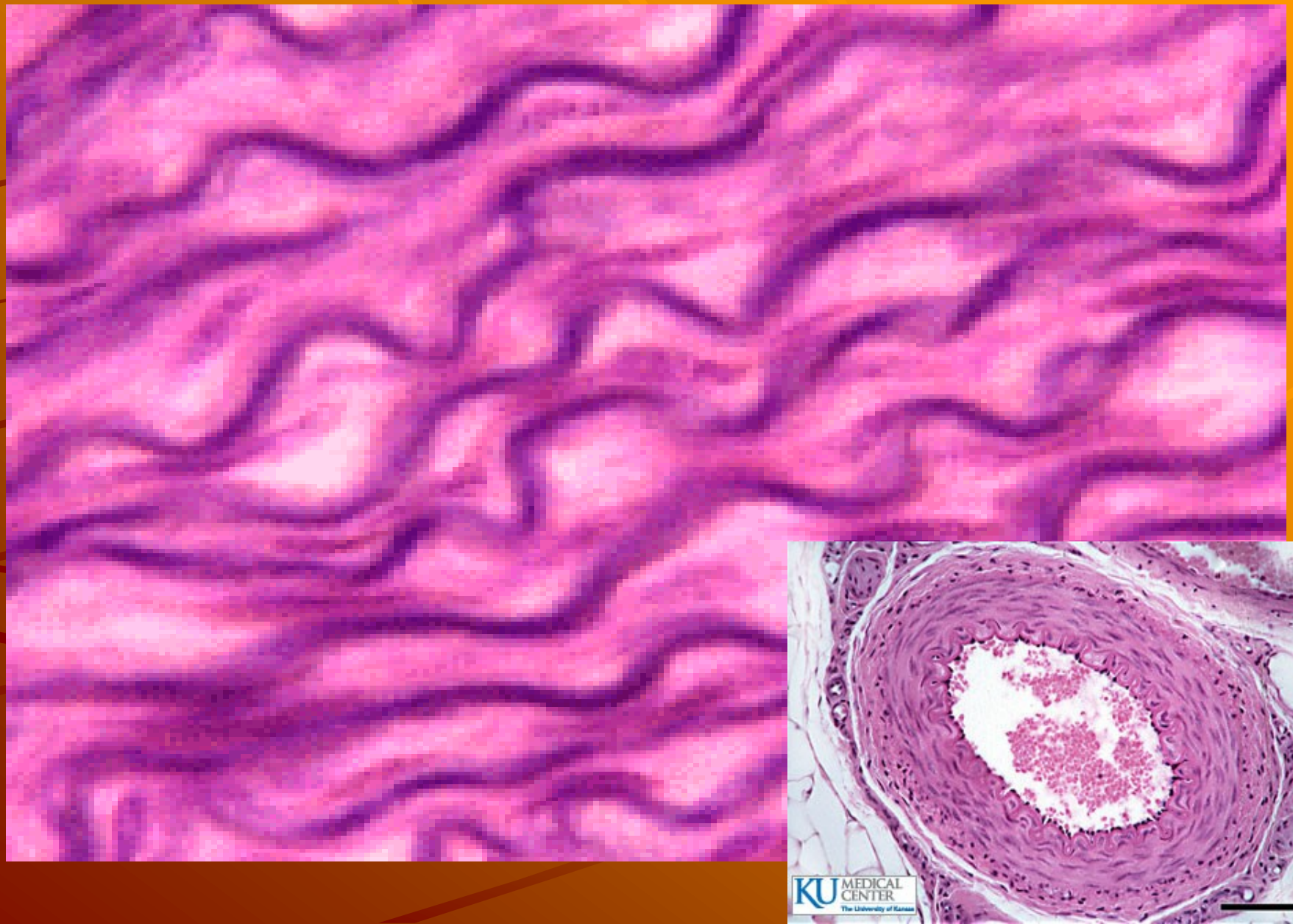
Elastická vlákna

- **„žlutá“** - protein elastin - produkt fibroblastů a hladkých svalových buněk ve stěně cév
- 1-4 (12) μm Ø
- prodloužení až 1.5 x,
- elasticita
- (orcein nebo resorcin-fuchsin)





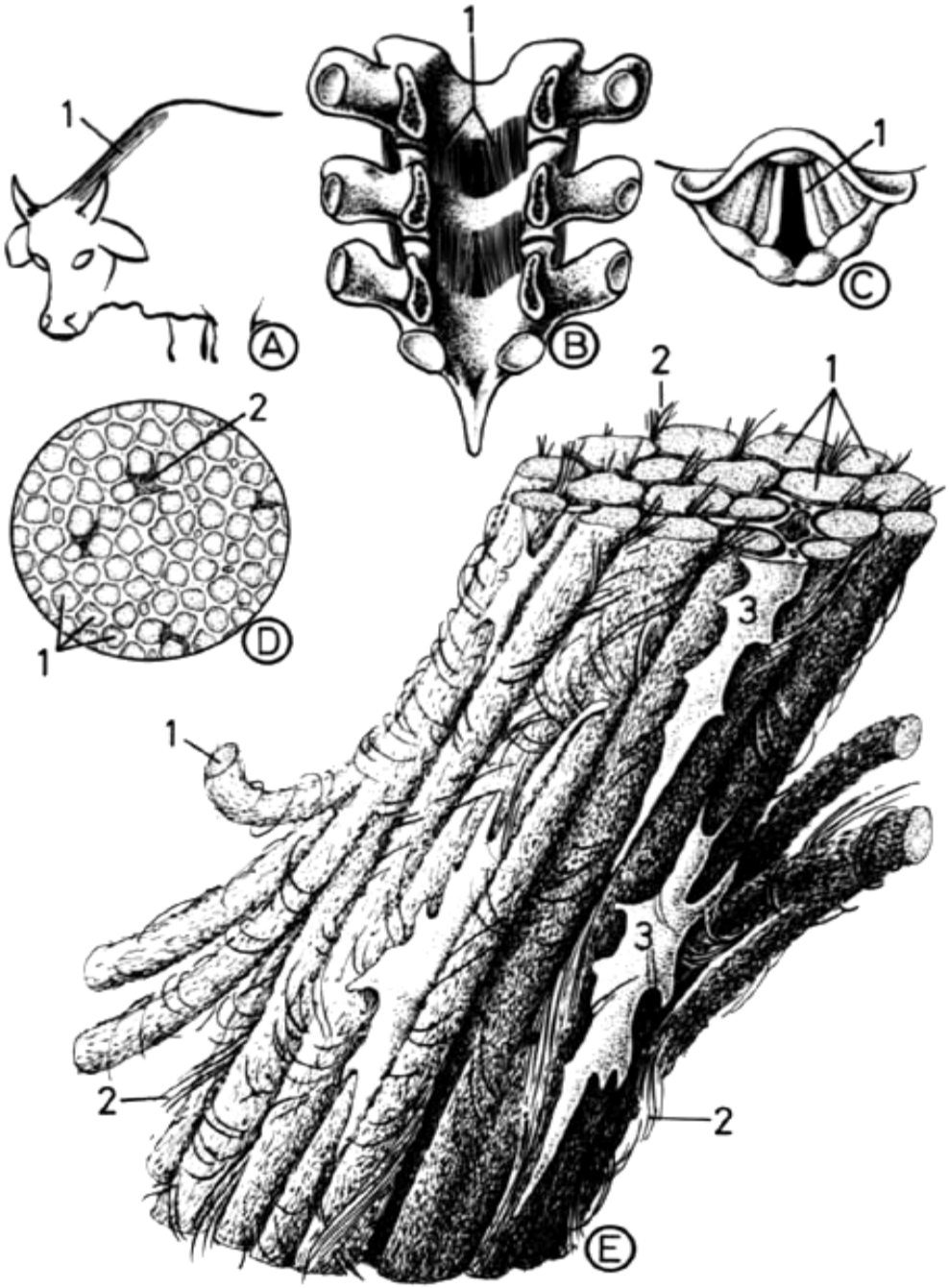
Svazky elastických vláken (stěna arterie)



Výskyt:

Vazy
ligamenta flava
ligamenta vocalia
ligamentum nuchae

Stěna cév:
membranae fenestratae



Klasifikace vaziv

- Závisí na poměru a uspořádání buněk, vláken a zákl. amorfní hmoty:

- zákl. hmota ⇨ „měkká konzistence“
- vlákna ⇨ „tuhá konzistence“
- uspořádání vláken → pravidelné
  → nepravidelné

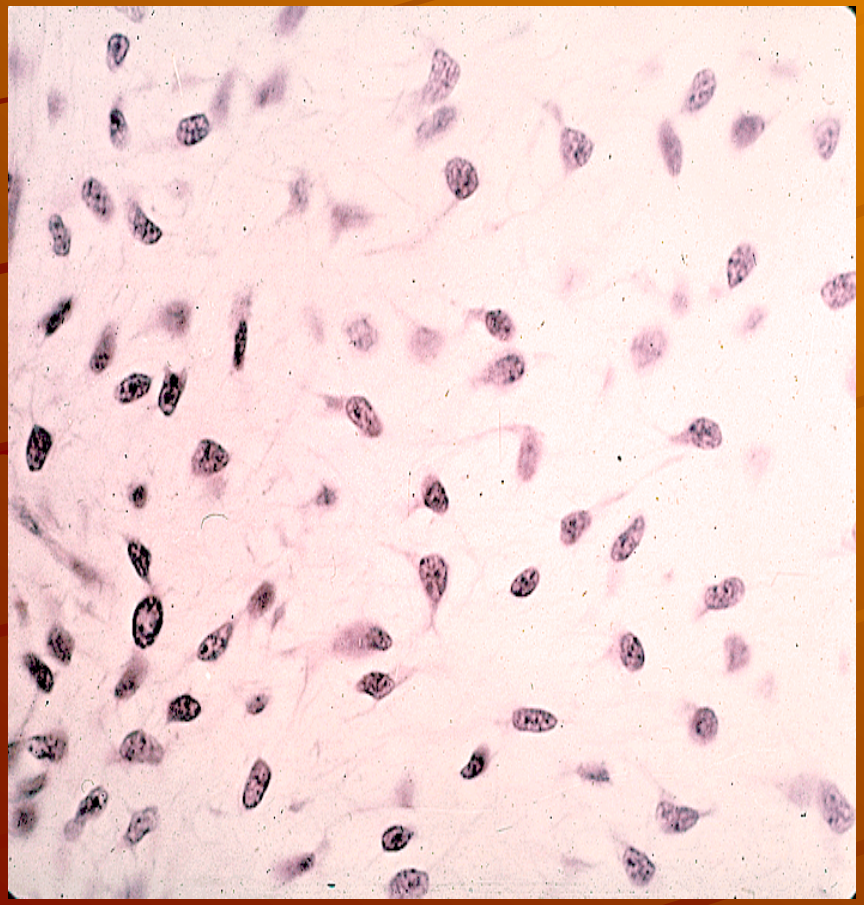
Typy vaziv

- Mezenchym
- Rosolovité v. (Whartonův rosol)
- Kolagenní v. → řídké
  husté → neuspořádané
  uspořádané

