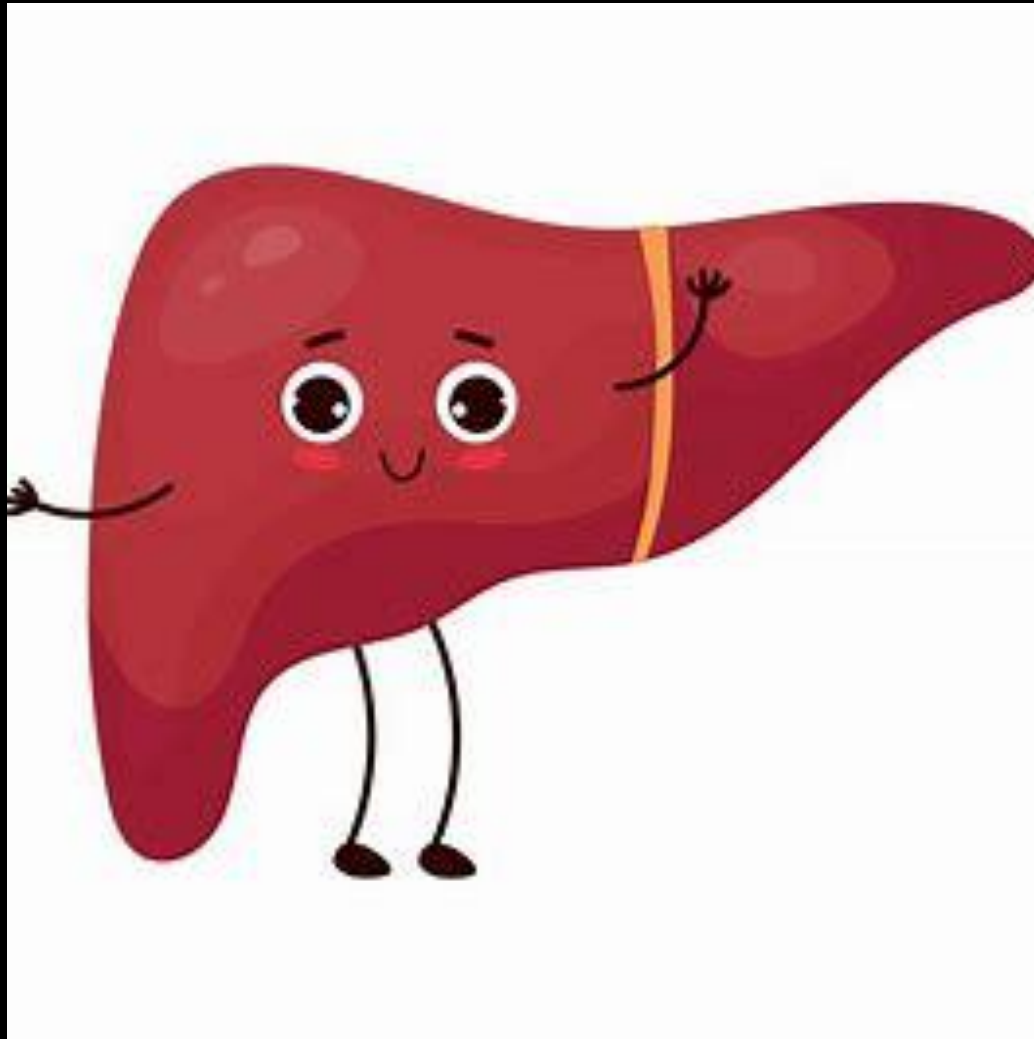
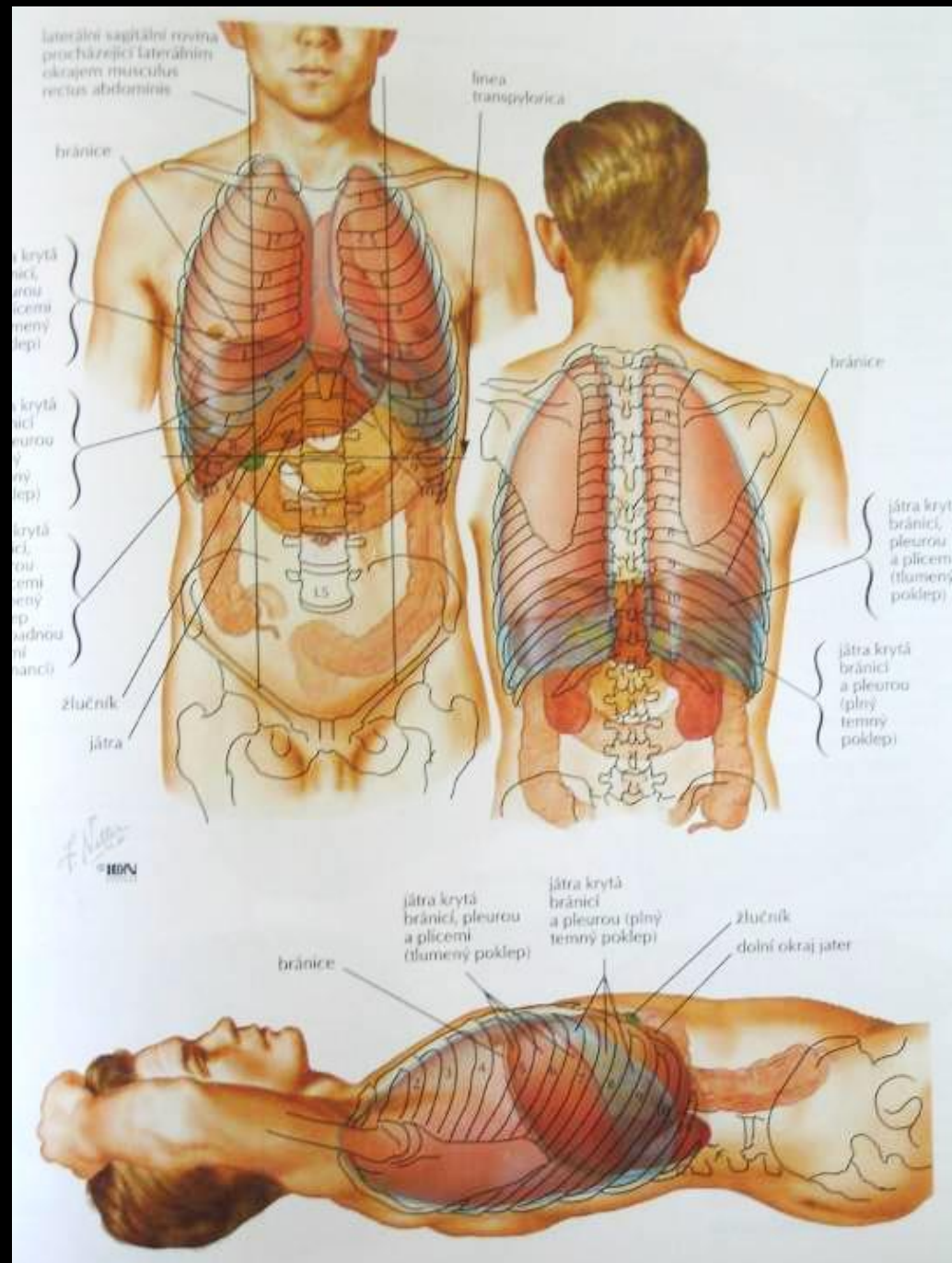


Játra (iecur, hepar)



Základní informace

- Největší žláza těla – 3 % tělesné hmotnosti
- Dospělý muž 1500–1800 g
- Dospělá žena 1200– 500 g
- Spotřeba 12 % kyslíku z krve
- Intraperitoneální orgán
- Lokalizace v regio hypochondriaca dextra

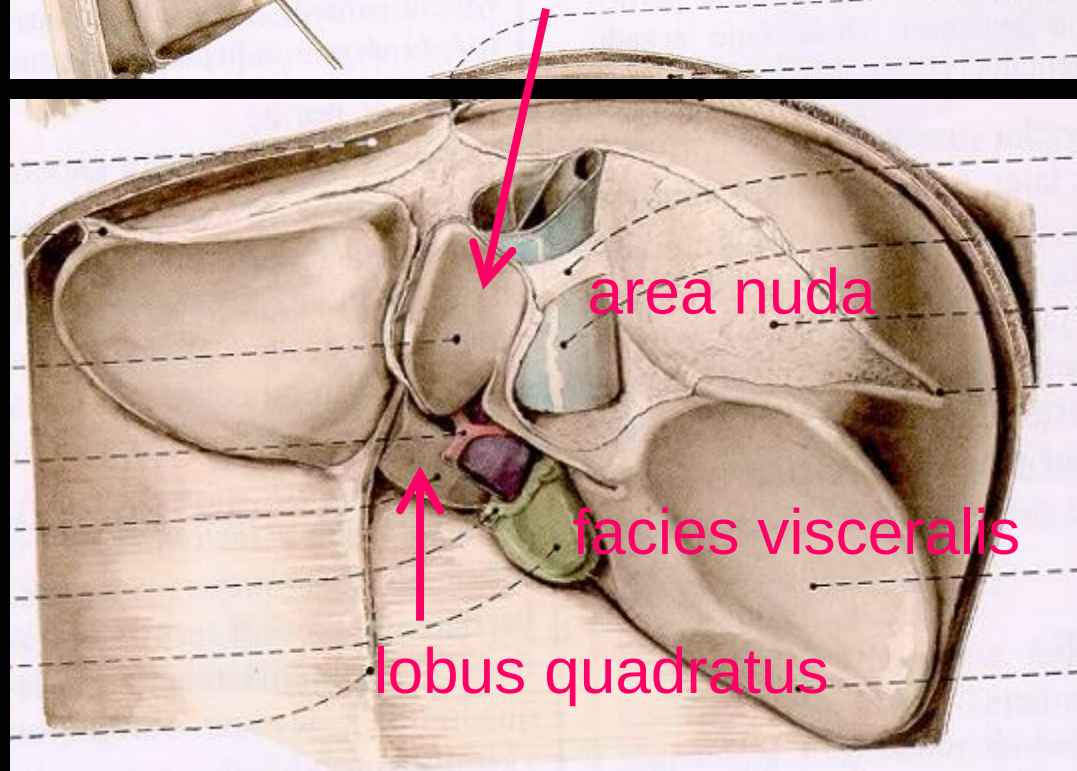
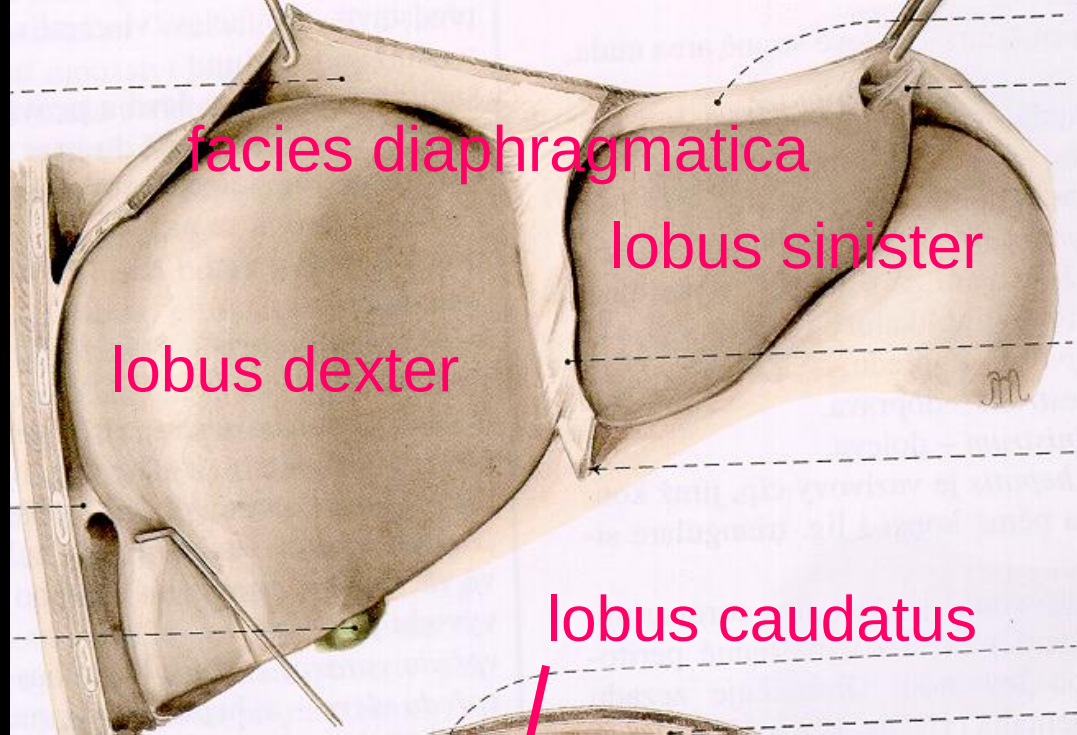
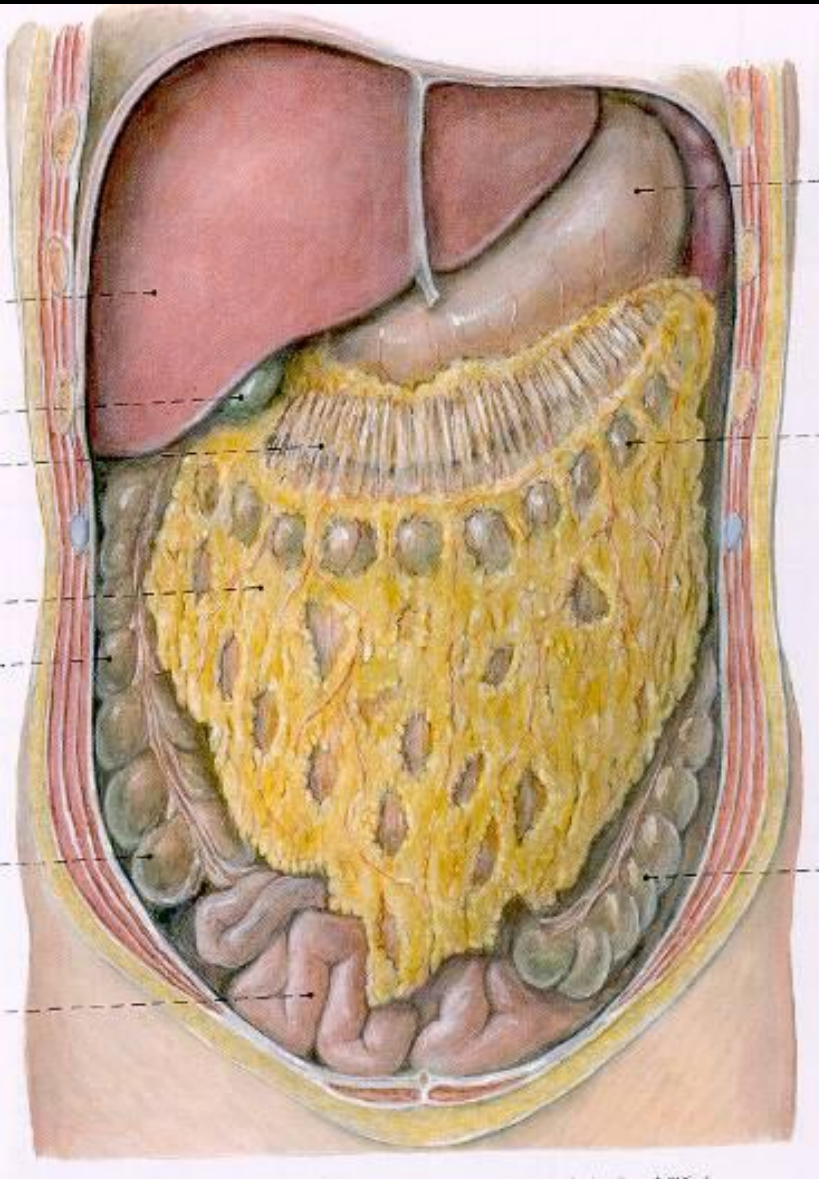