- Retikulární v.
- Elastické v.
- Tukové v. → bílé
  hnědé

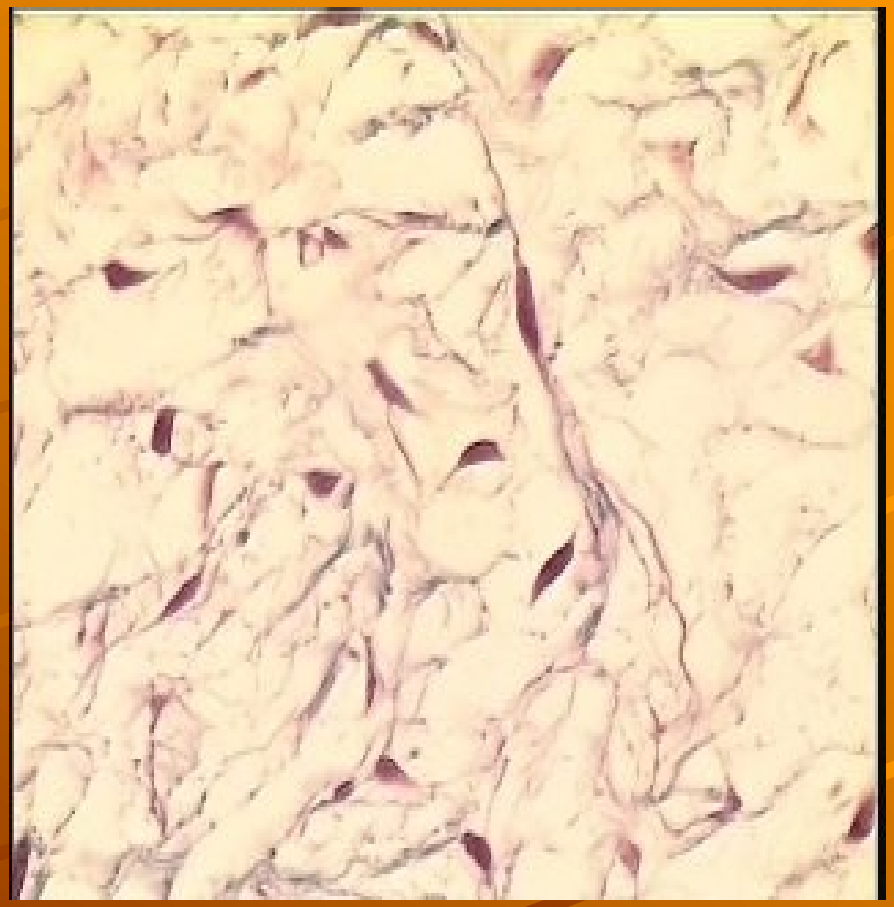
Mezenchym

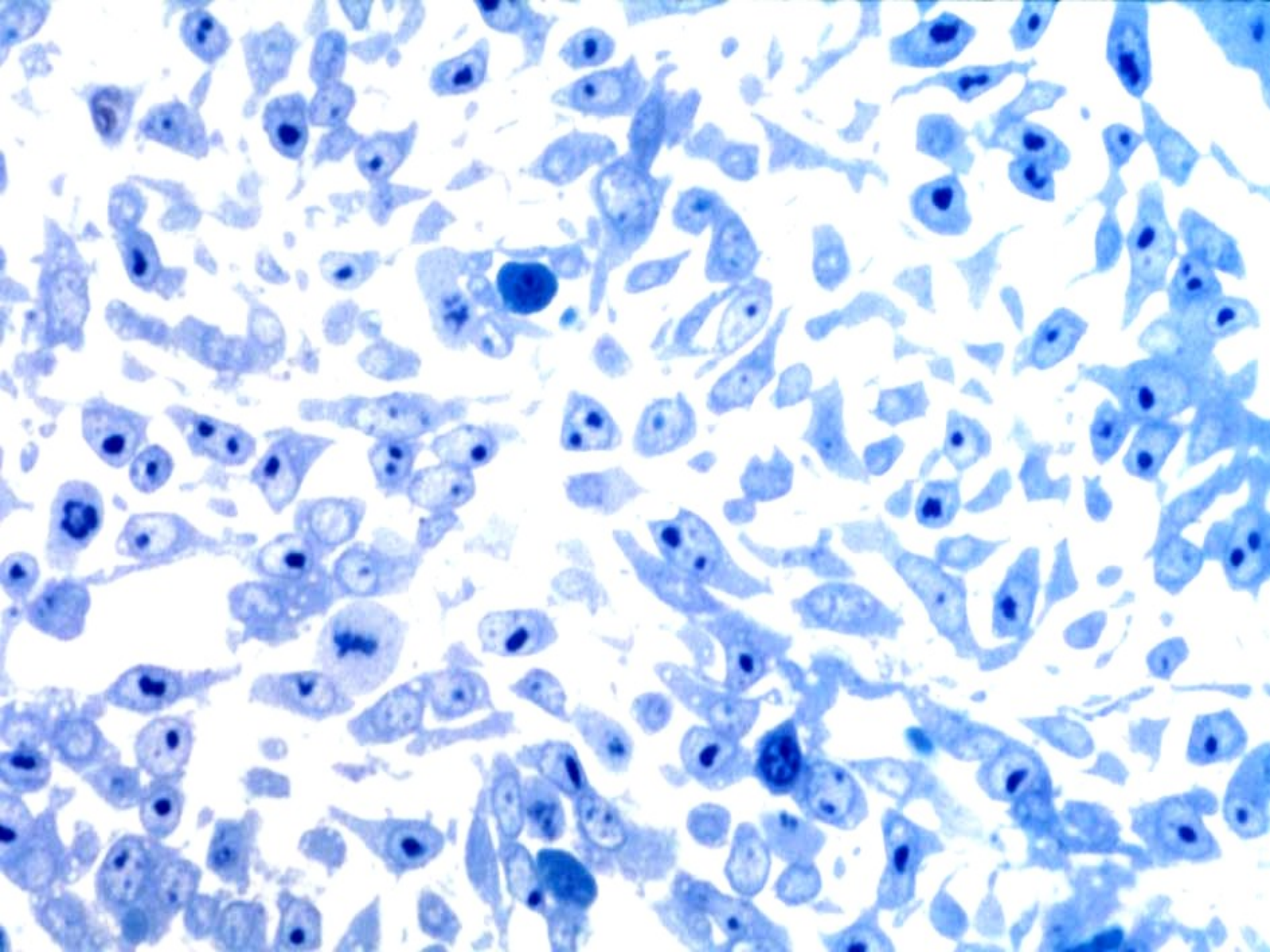
embryonální vazivo

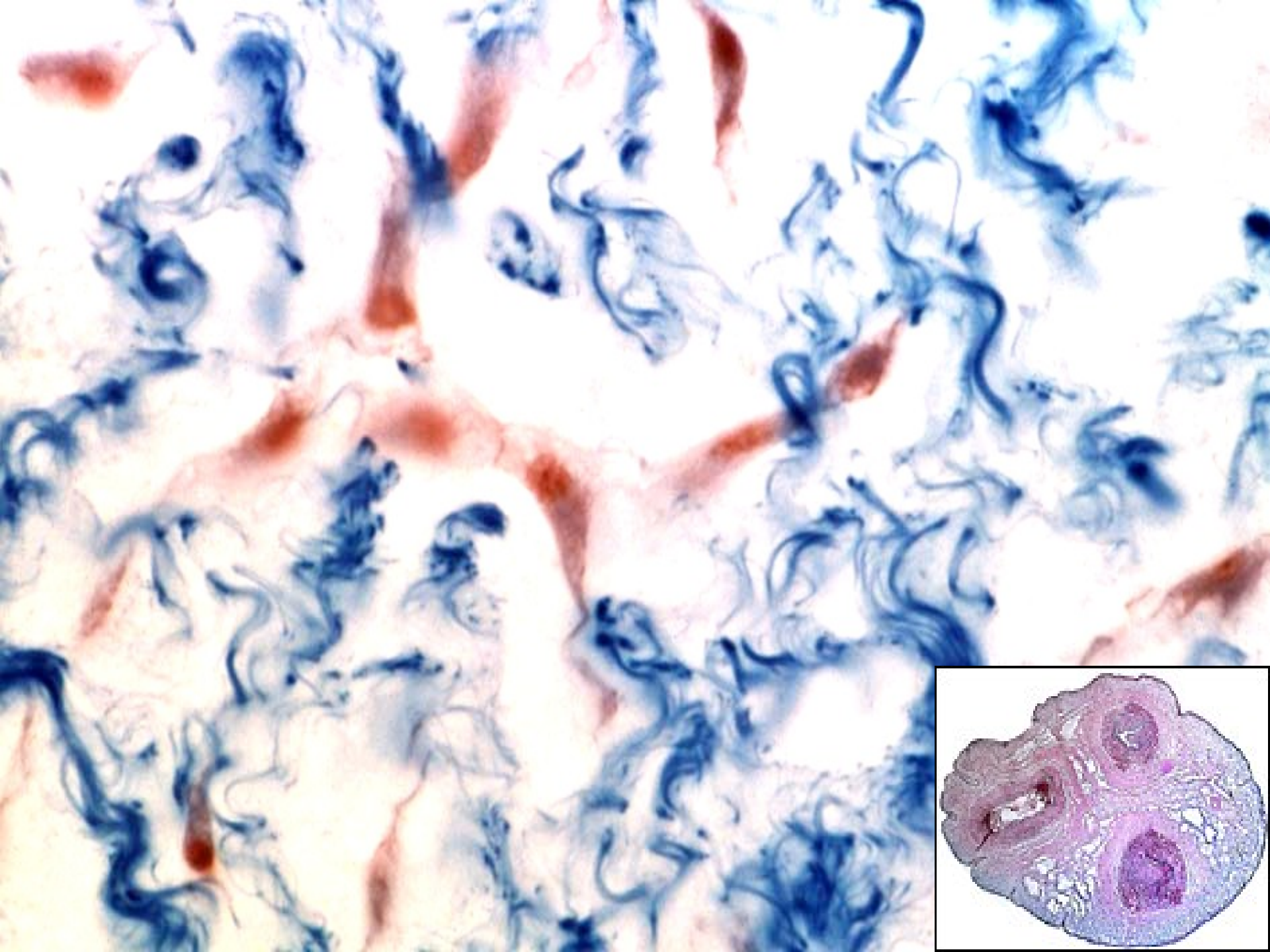


Rosolovité v.

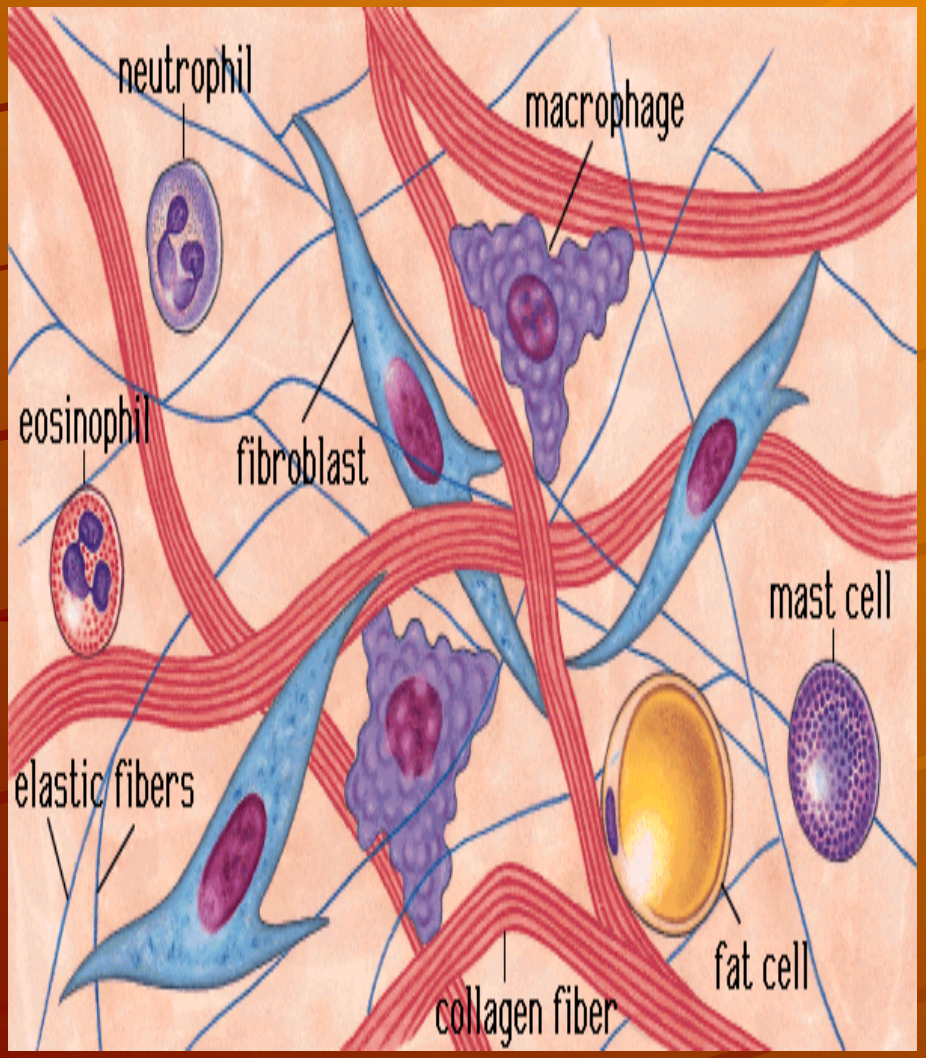
pupečník, zubní pulpa

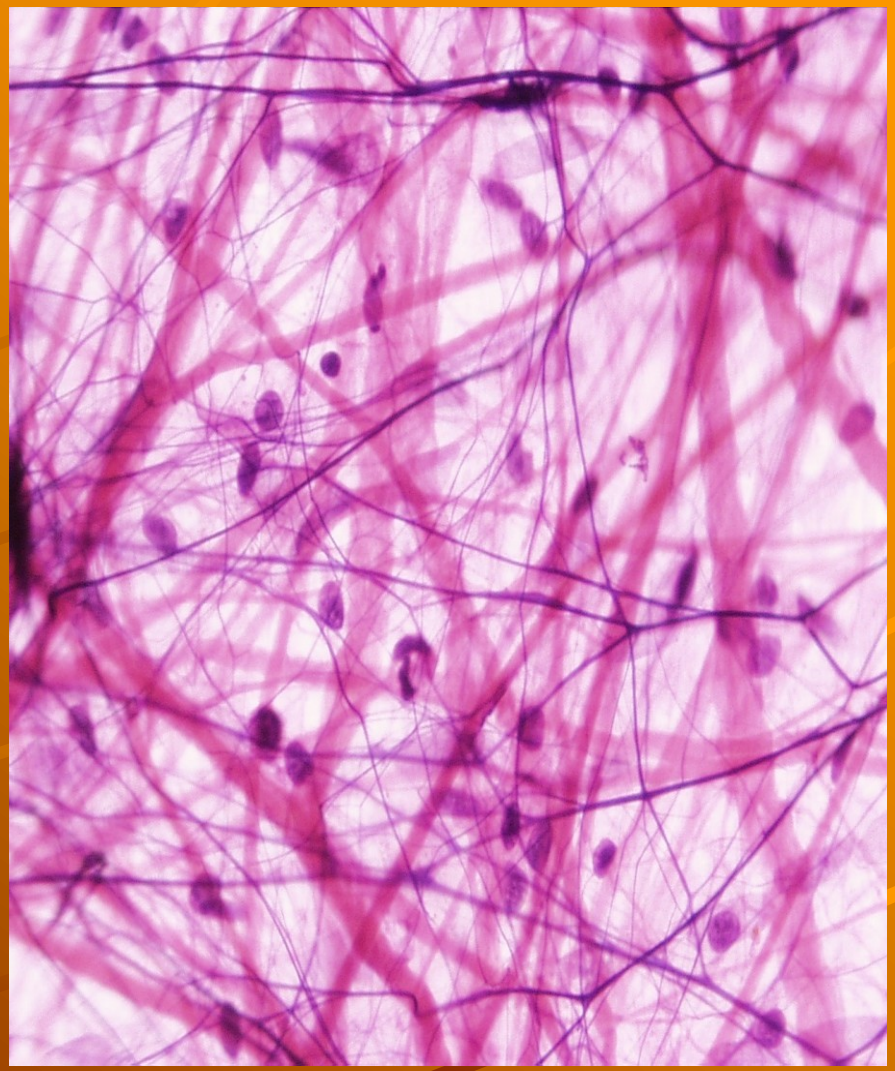






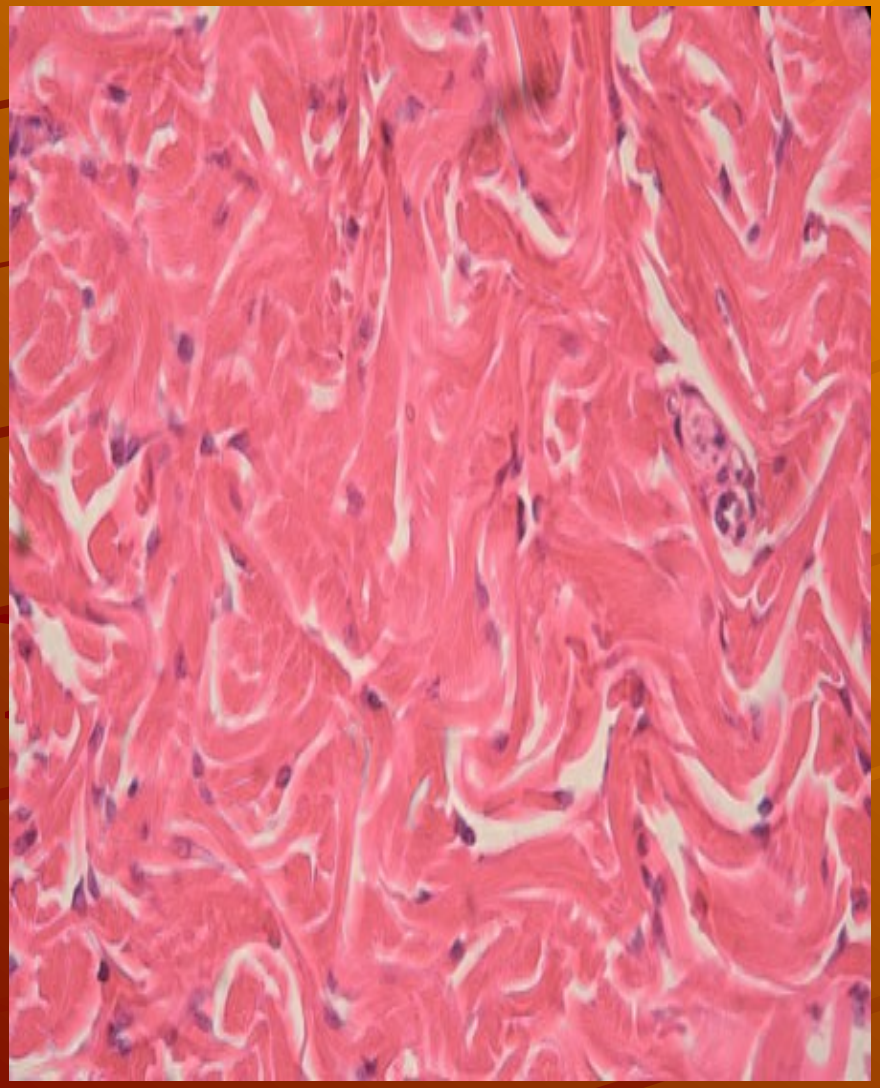
Kolagenní v. řídké

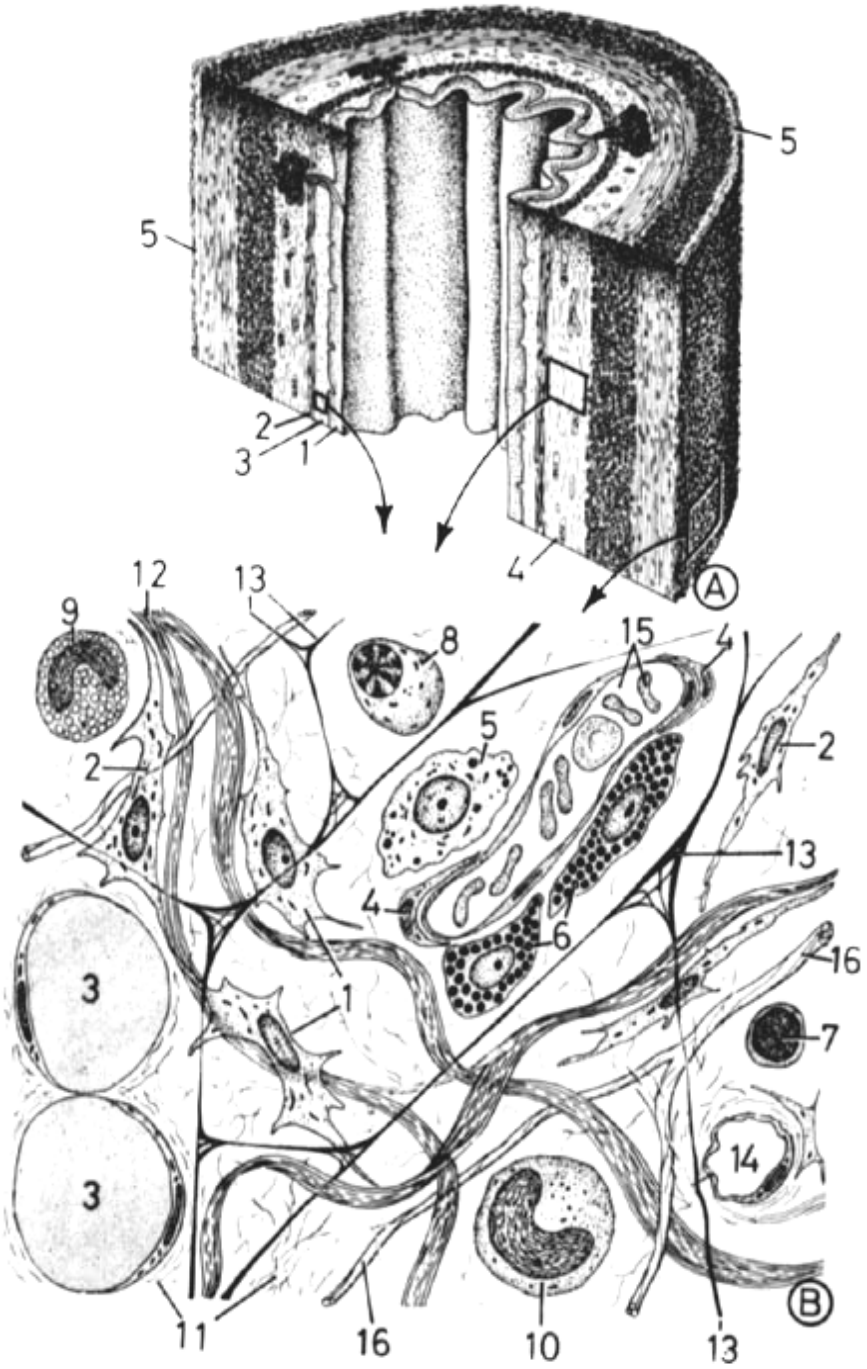


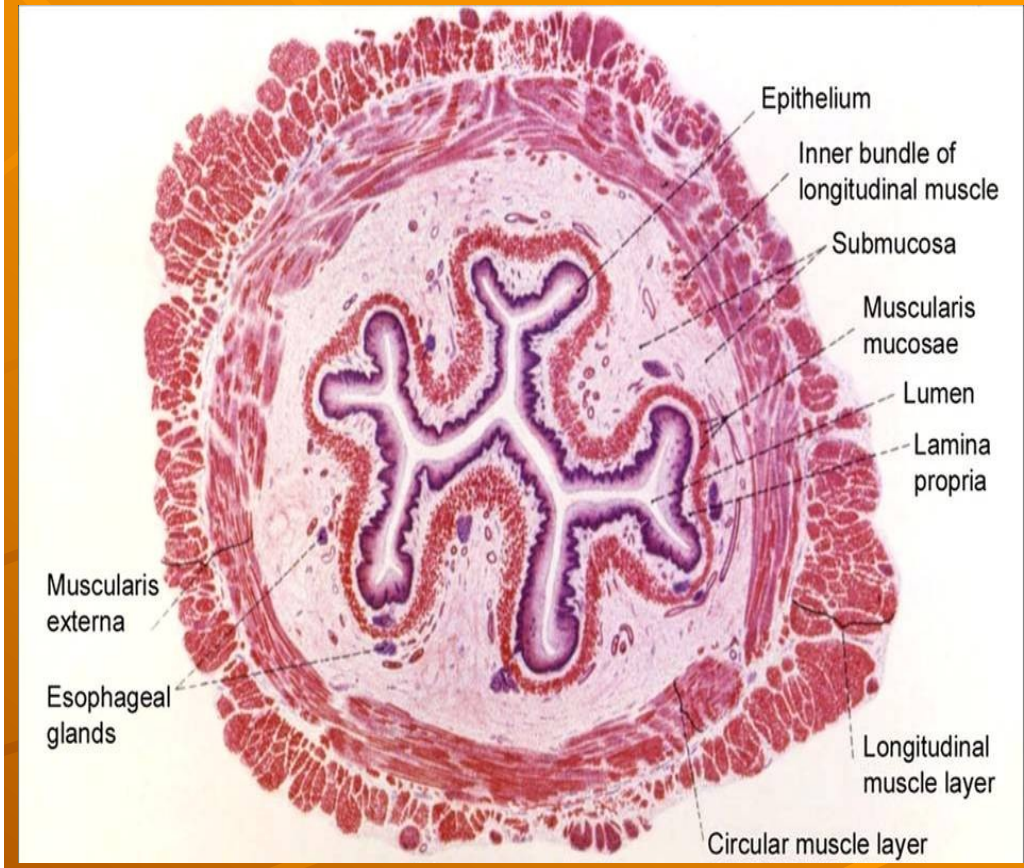