Játra – popis a dělení

- facies diaphragmatica
 - area nuda, impressio cardiaca
- facies visceralis – otisky 6 orgánů
 - žaludek, jícen, ledvina, nadledvina, dvanáctník, pravé tračnickové ohbí
- margo inferior – obvykle nehmatný

dělení:

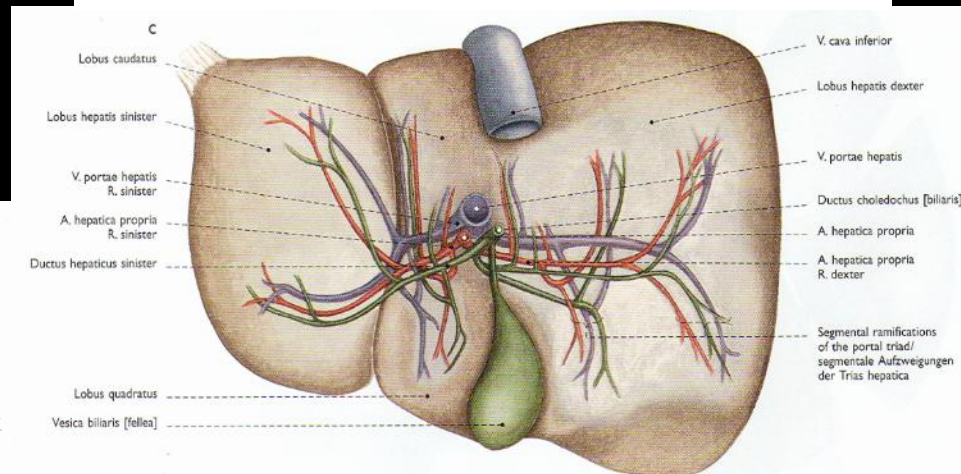
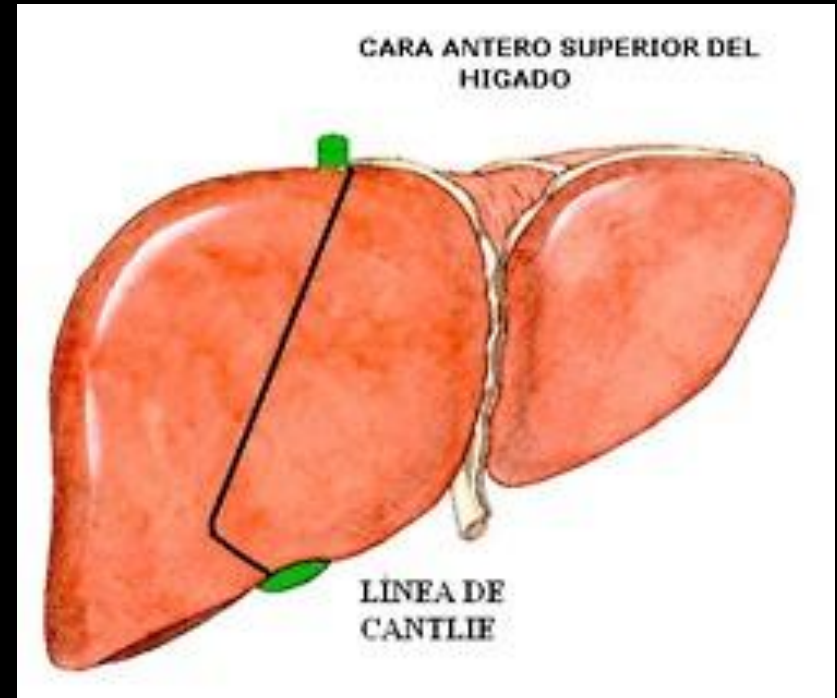
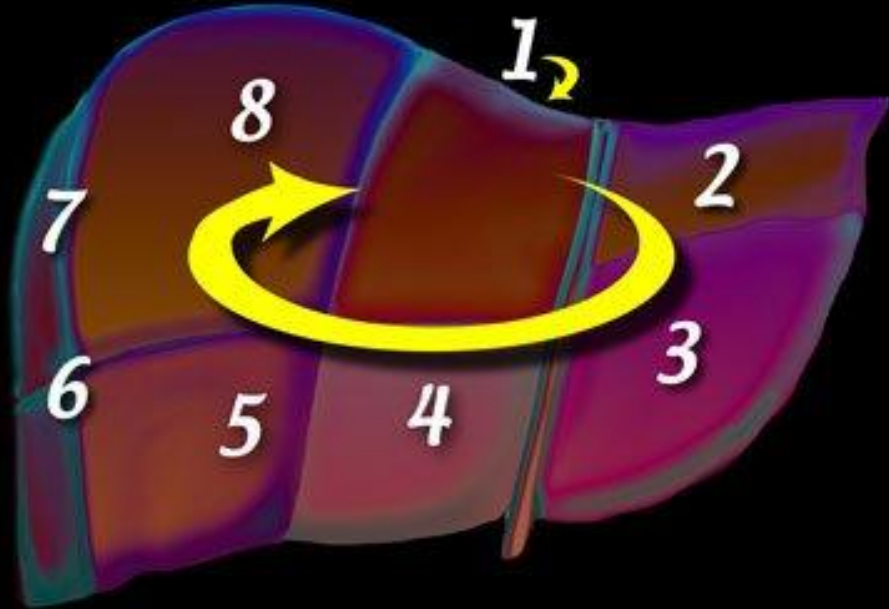
- 4 laloky popisné
 - lobus dx., sin., caudatus, quadratus
- 8 segmentů dle cév



Játra – Segmenty (Dílce)

- segment má ve středu svoji tepnu, žílu (větev z v. portae) a žlučovod
- mezi segmenty jsou vv. hepaticae
- rovina podél v. hepatica media dělí játra na pravý a levý (klinický) lalok
 - na povrchu jako Rexova-Cantlieho čára (spojnice středu fossa vesicae biliaris – v. cava inf.)
- v. hepatica dx. dělí pravý (klinický) lalok na přední (V+VI) a zadní segmenty (VII+VIII)
- v. hepatica sin. dělí levý (klinický) lalok na laterální (II+III) a mediální (IV) segment
- *podle hodinových ručiček*

Játra – Segmenty (Dílce)



Části jater (Claude Couinaud 1957)

Dílec (Segmentum)

Pars hepatis sinistra

Divisio lateralis sinistra

Segmentum posterius laterale sinistrum

II

Segmentum anterius laterale sinistrum

III

Divisio medialis sinistra

Segmentum mediale sinistrum

IV

Pars posterior hepatis; Lobus caudatus

Segmentum posterius; Lobus caudatus Spigeli

I

Pars hepatis dextra

Divisio medialis dextra

Segmentum anterius mediale dextrum

V

Segmentum posterius mediale dextrum

VIII

Divisio lateralis dextra

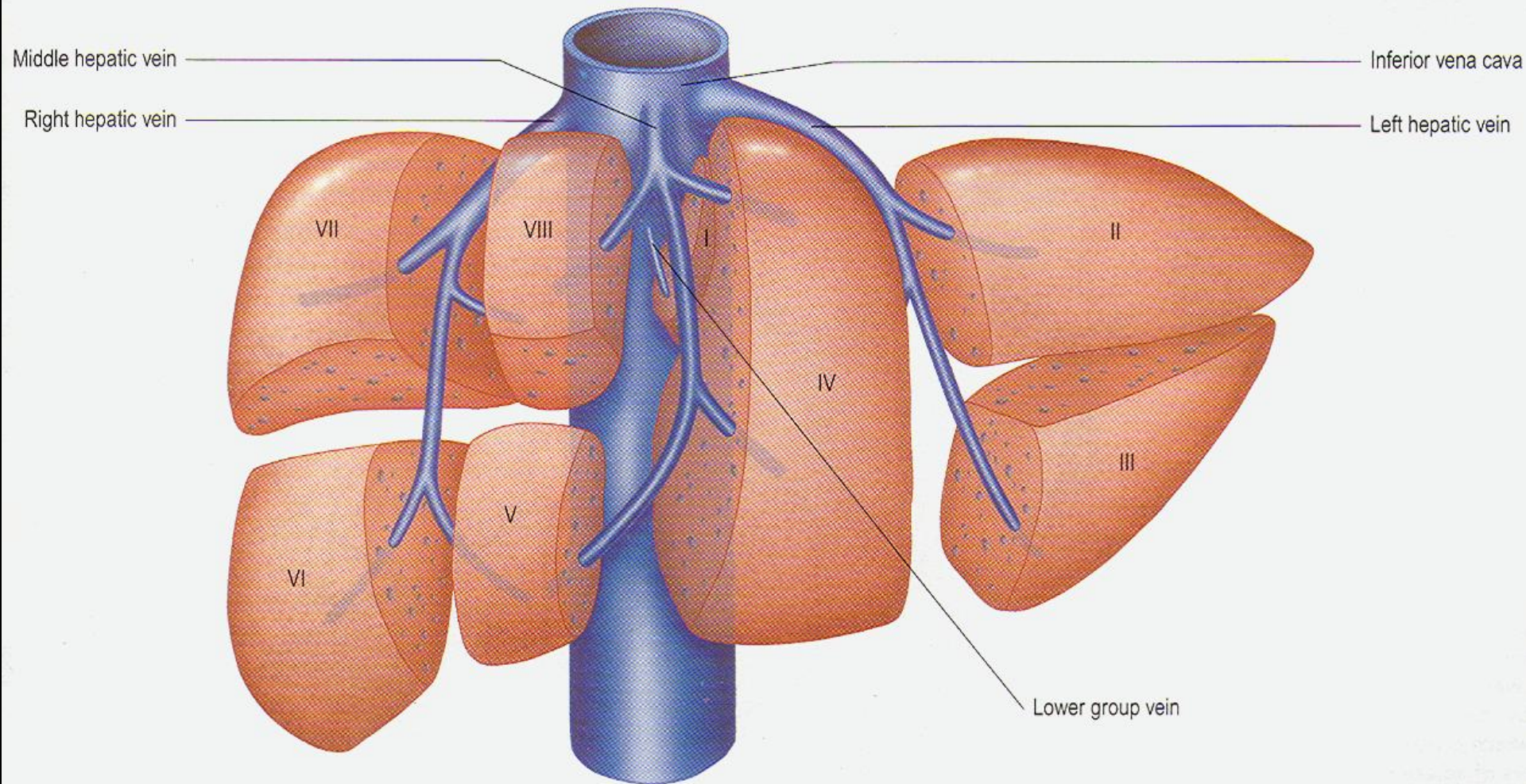
Segmentum anterius laterale dextrum

VI

Segmentum posterius laterale dextrum

VII

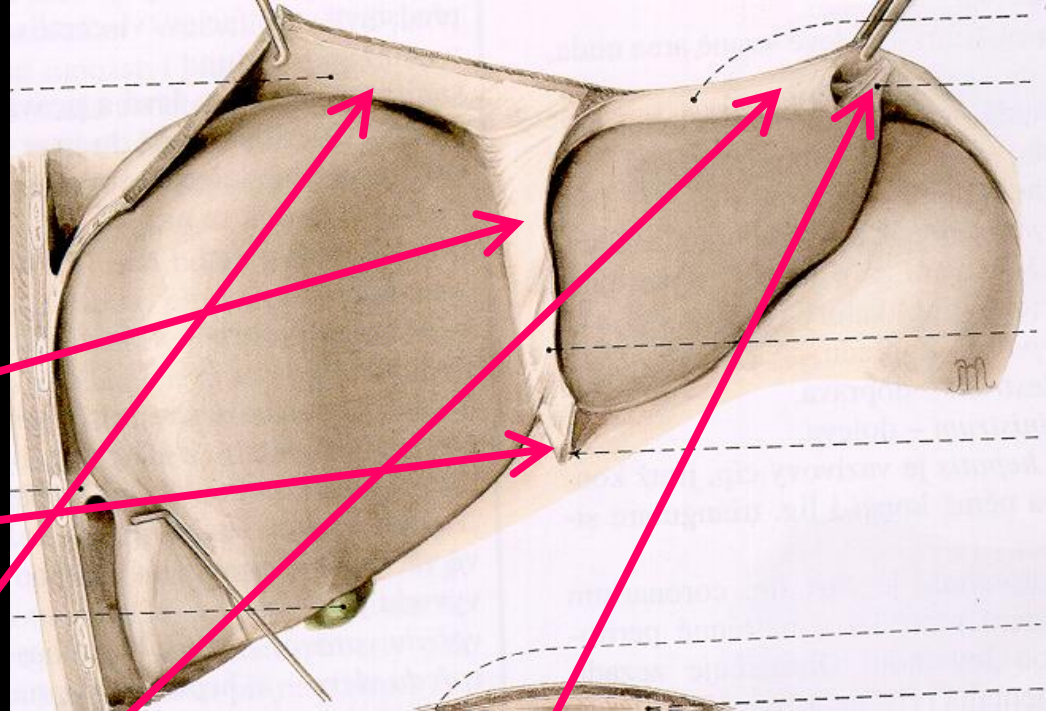
Játra – Segmenty (Dílce)



Játra

vazy a fixace

- lig. falciforme
- lig. teres hepatis
- lig. venosum
- lig. coronarium dx.+sin.
- lig. triangulare dx.+sin., appendix fibrosa hepatis
- lig. hepatorenale; lig. venae cavae



Fixace: závěs na v. cava inf., srůst s bránicí,
břišní orgány, lig. teres hepatis

a

(Appendix fibrosa hepatis)

Fissura ligamenti venosi

Impressio oesophagea

Lig. venosum

Lobus caudatus

Tuber omentale

Lobus hepatis sinister

Impressio gastrica

A. hepatica propria

Ductus choledochus [biliaris]

V. cava inferior

Area nuda

(Lig. venae cavae)

Lig. coronarium
(inferior layer/
untere Umschlagfalte)

Impressio renalis

Lobus hepatis dexter

Proc. caudatus lobi caudati

V. portae hepatis

Porta hepatis

Ductus hepaticus dexter

Ductus cysticus

Impressio duodenalis

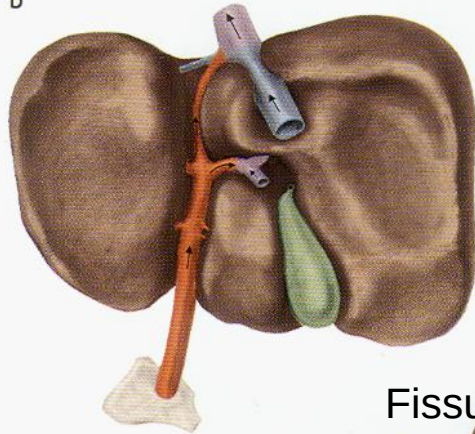
Impressio colica

Vesica biliaris [fellea]

Lobus quadratus

Lig. teres hepatis

b



Fissura sagittalis sin. et dx.

c

Fissura ligamenti venosi

Lobus caudatus

Lobus hepatis sinister

Fissura ligamenti teretis

Lobus quadratus

Incisura ligamenti teretis

Area nuda

Lig. coronarium
(inferior layer/
untere Umschlagfalte)

(Sulcus venae cavae)