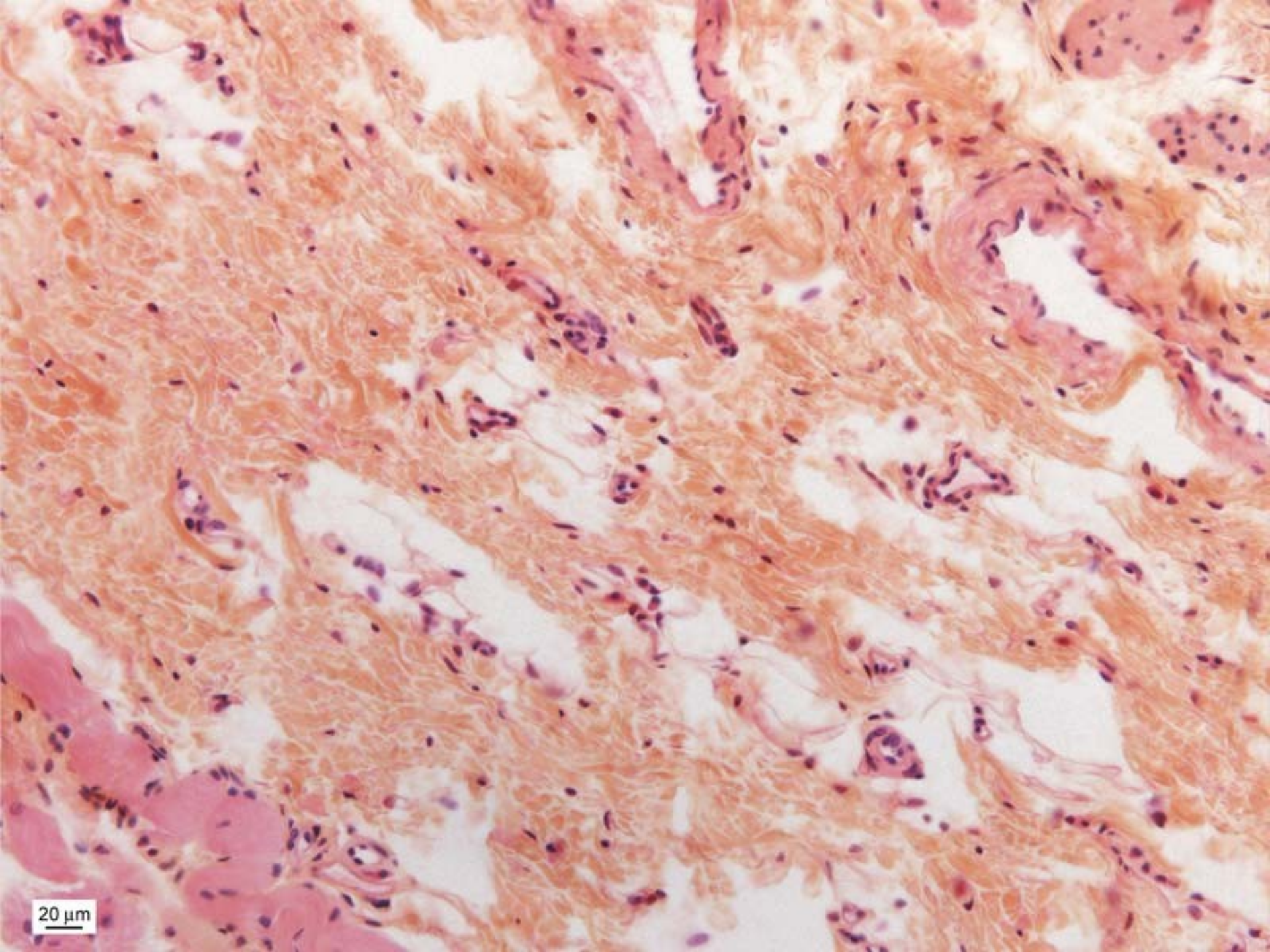
Kolagenní v. husté

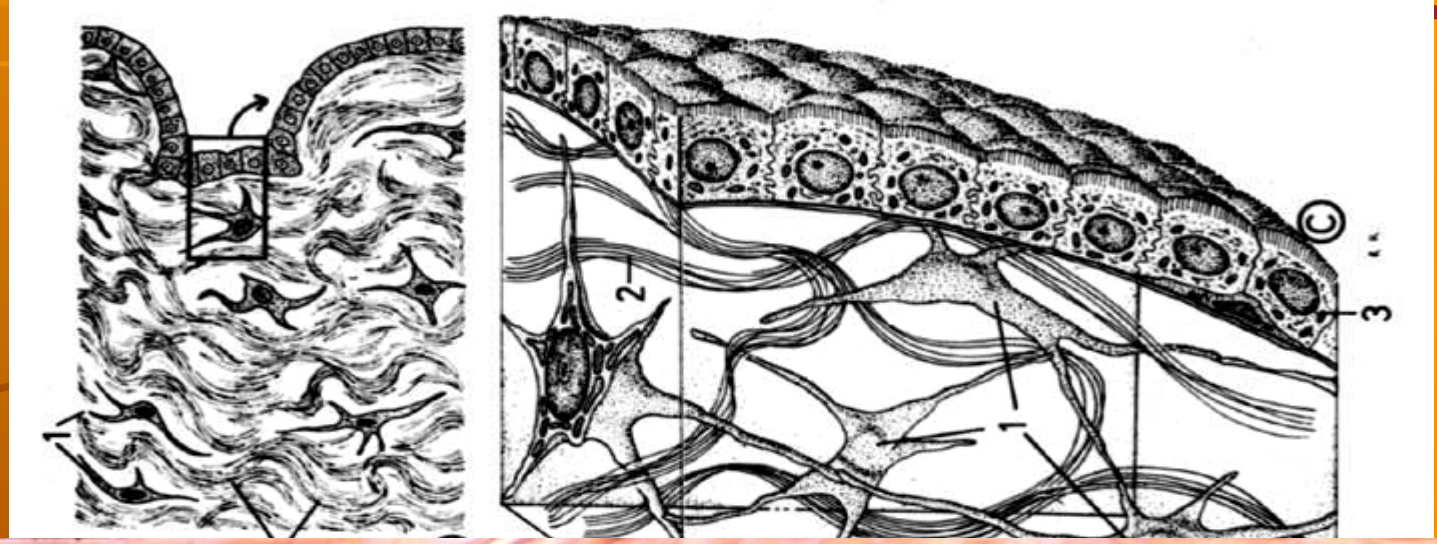
- neuspořádané
- uspořádané

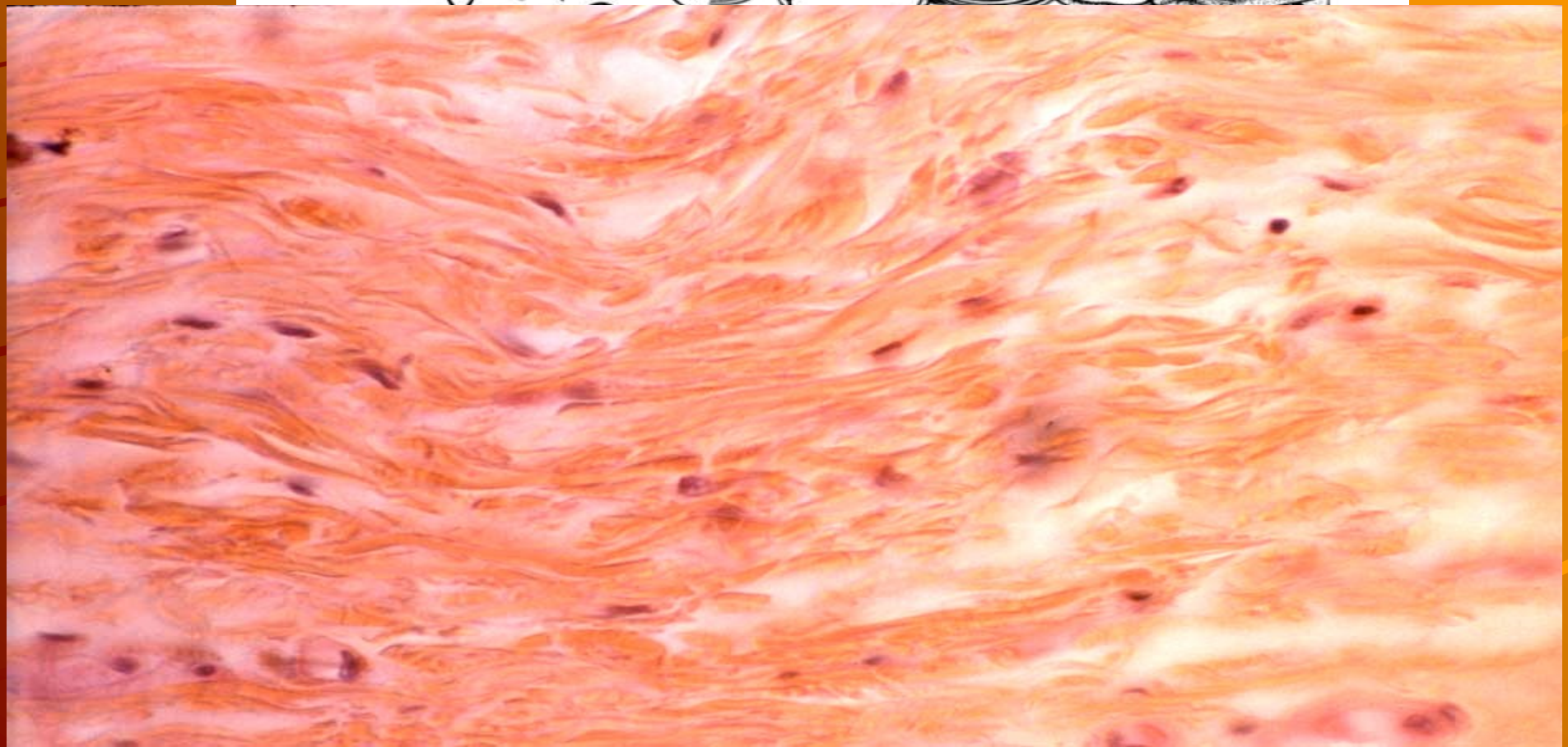


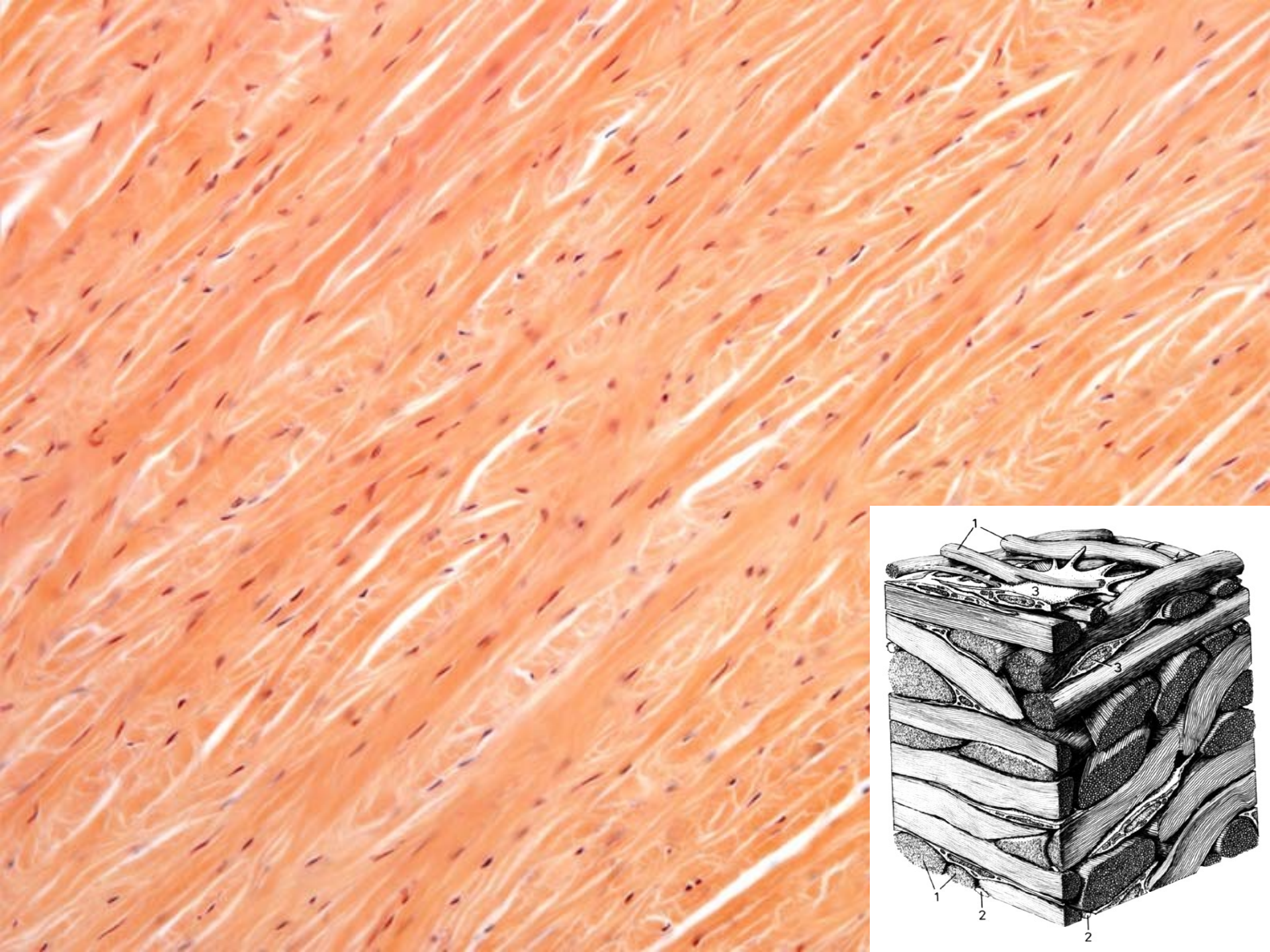

5
5
2
3
1
4
A
12
13
9
8
15
4
5
2
2
13
4