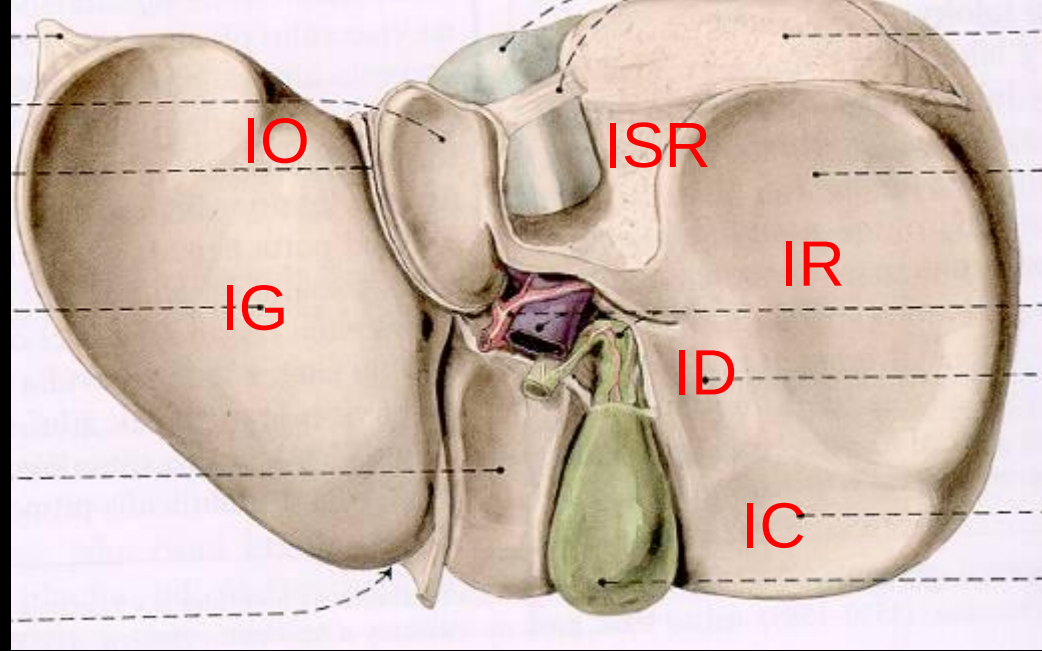
Porta hepatis

Lobus hepatis dexter

Fossa vesicae biliaris
[felleae]

Játra

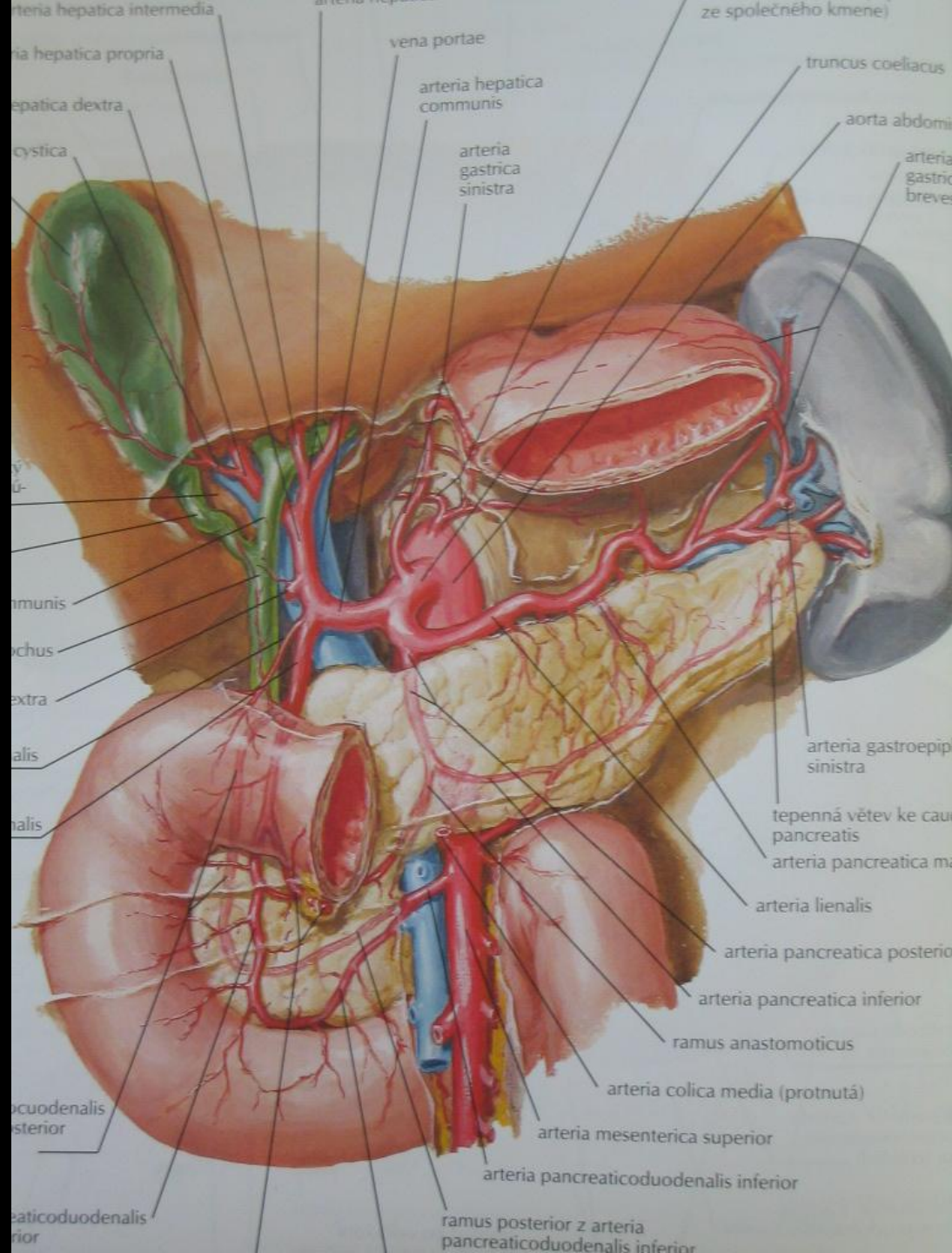
facies visceralis



- porta hepatis:
 - v. portae
 - a. hepatica propria
 - ductus hepaticus dx. et sin.
 - mízní cévy + nervy
- fissura lig. venosi + fissura lig. teretis
- sulcus venae cavae
- fossa vesicae biliaris

Porta hepatis Jaterní branka

- **v. portae** (vrátnice)
→ r. dx. et sin.
– *dorzálně*
- **a. hepatica propria**
→ r. dx. et sin.
– *ventromediálně*
- **ductus hepaticus**
dx. et sin.
– *ventrolaterálně*
- mízní cévy
- nervy



Játra – cévní zásobení

2 oběhy

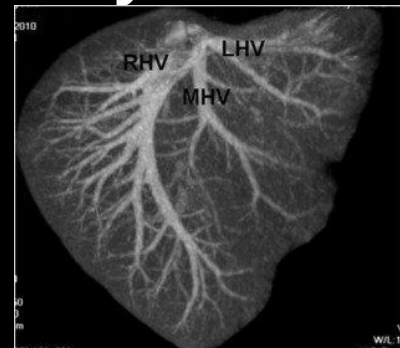
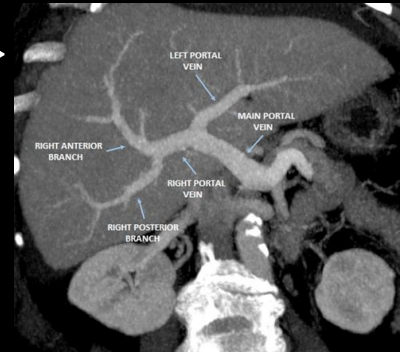
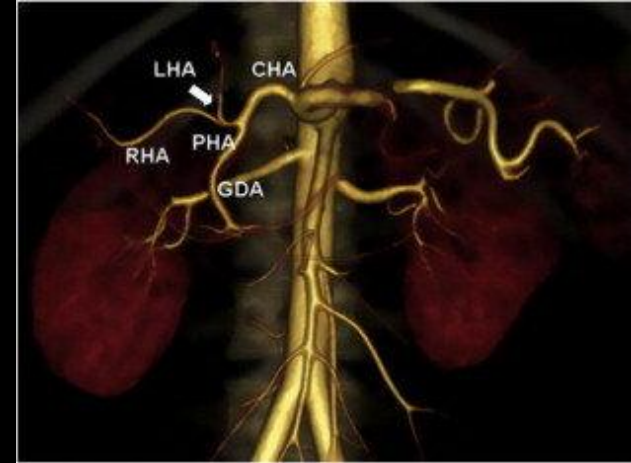
- nutritivní (tepny) – 25 % krve

truncus coeliacus → a. hepatica communis →
a. hepatica propria (+ a. hepatica accessoria)
→ r. dx.+ sin. → aa. interlobulares → sinusoidy

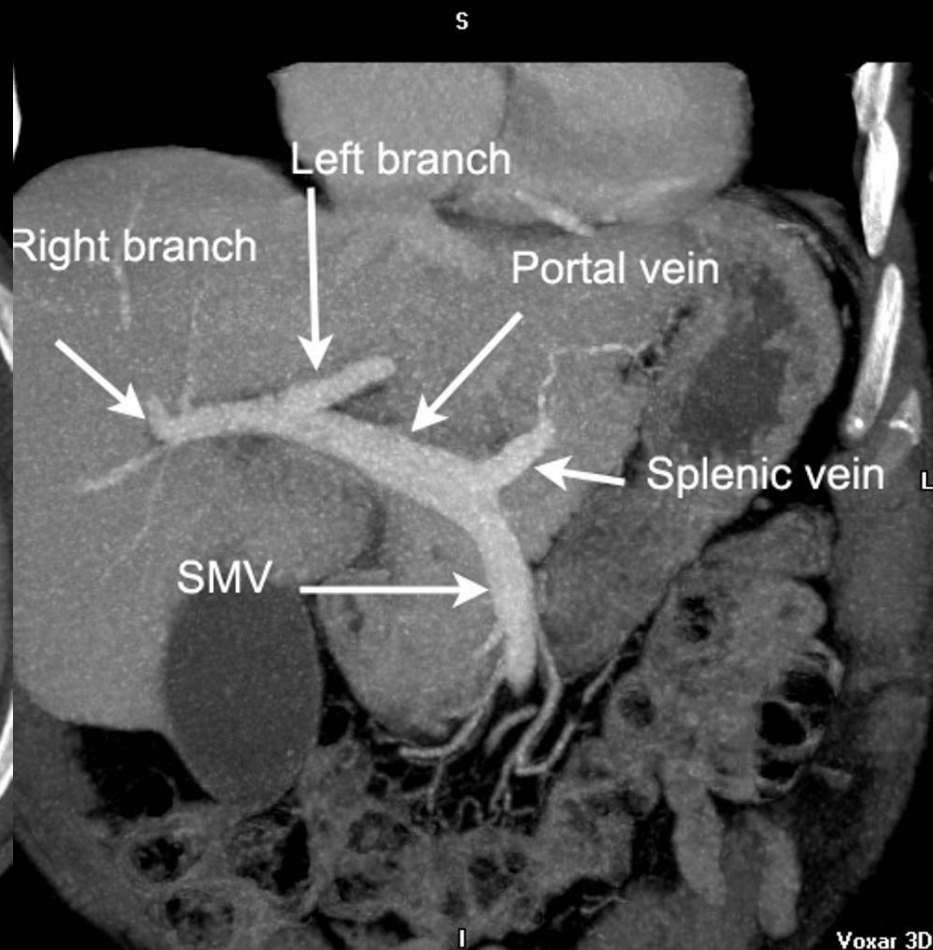
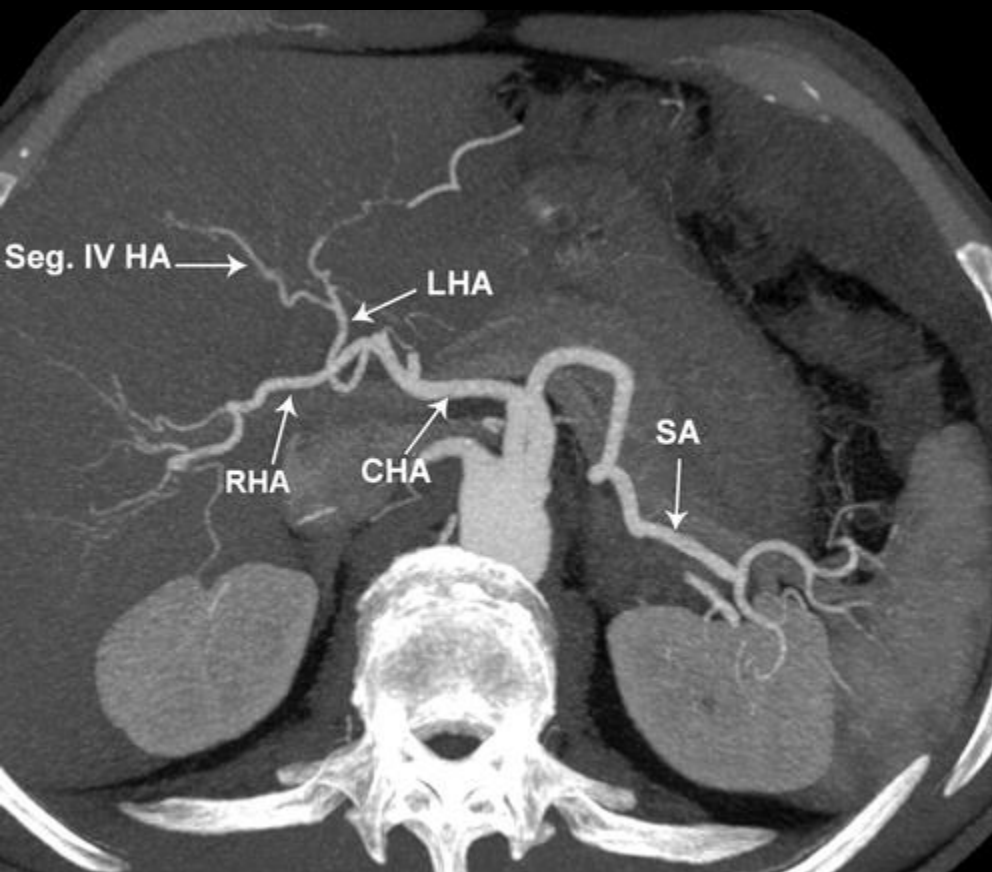
- funkční (žíly) – 75 % krve