6
16
1
3
7
3
14
11
16
10
13
B

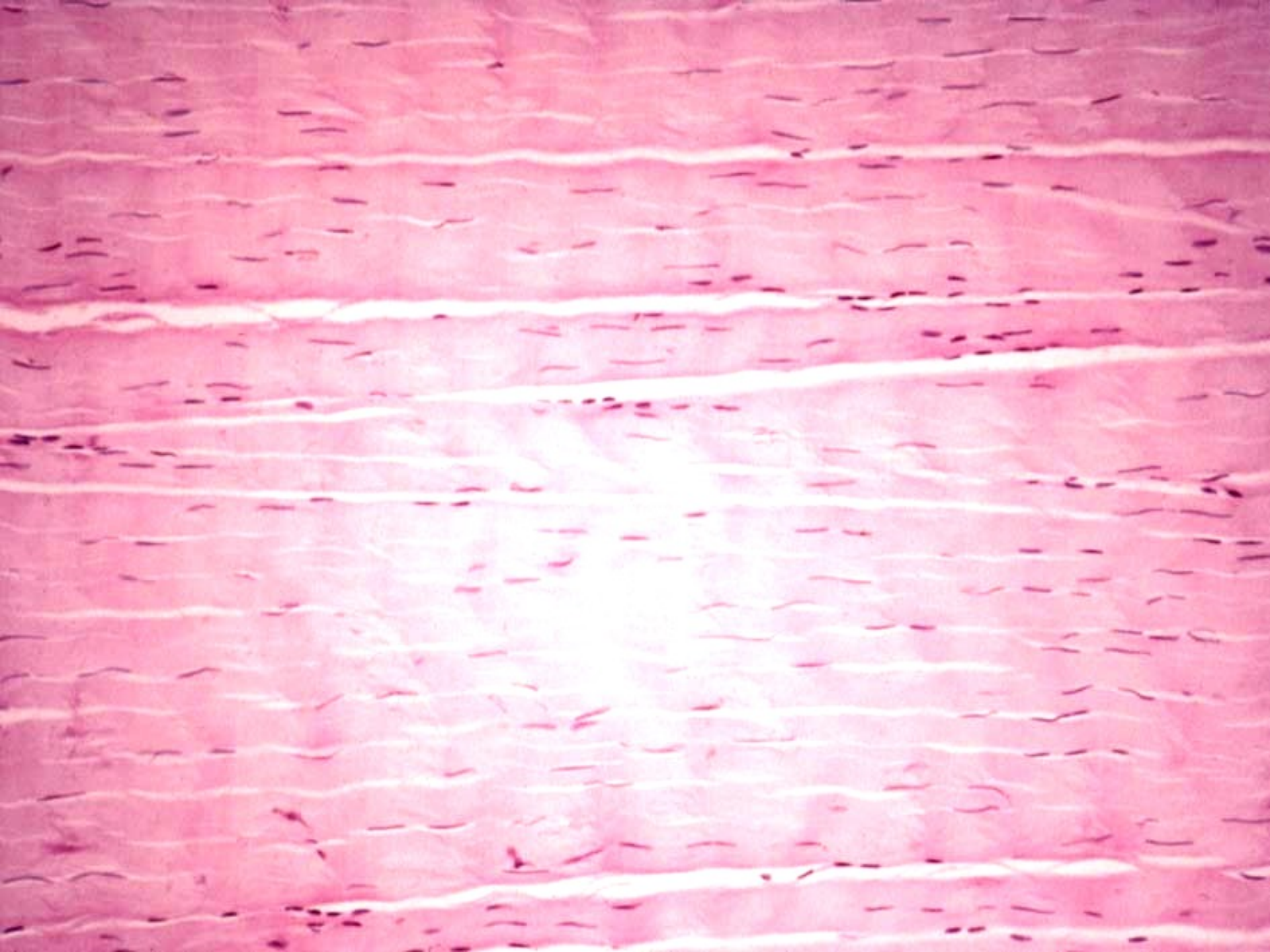

Epithelium
Inner bundle of longitudinal muscle
Submucosa
Muscularis mucosae
Lumen
Lamina propria
Muscularis externa
Esophageal glands
Longitudinal muscle layer
Circular muscle layer