v. portae → vv. interlobulares → sinusoidy

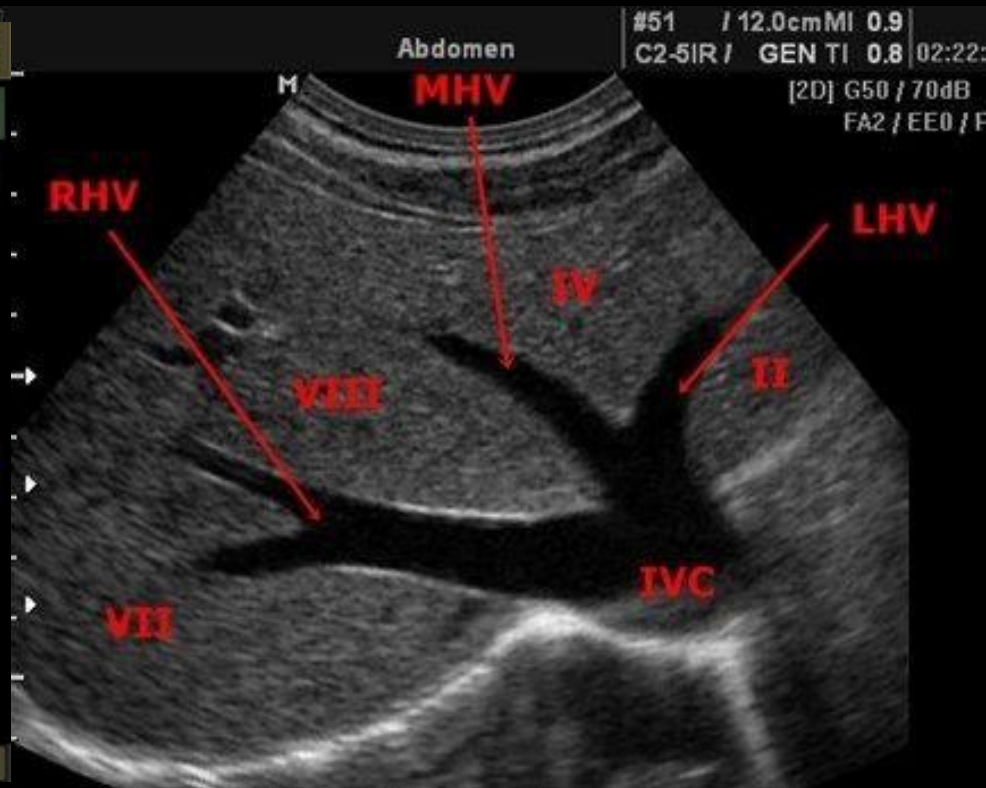
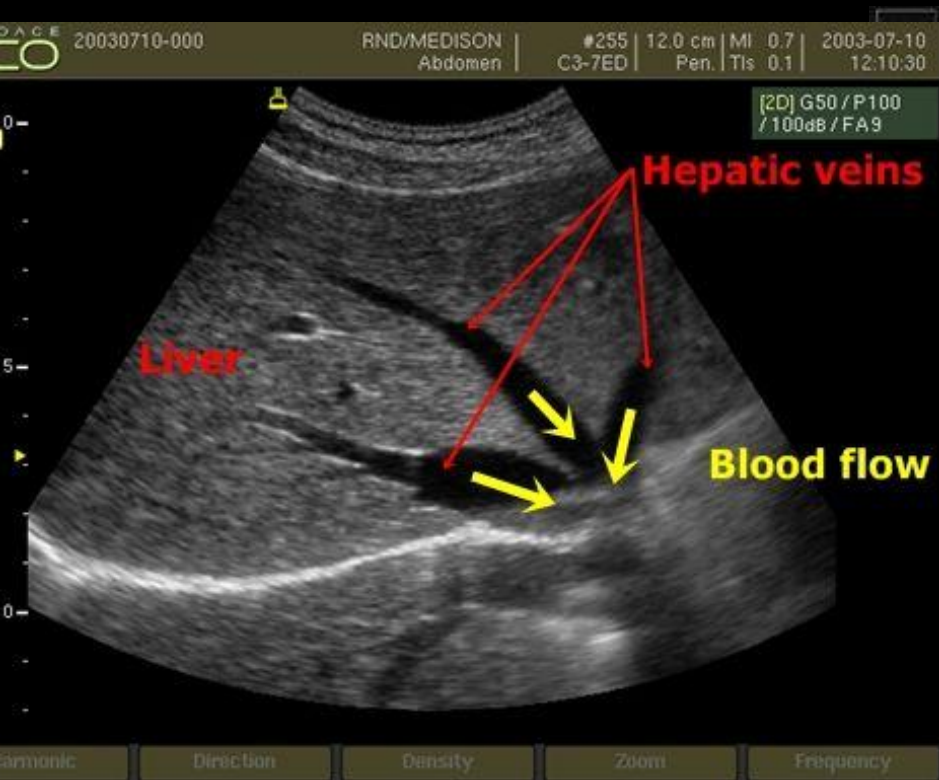
společný odtok: → vv. centrales →
v. hepaticae (dx.+ media + sin.) →
v. cava inf.



Játra – cévy



Ultrazvukové vyšetření jater – cévy



Játra – míza a nervy

Míza: 3 směry

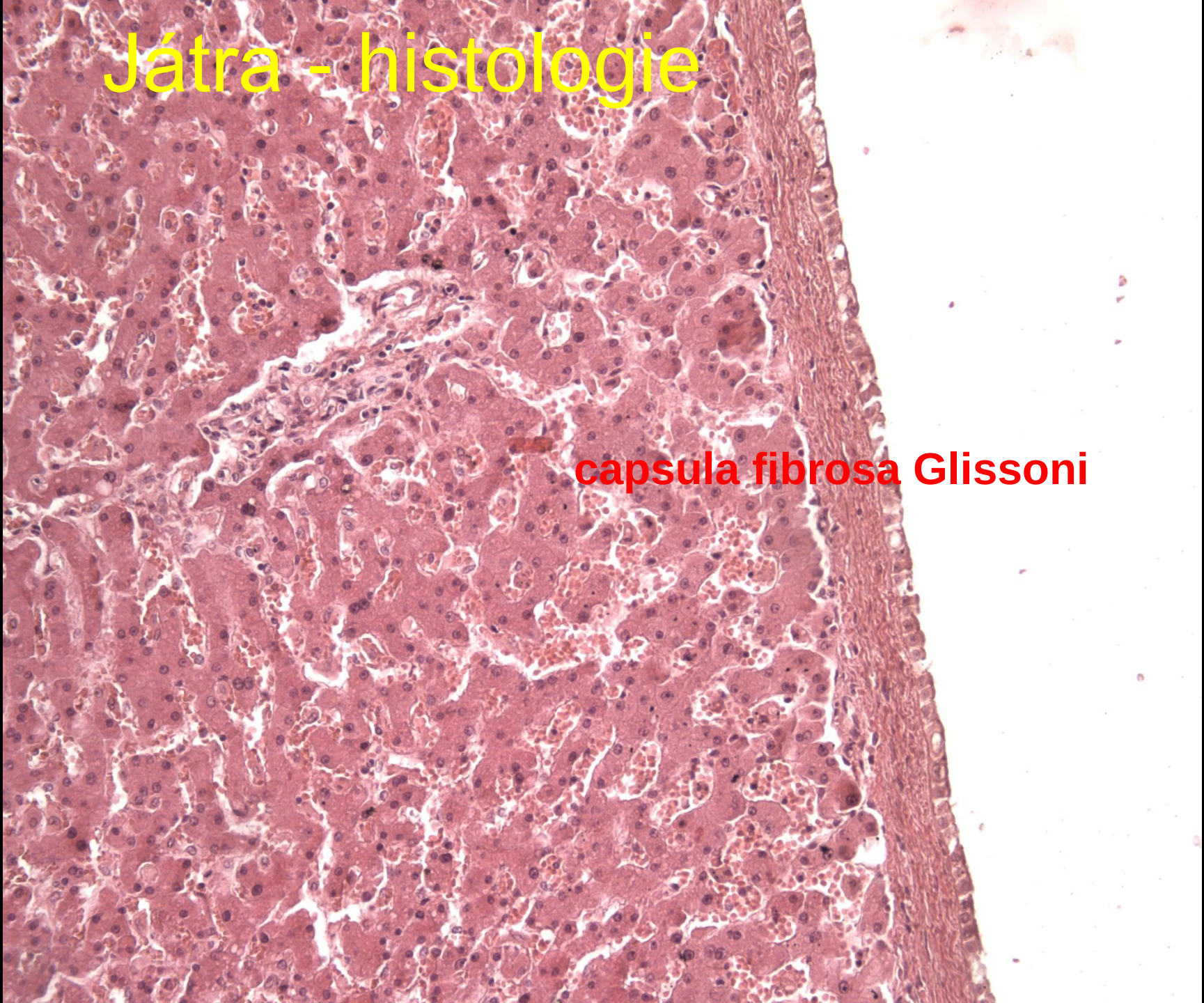
- **n.l. coeliaci**
- n.l. mediastinales ant.
- n.l. mediasitnales post.

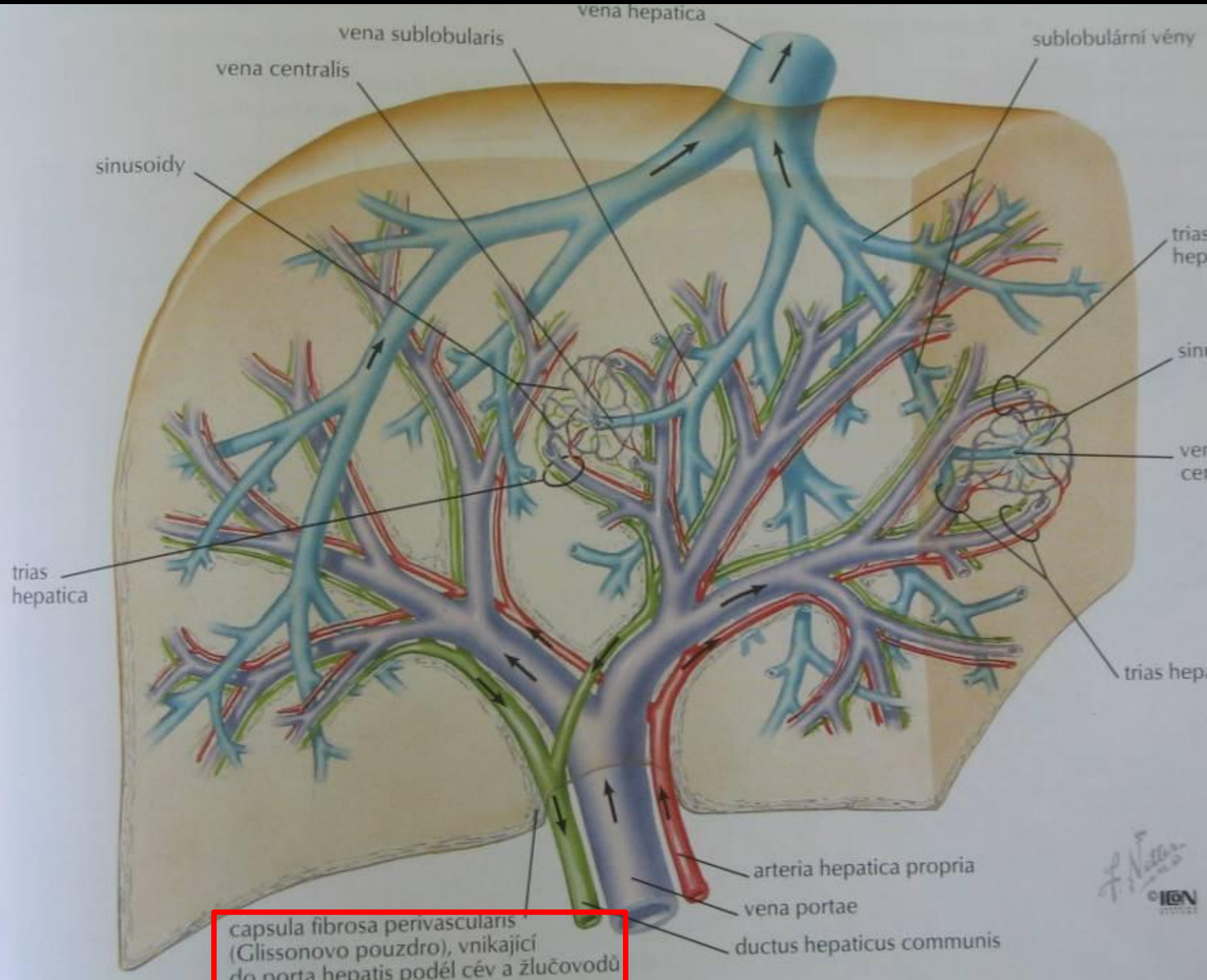
Nervy:

- parasympatikus – **n. X**
- sympatikus – **truncus sympathicus** → nn. splanchnici thoracici → plexus coeliacus → plexus hepaticus
- senzitivní – **n. phrenicus**
 - pobřišnice pod játry až ke žlučníku !!!

Játra - histologie

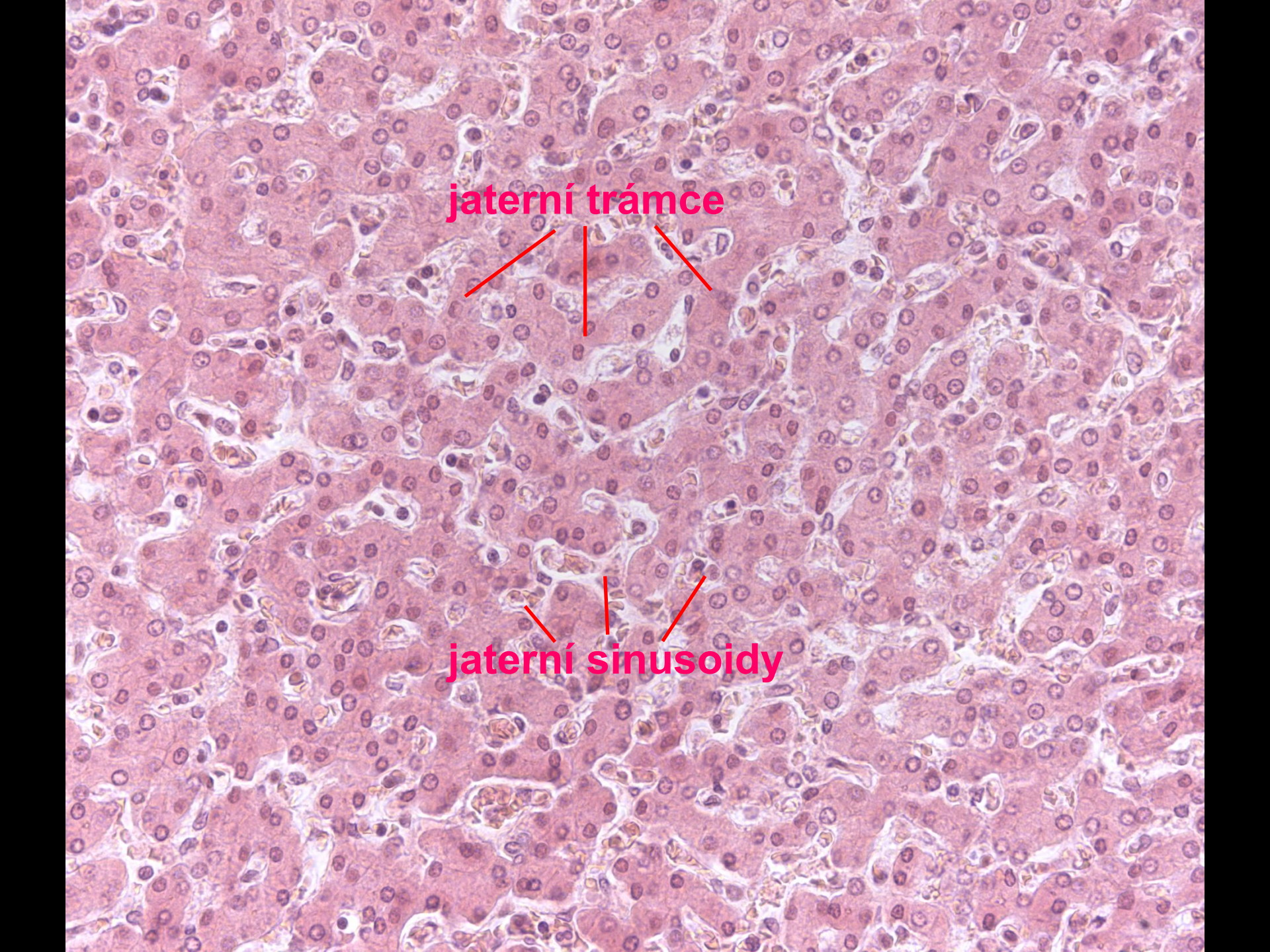
capsula fibrosa Glissoni





Trámčitý epitel

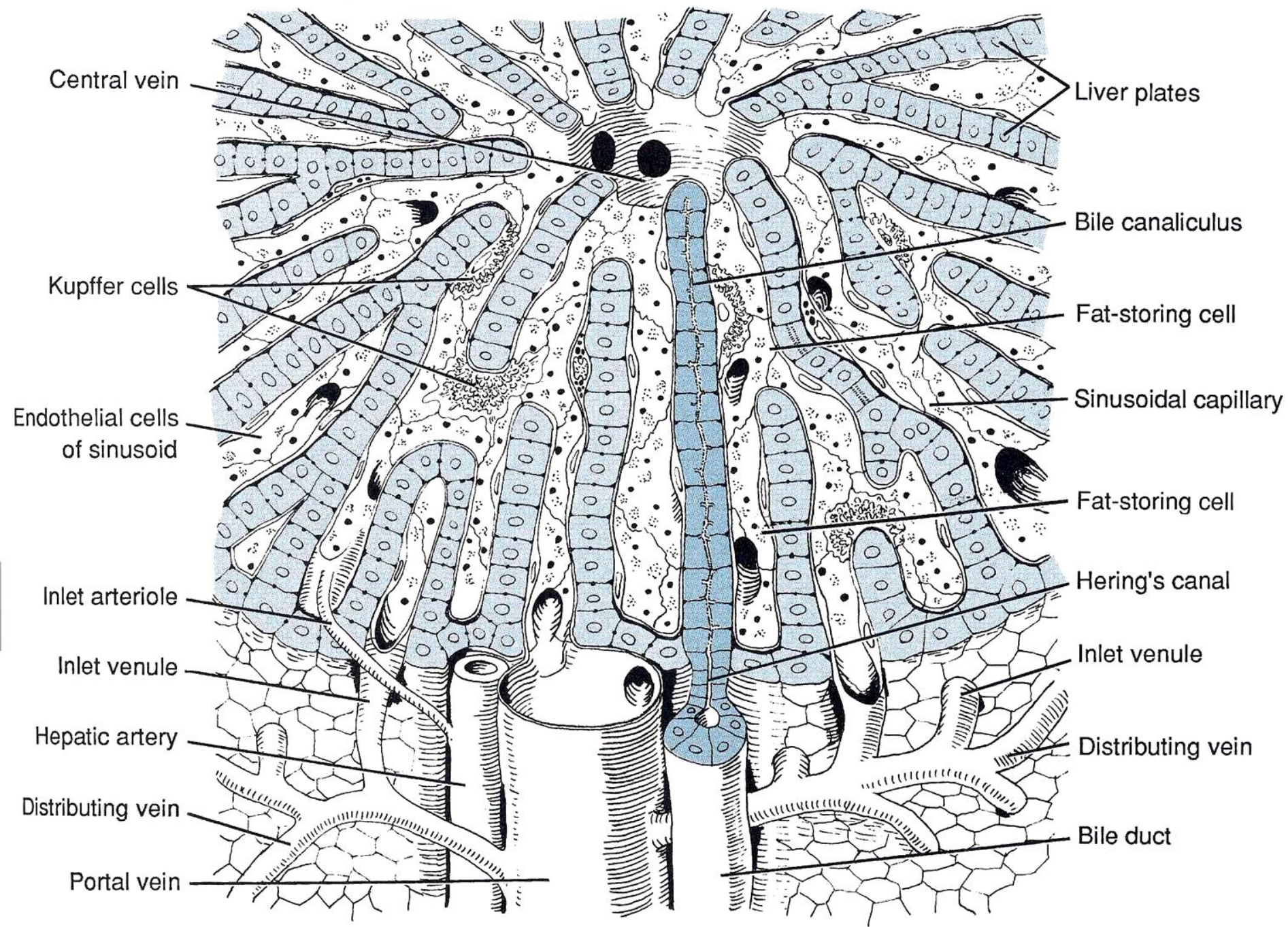




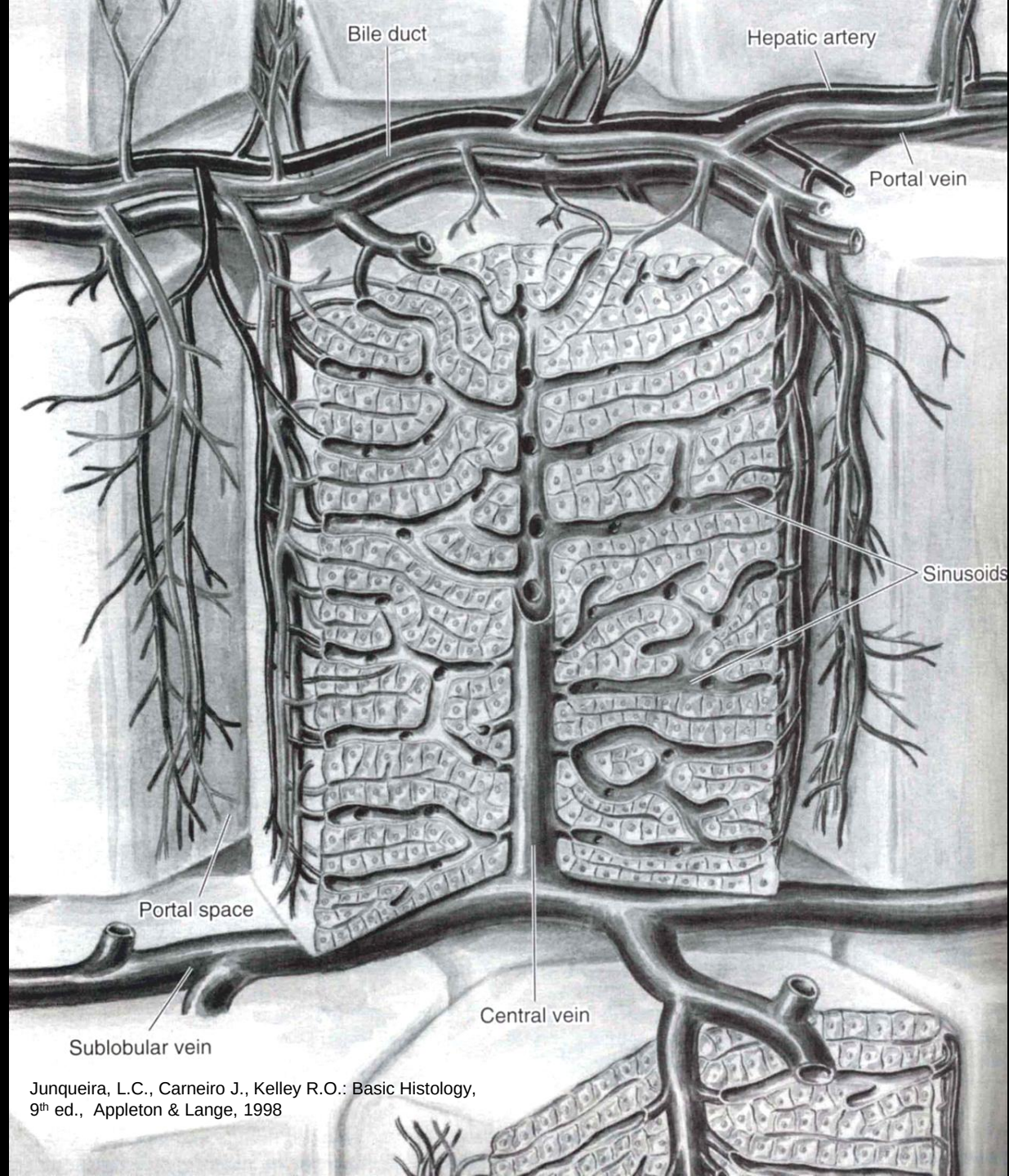
A high-magnification histological image of liver tissue stained with hematoxylin and eosin (H&E). The image displays the characteristic architecture of the liver, with cords of hepatocytes (labeled as 'jaterní trámce') separated by narrow spaces called sinusoids (labeled as 'jaterní sinusoidy'). The hepatocytes have large, round nuclei and abundant cytoplasm. The sinusoids are lined by a single layer of endothelial cells. The overall color is a mix of pink (cytoplasm/extracellular matrix) and purple (nuclei).

jaterní trámce

jaterní sinusoidy

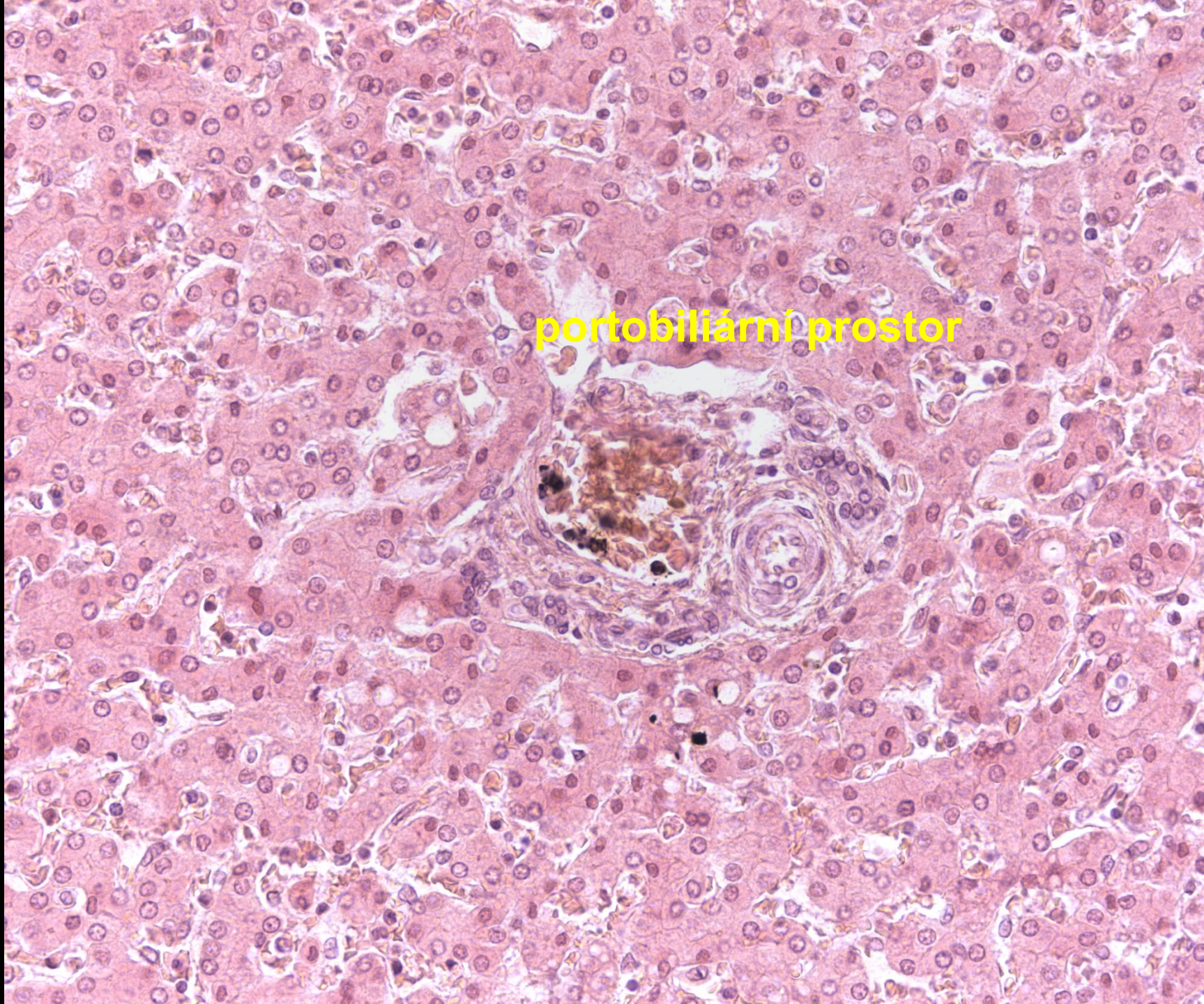


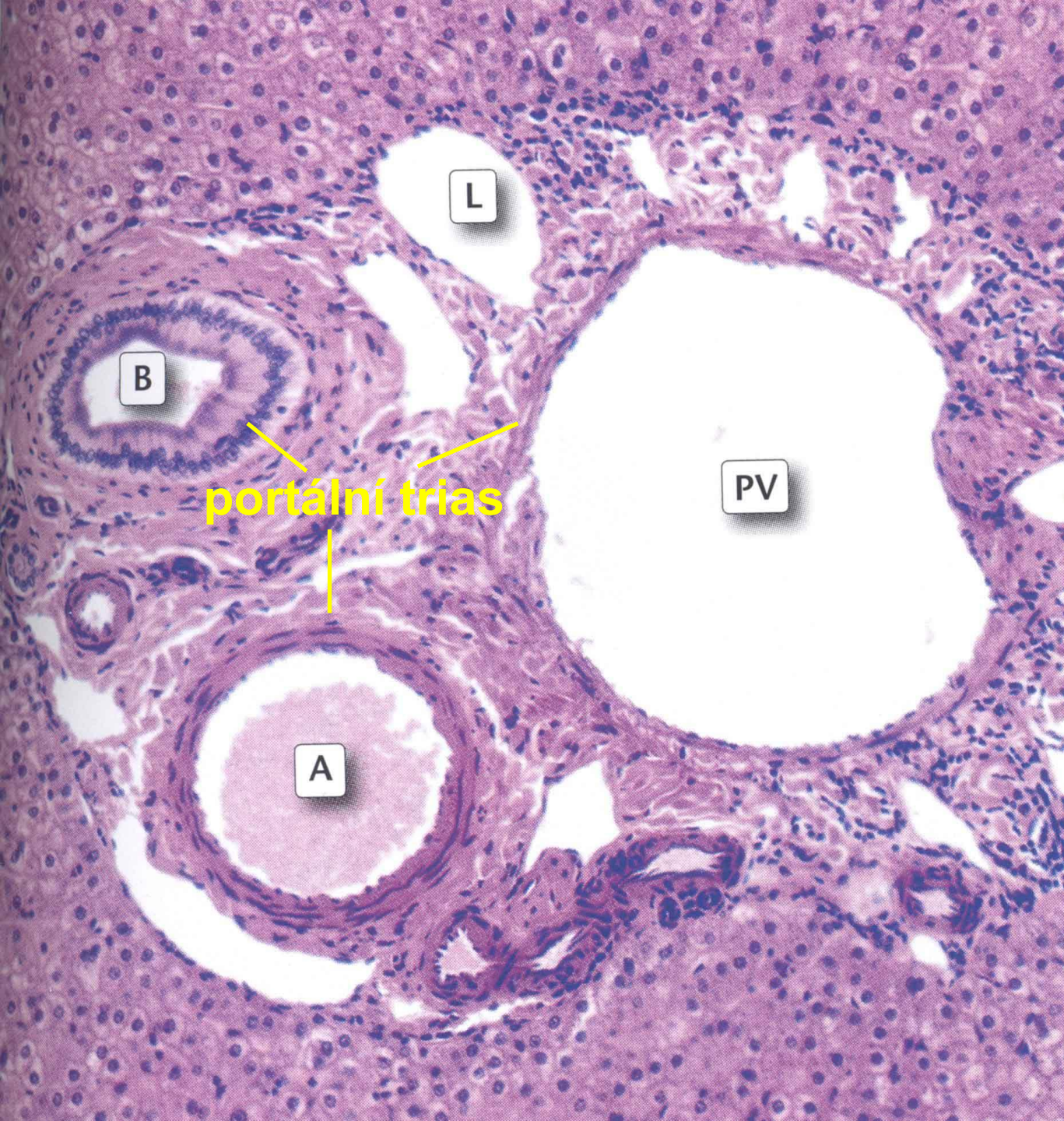
Cévní zásobení

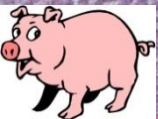


Junqueira, L.C., Carneiro J., Kelley R.O.: Basic Histology,
9th ed., Appleton & Lange, 1998