20 µm

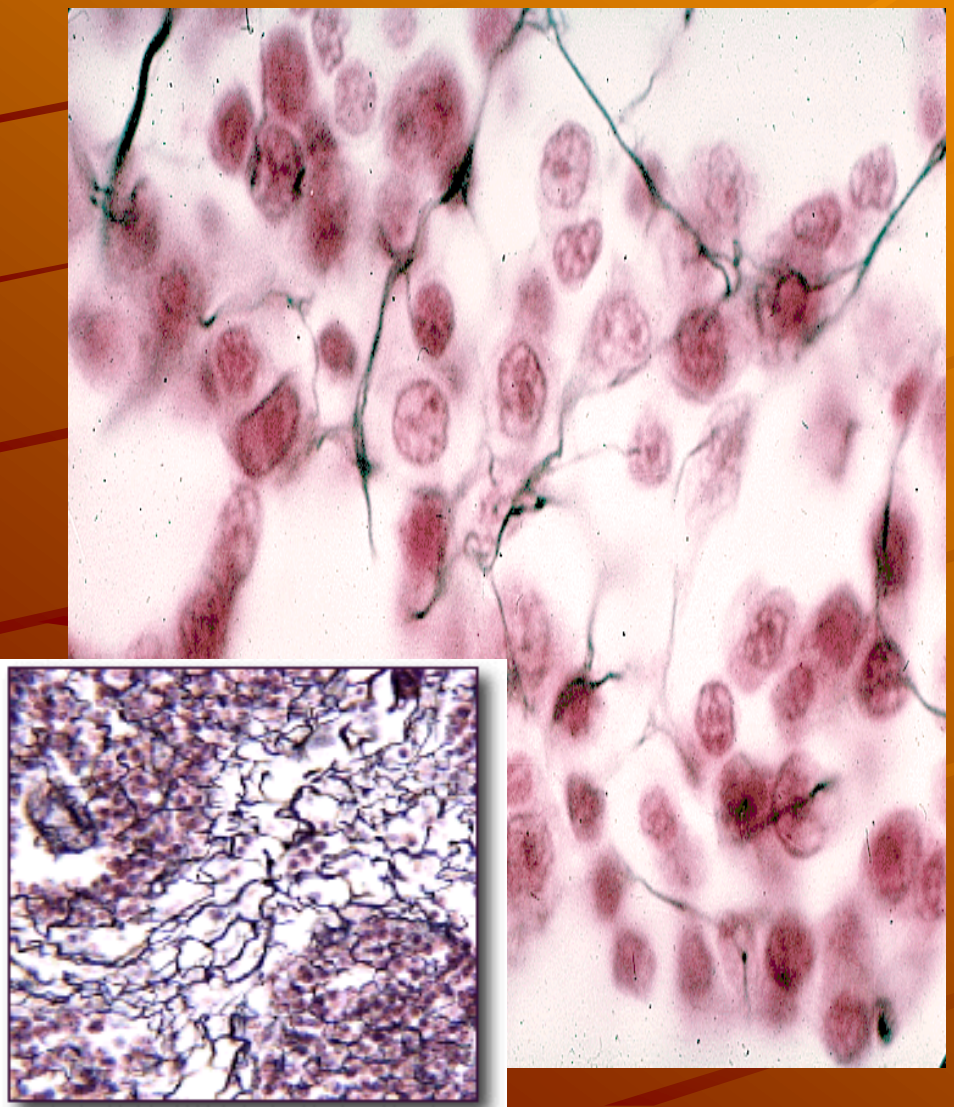

1
2
3



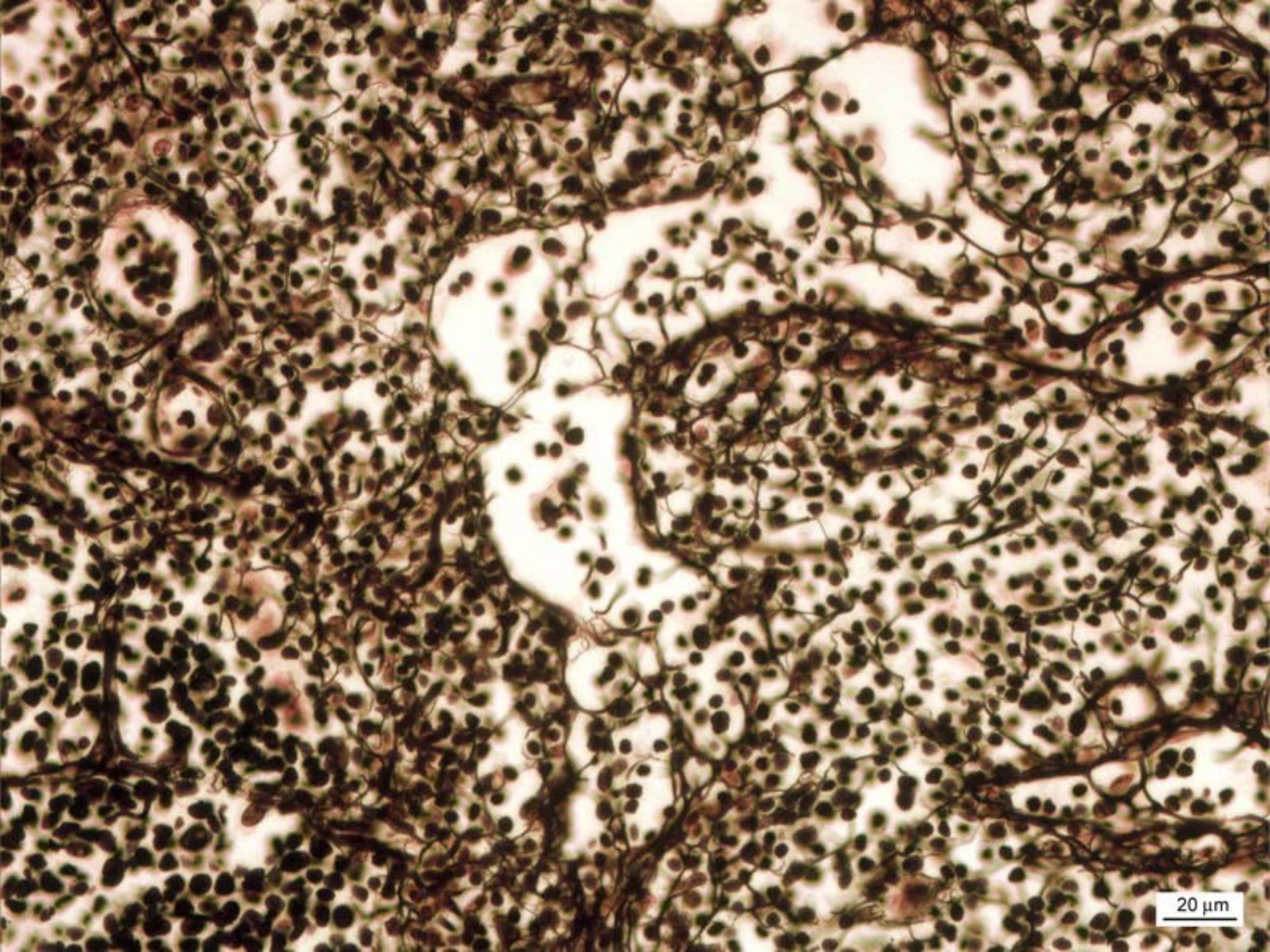

1
3
3
1
2
2

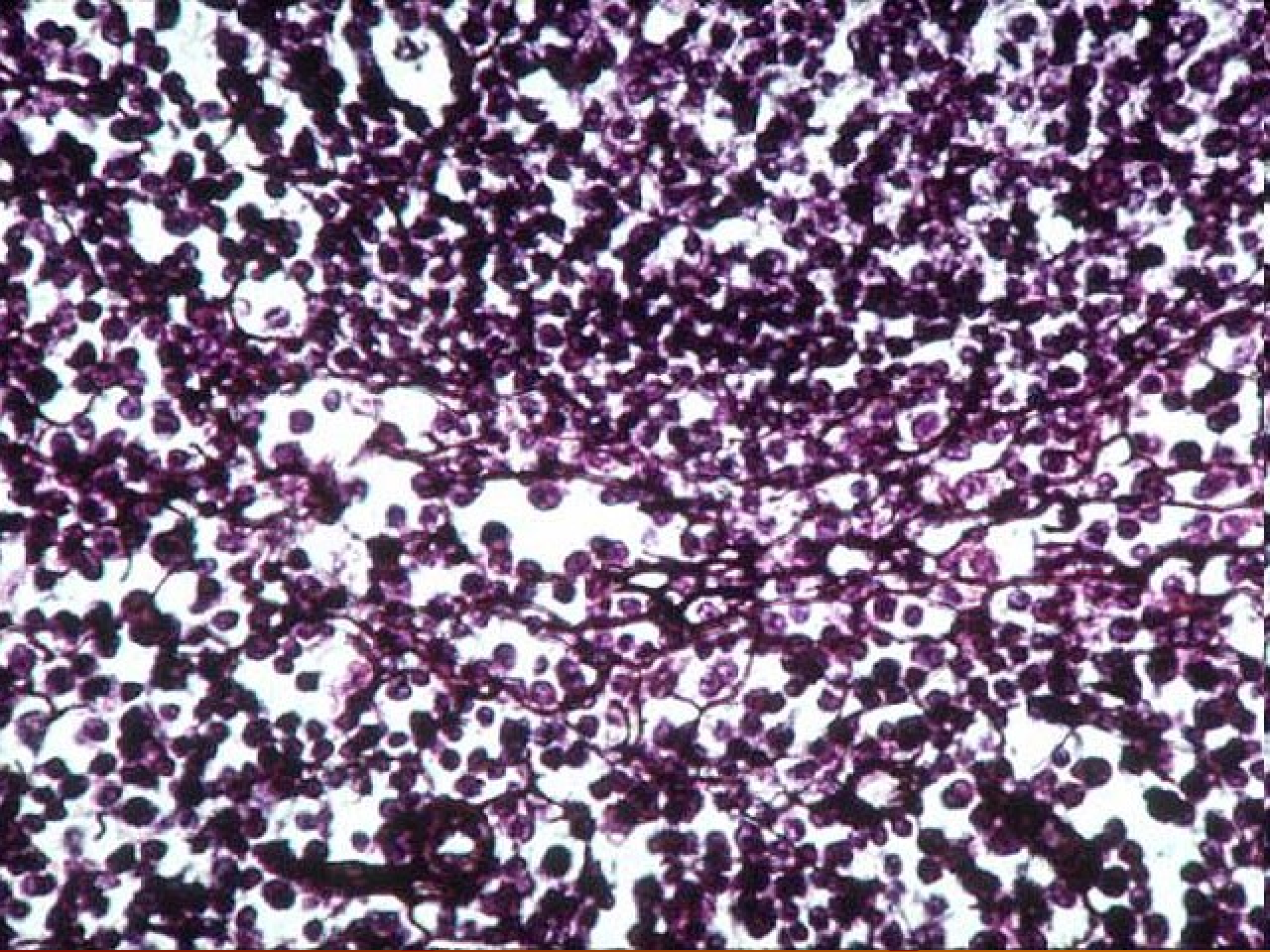


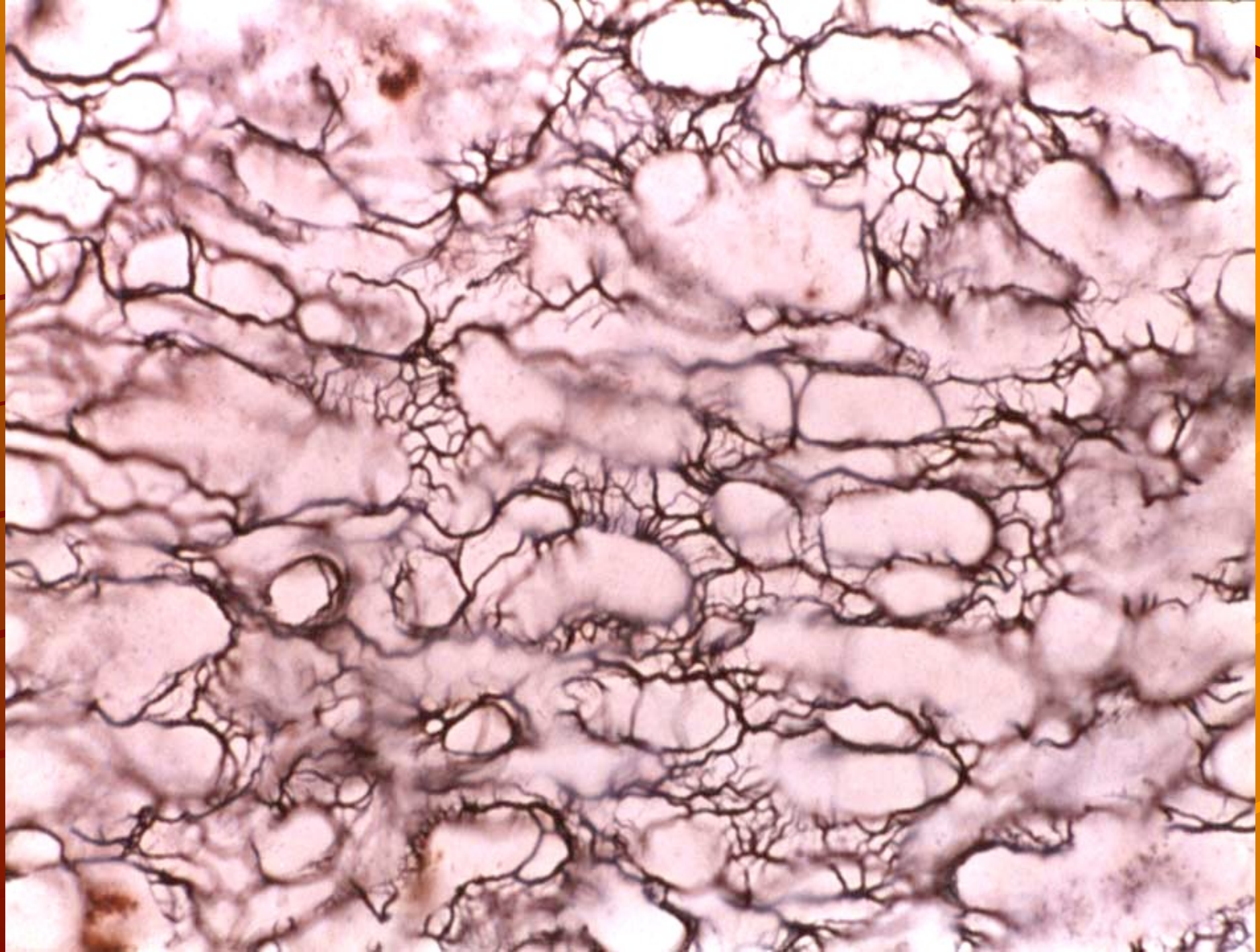
Retikulární v.