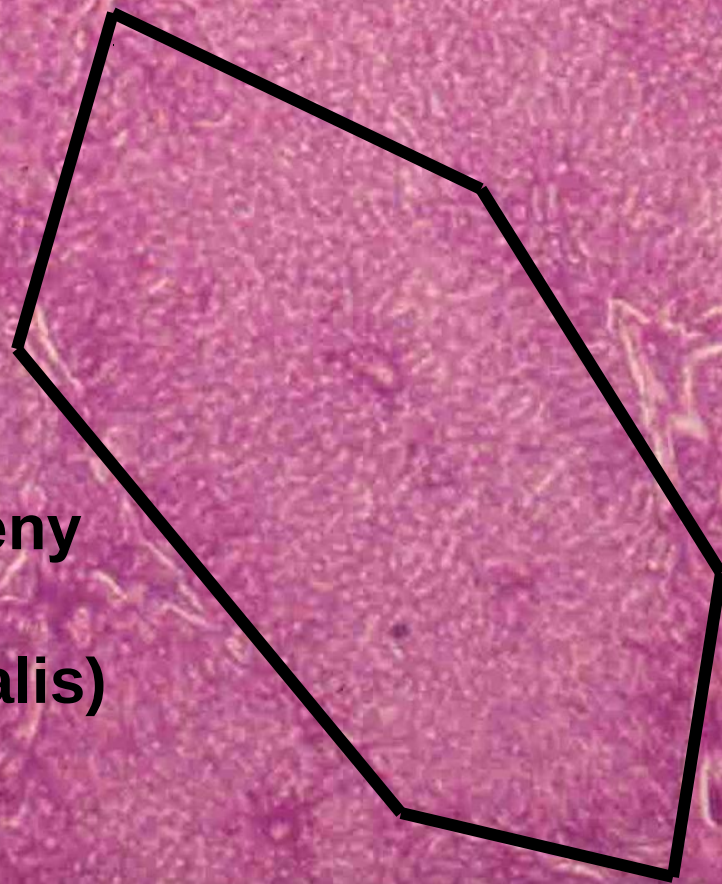
portobiliárni prostor



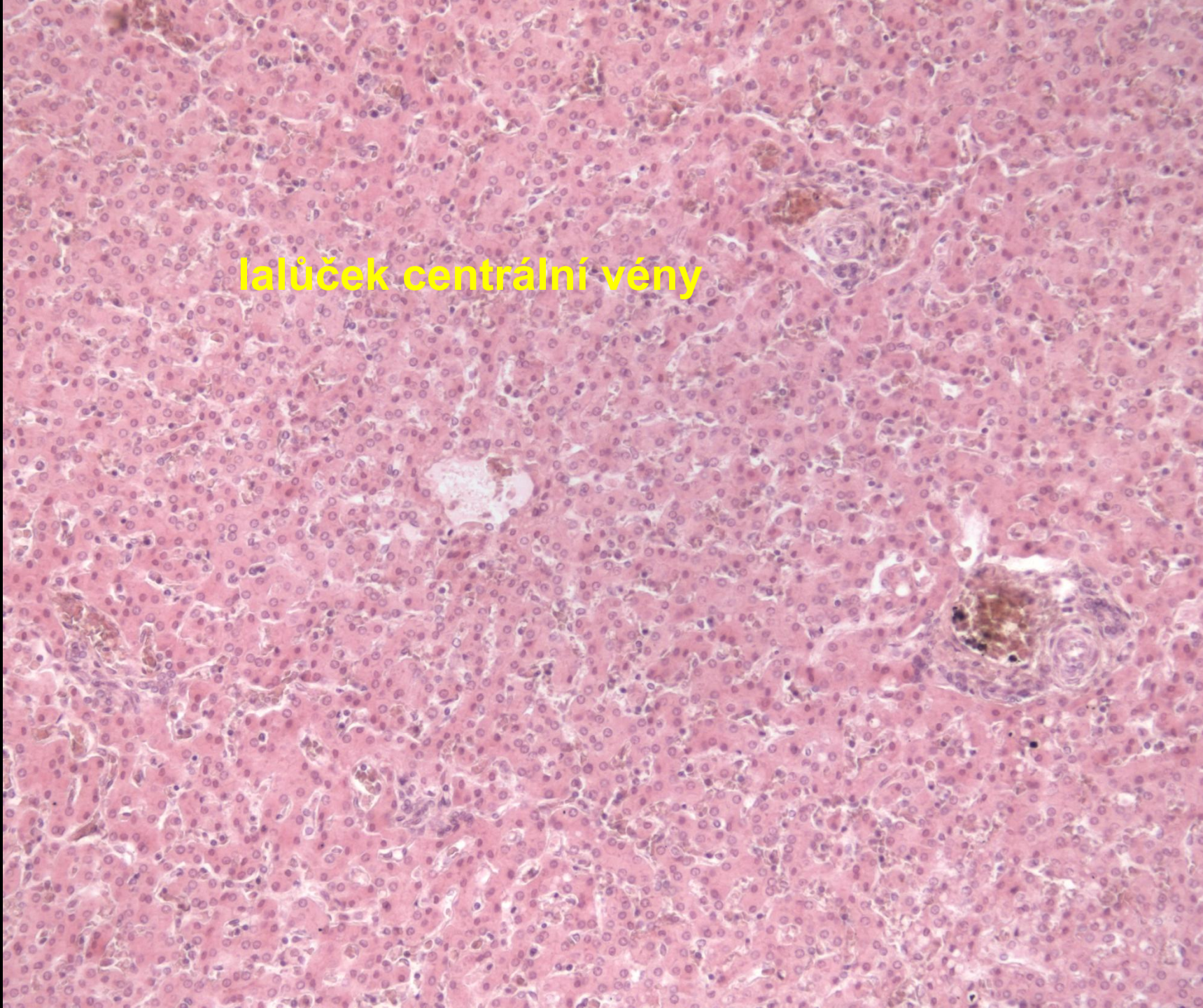


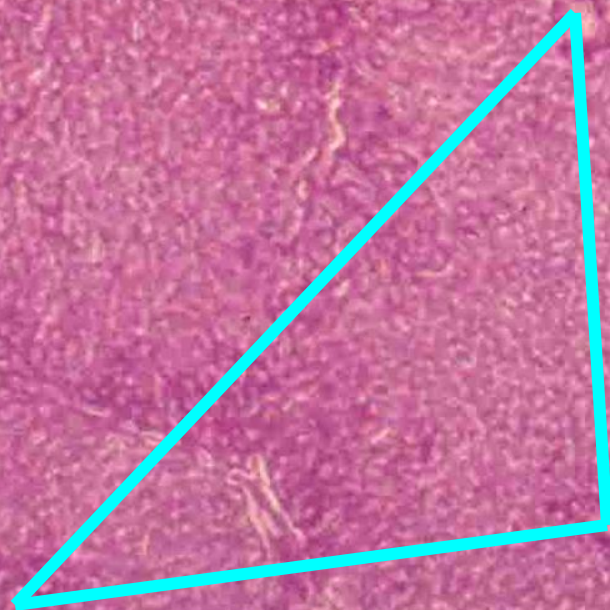


**lalůček centrální vény
jaterní lalůček
(lobulus venae centralis)**



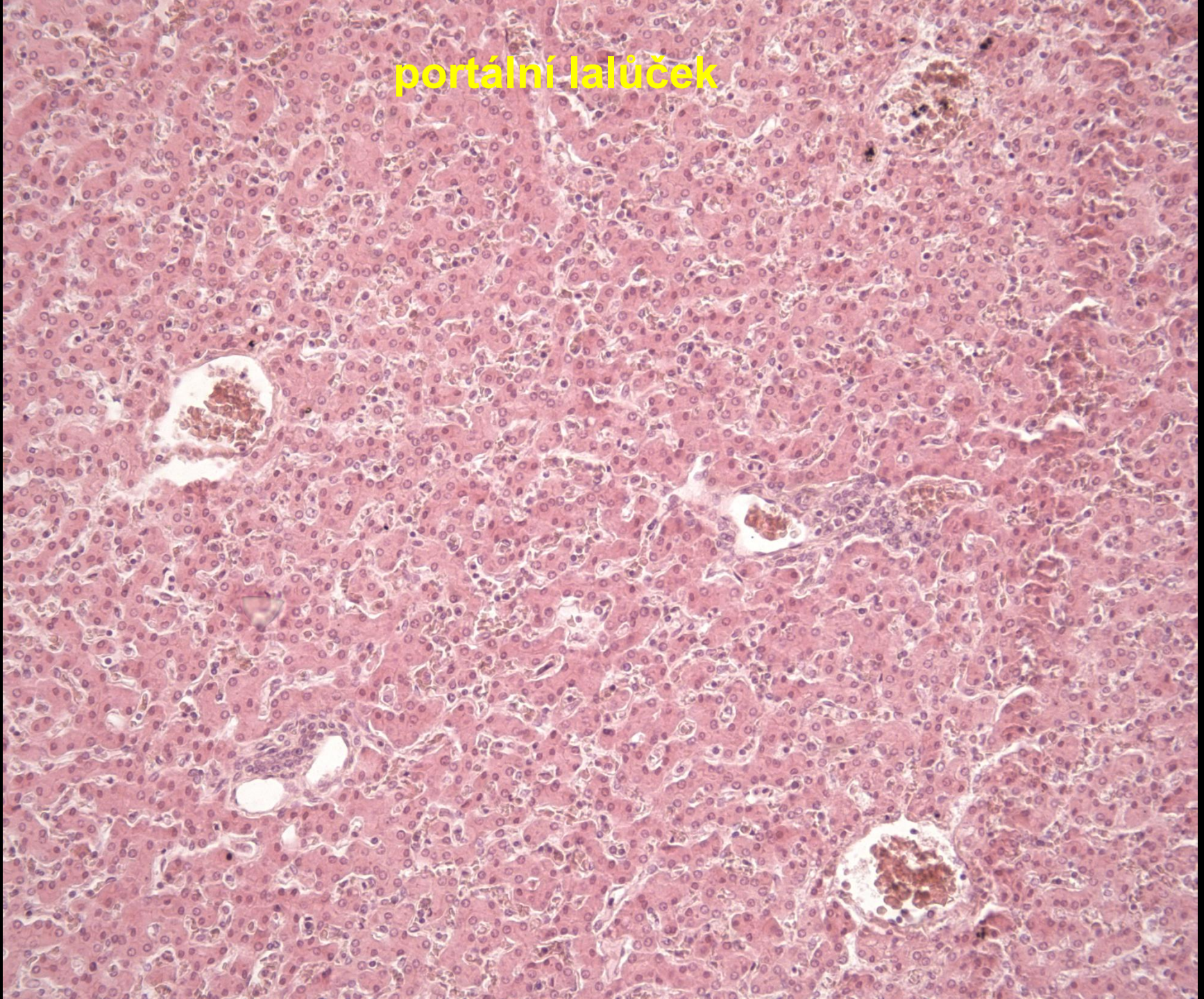
lalůček centrální veny



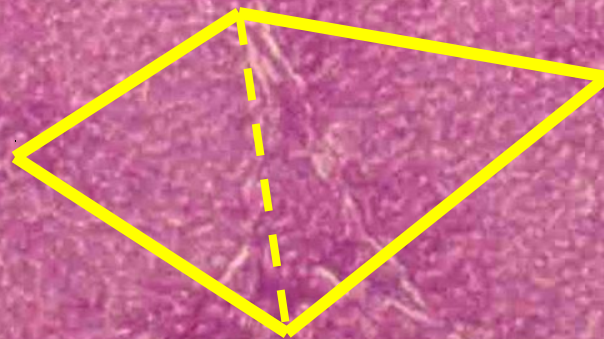


lalůček portální
(lobulus venae interlobularis)

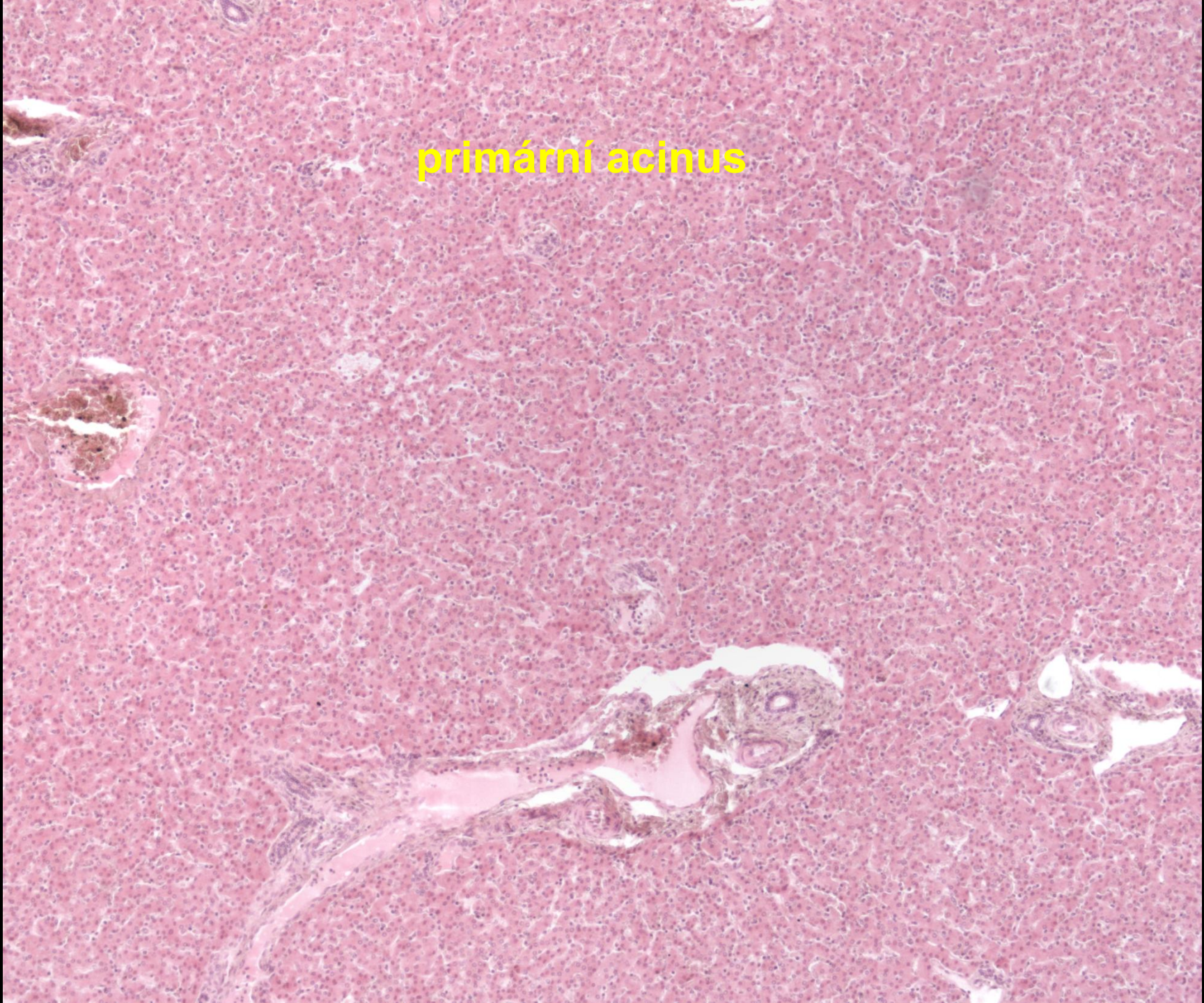
portální lalůček



**primární acinus
(acinus venae circumlobularis)**

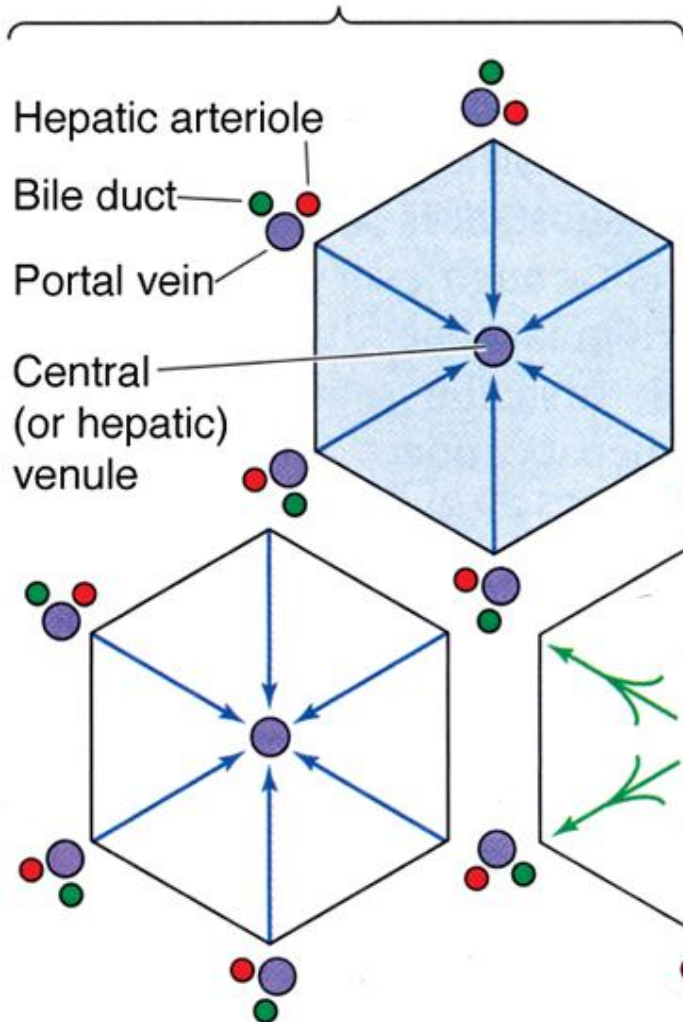


primární acinus



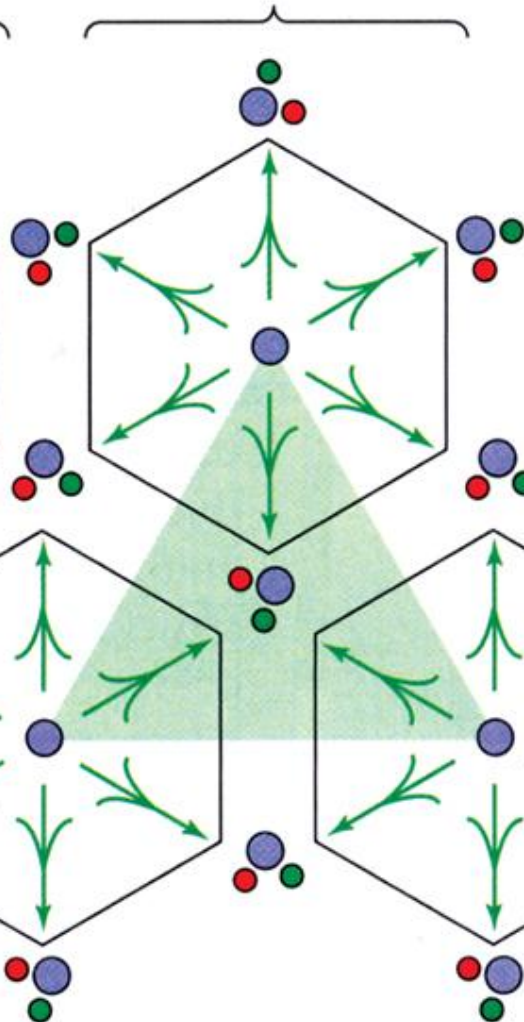
a CLASSIC HEPATIC LOBULE

Drains blood from the portal vein and the hepatic artery to the hepatic or the central vein