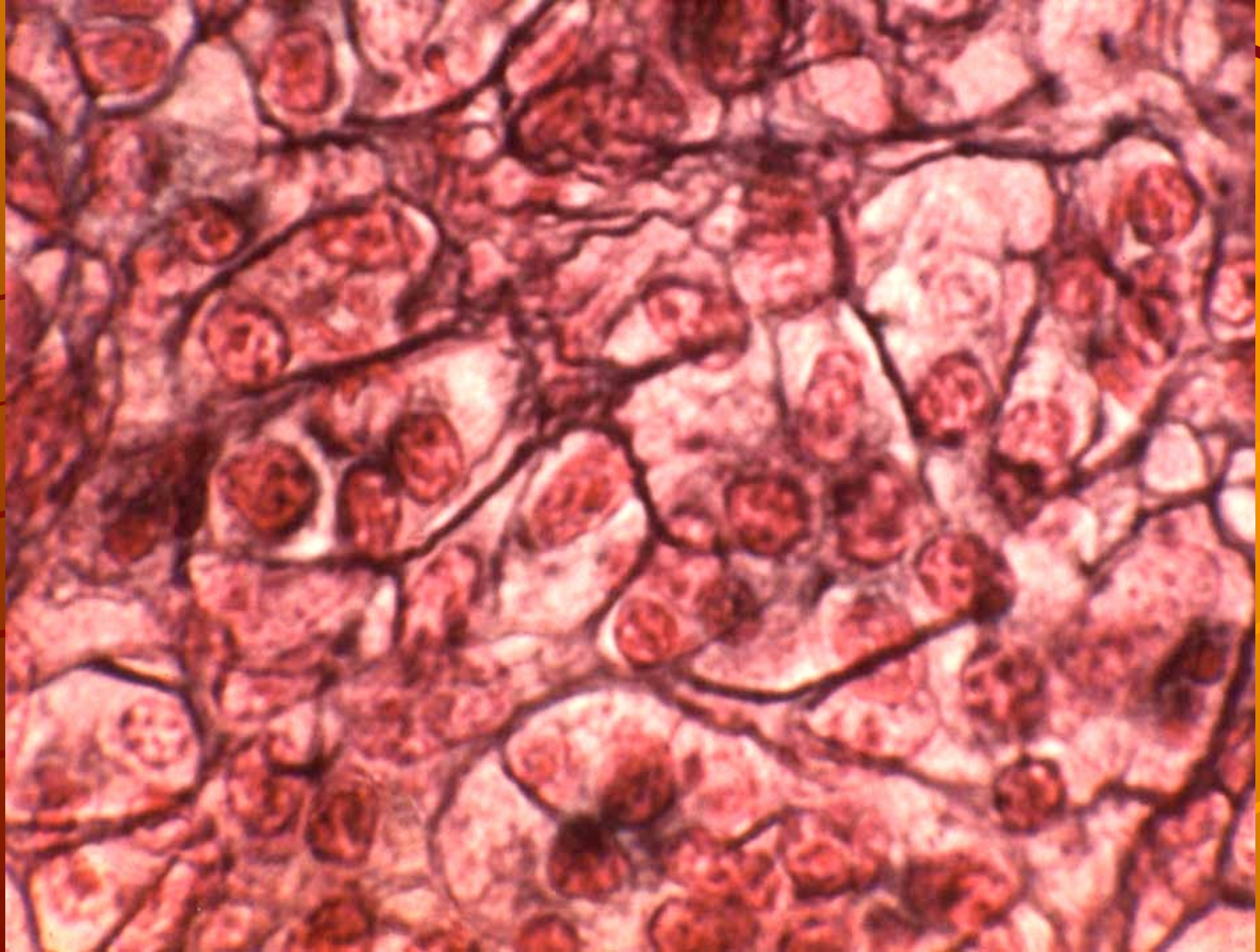


Elastické v.

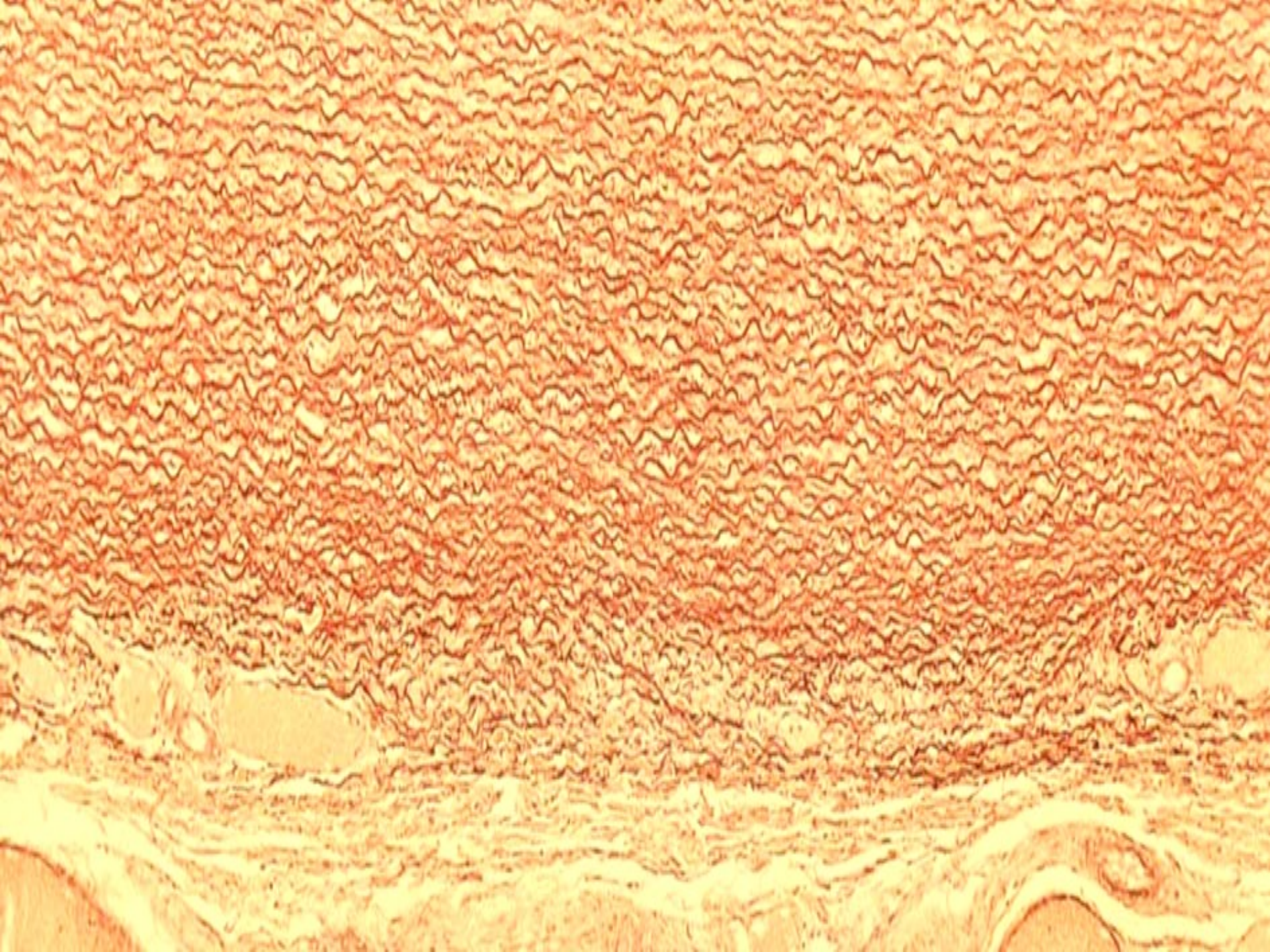

20 µm



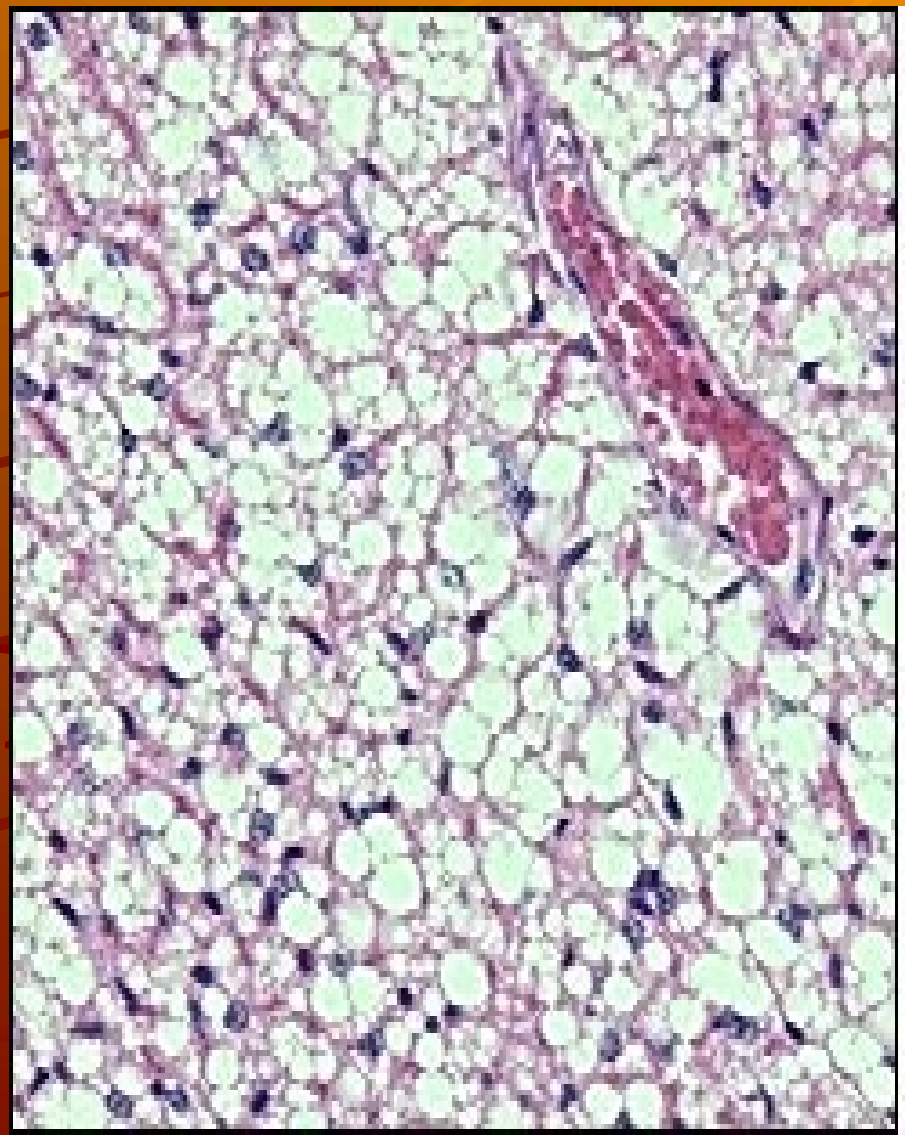


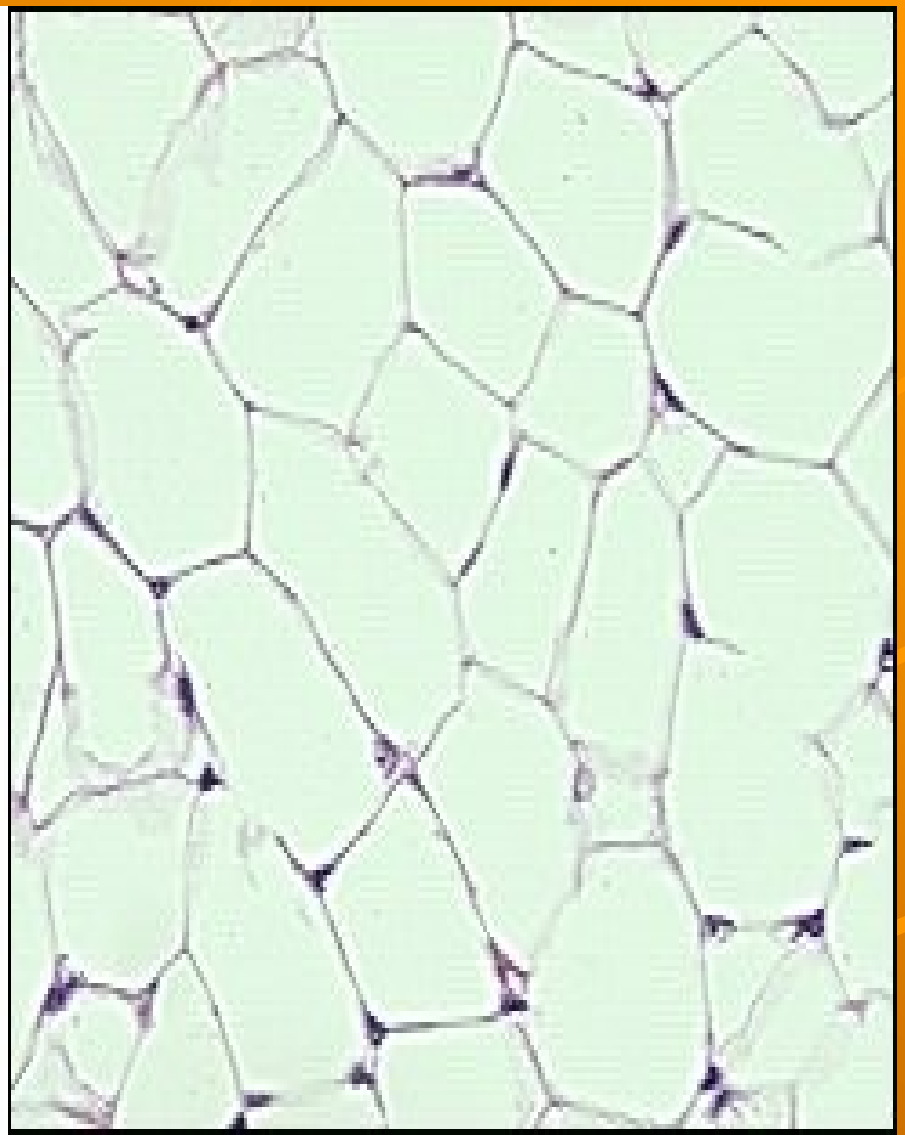


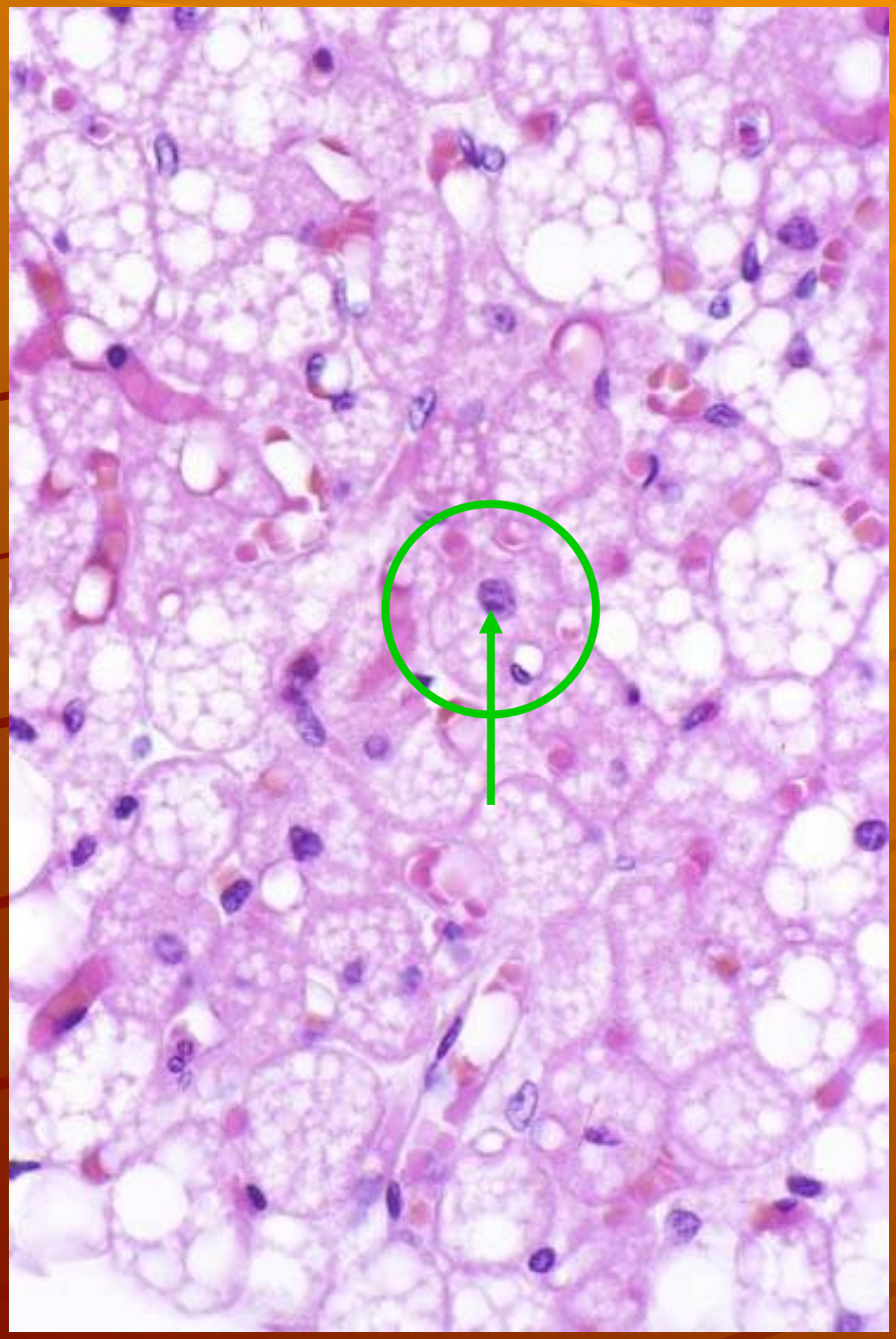

20 µm

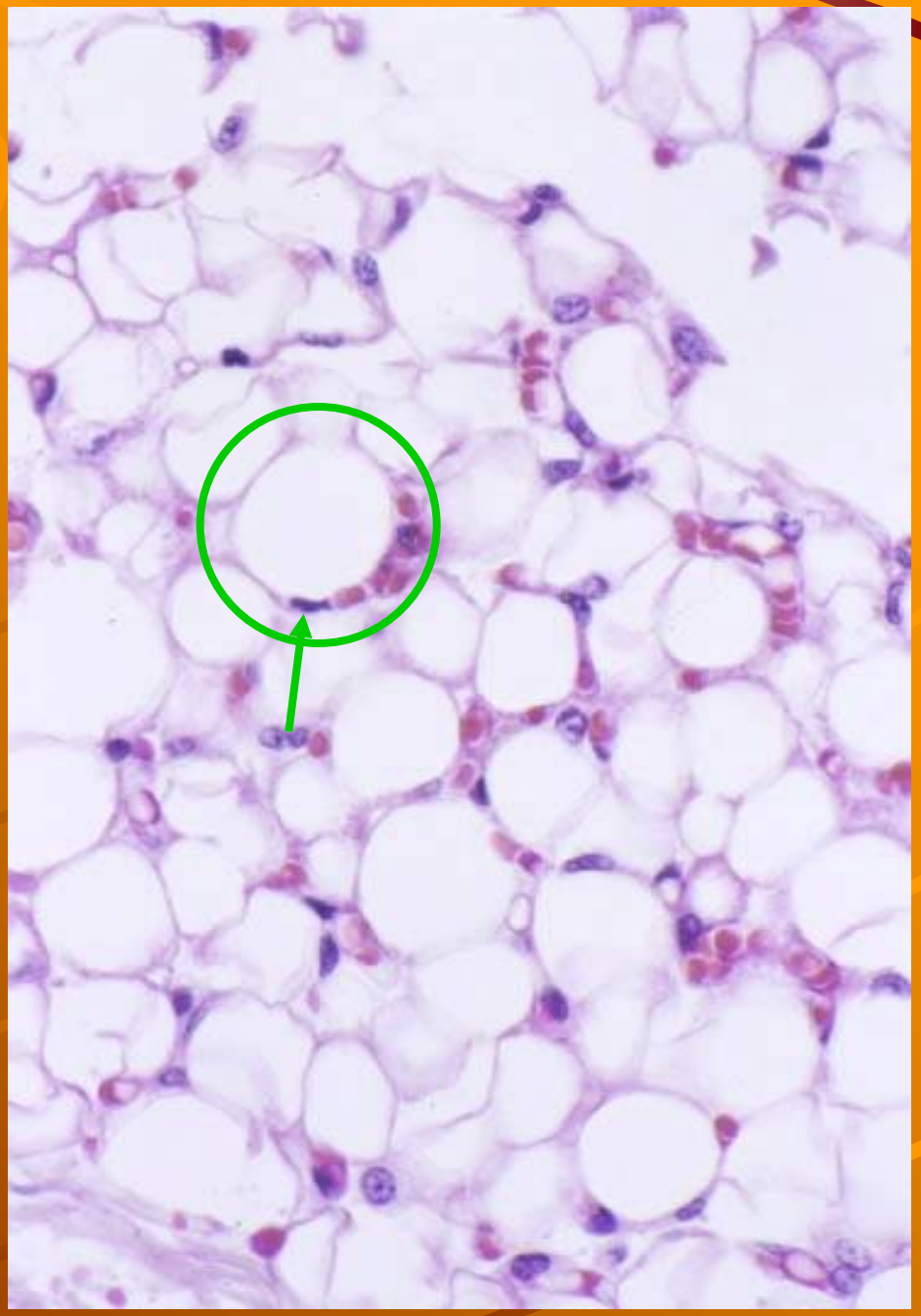


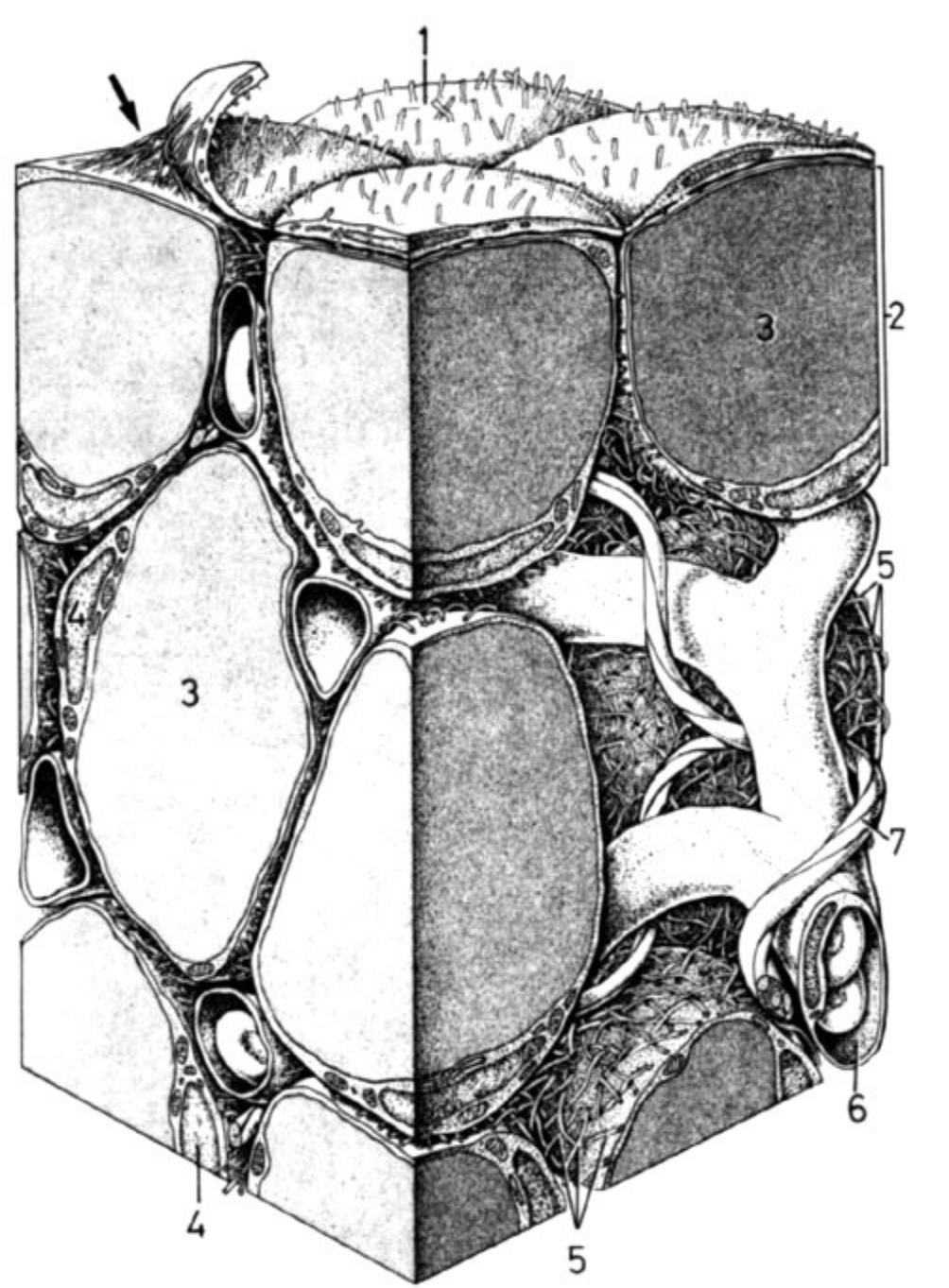
Tukové v. → hnědé
→ bílé







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