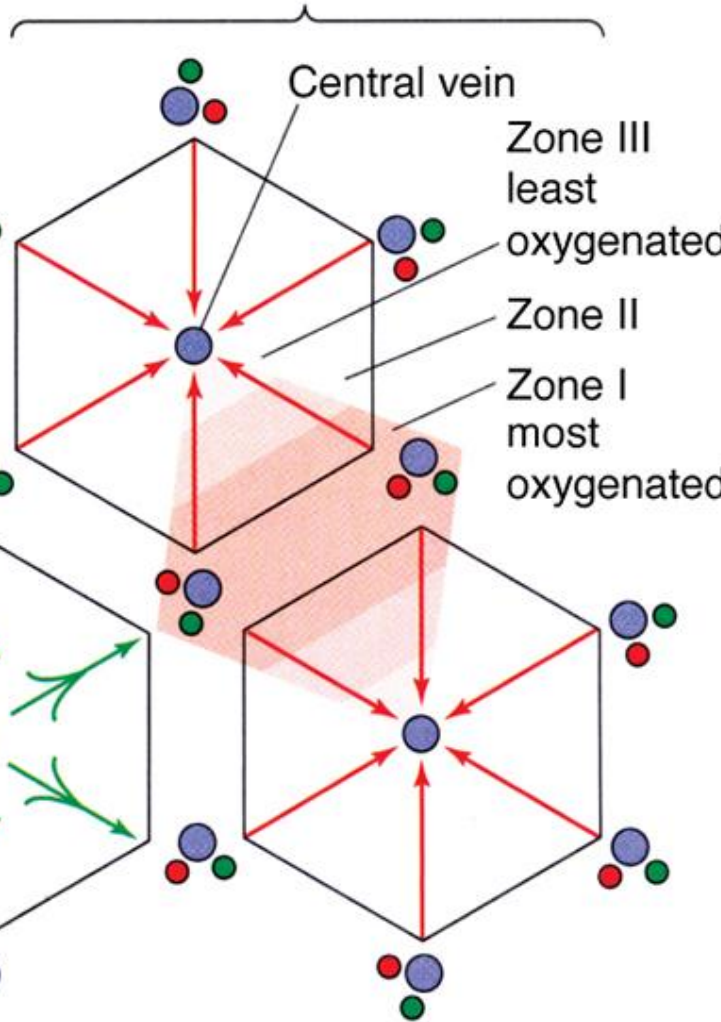
b PORTAL LOBULE

Drains bile from hepatocytes to the bile duct

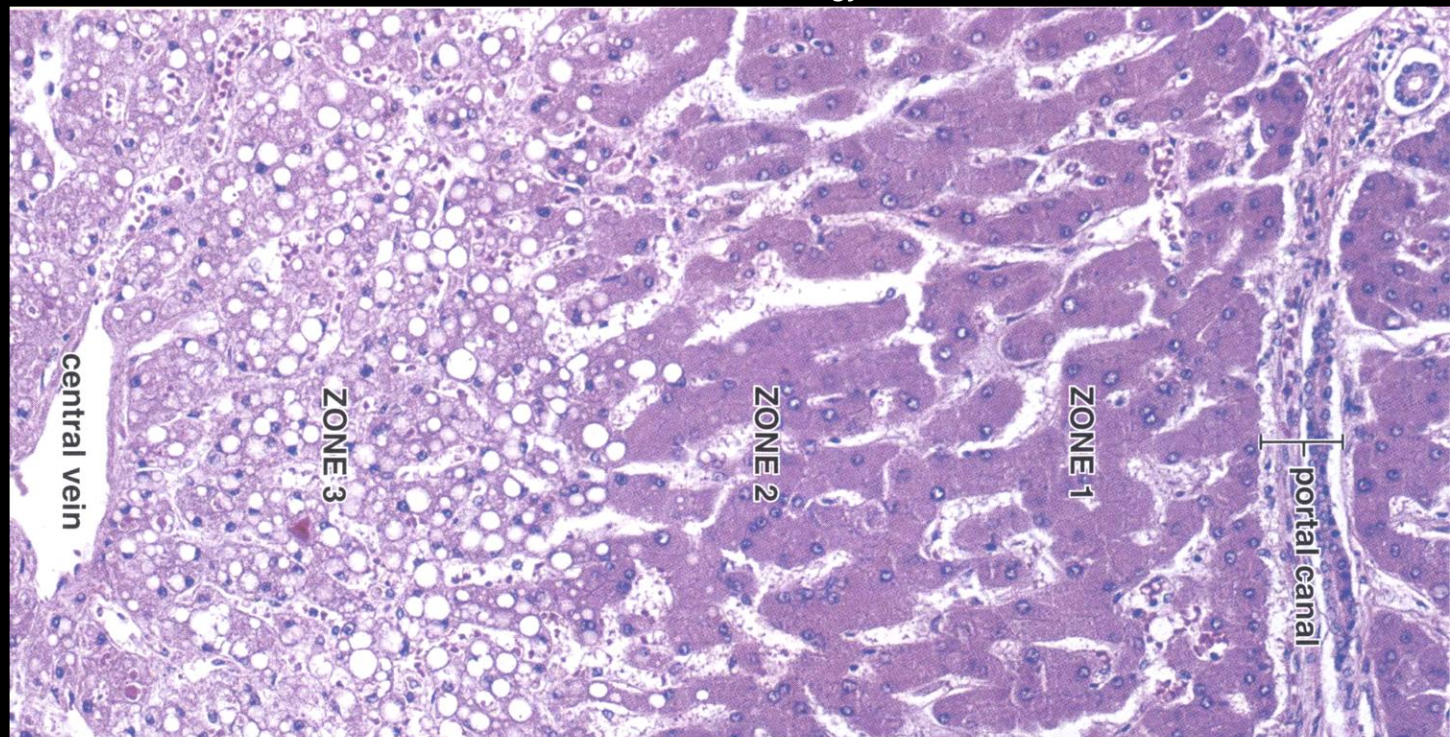


c PORTAL ACINUS

Supplies oxygenated blood to hepatocytes



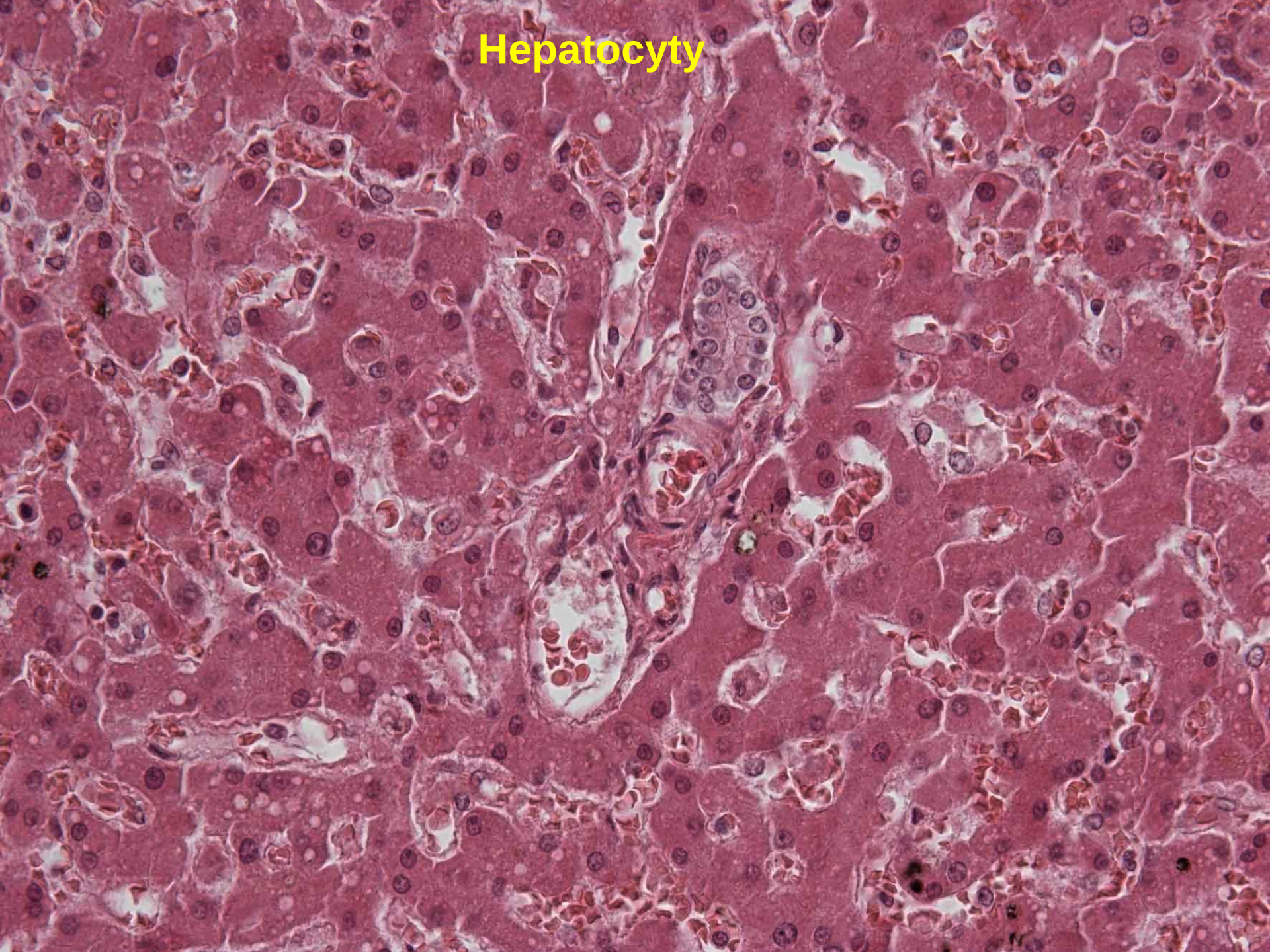
hypoxické poškození jaterního lalůčku

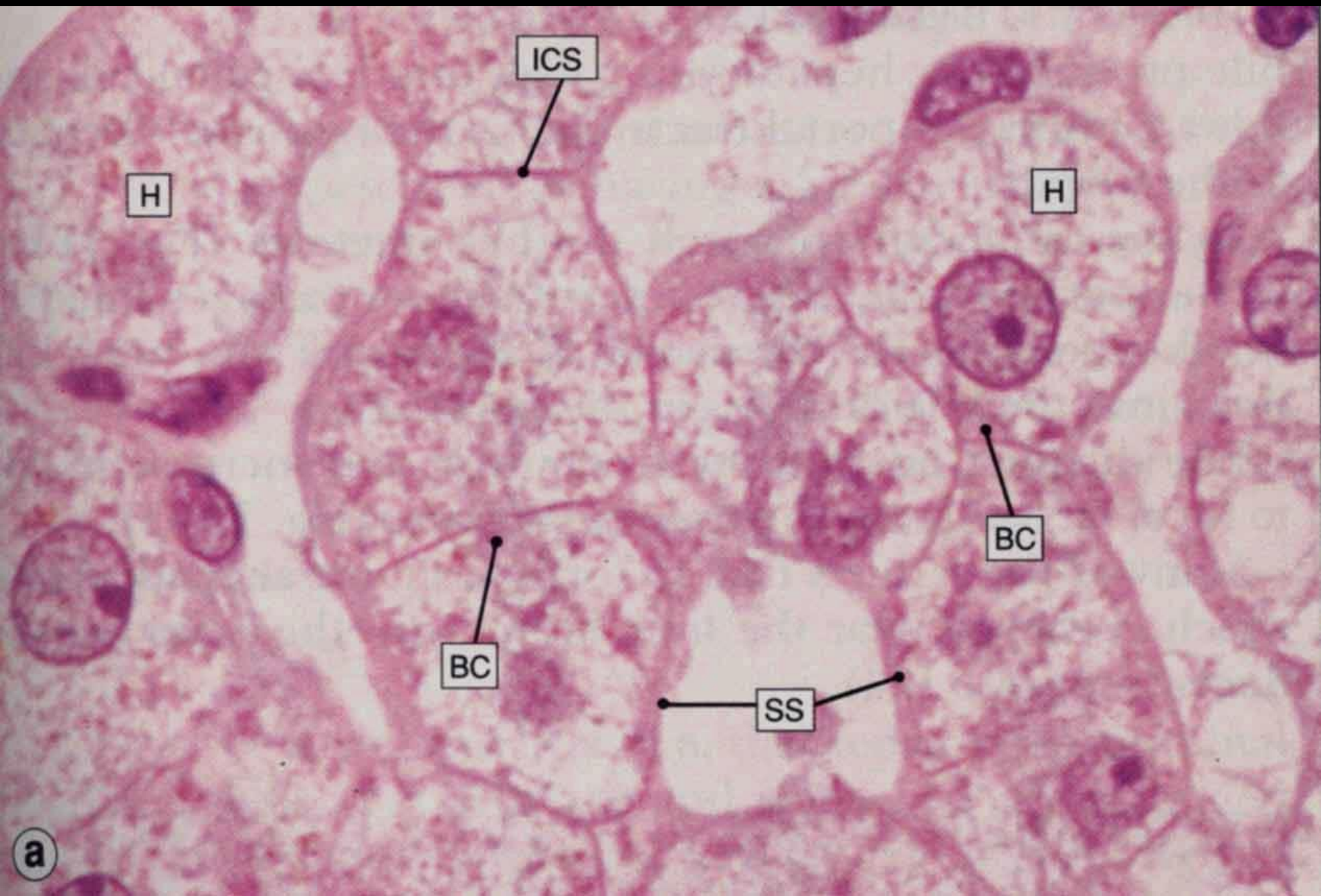


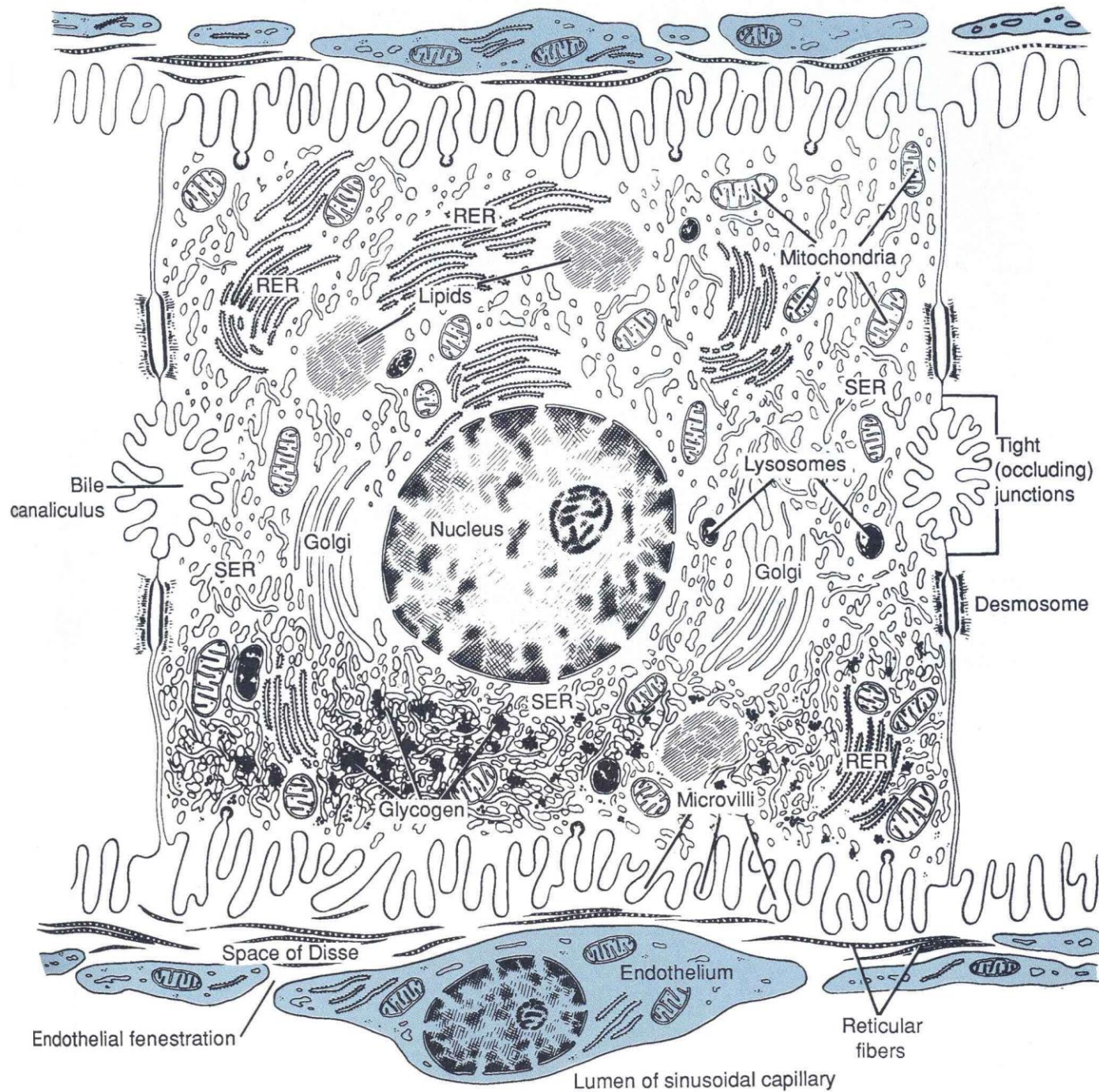
toxické poškození jaterního lalůčku

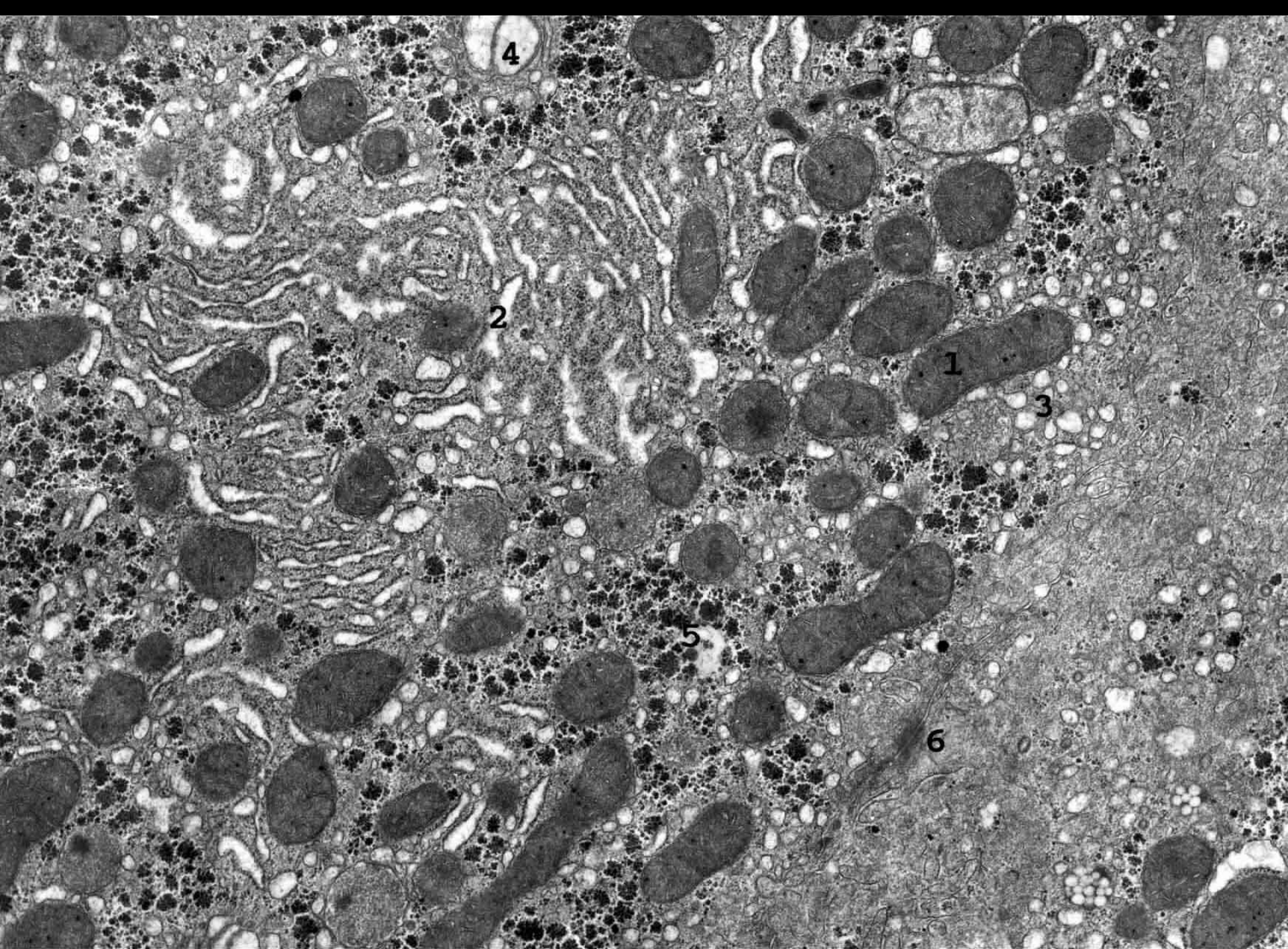


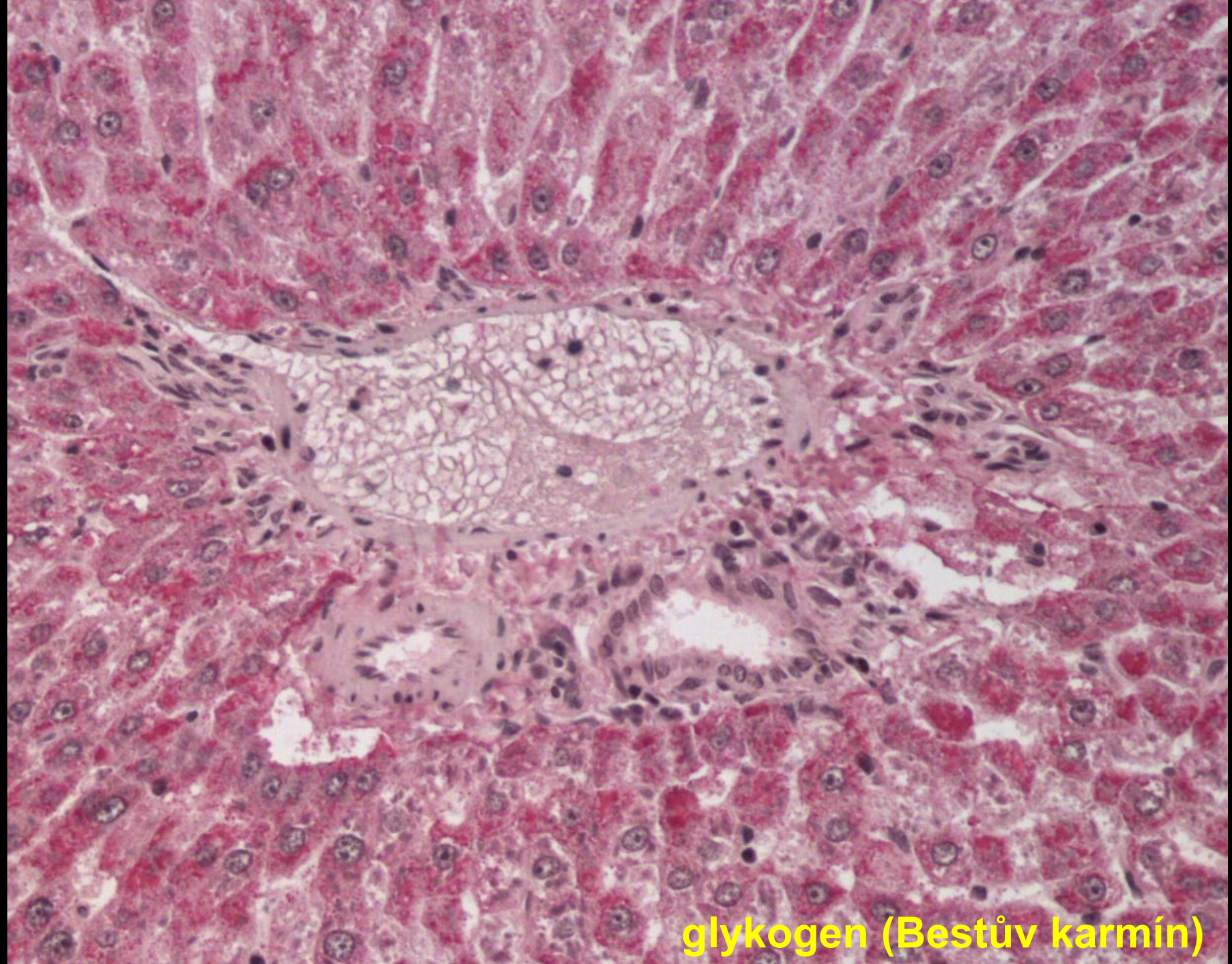
Hepatocyt



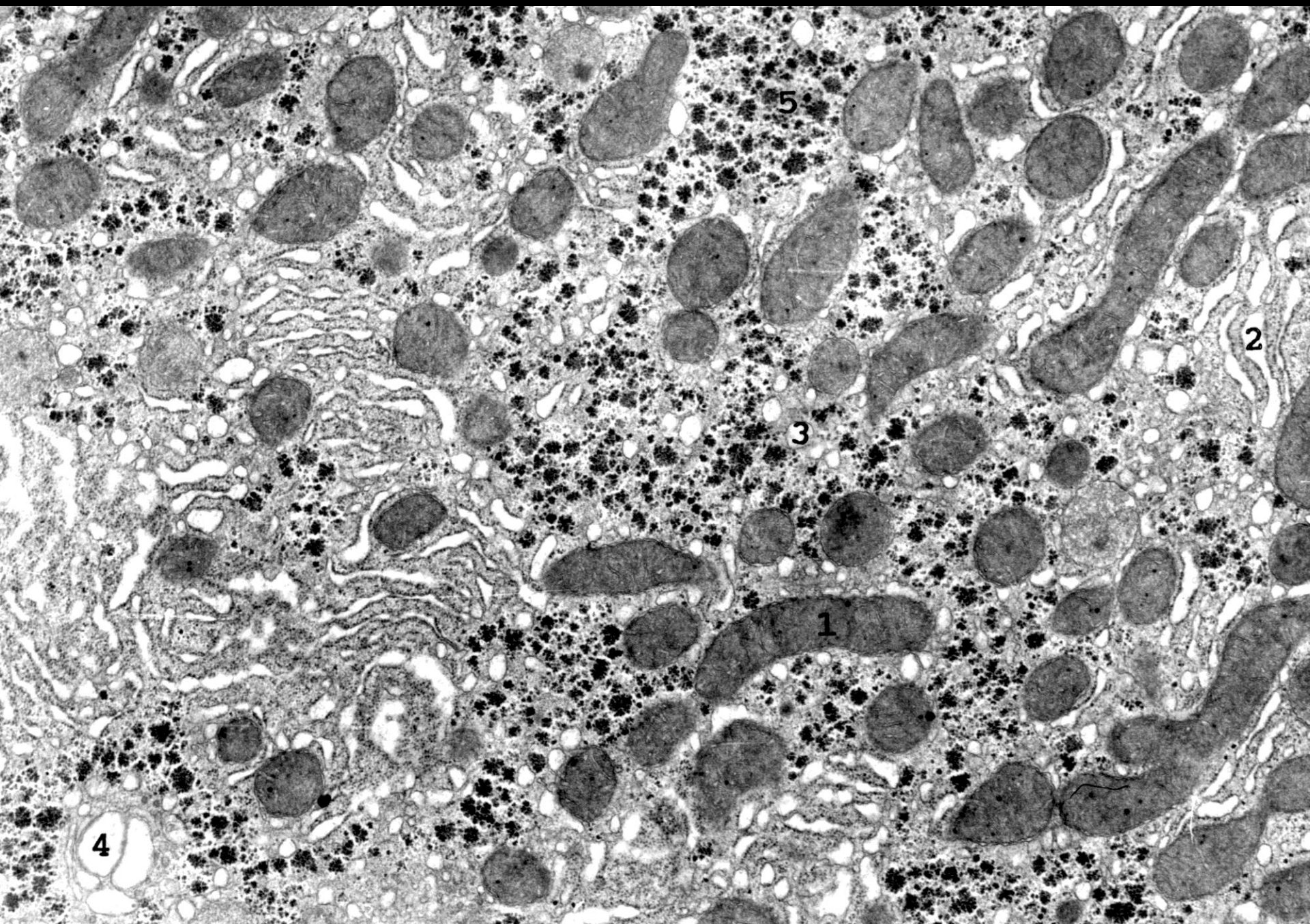


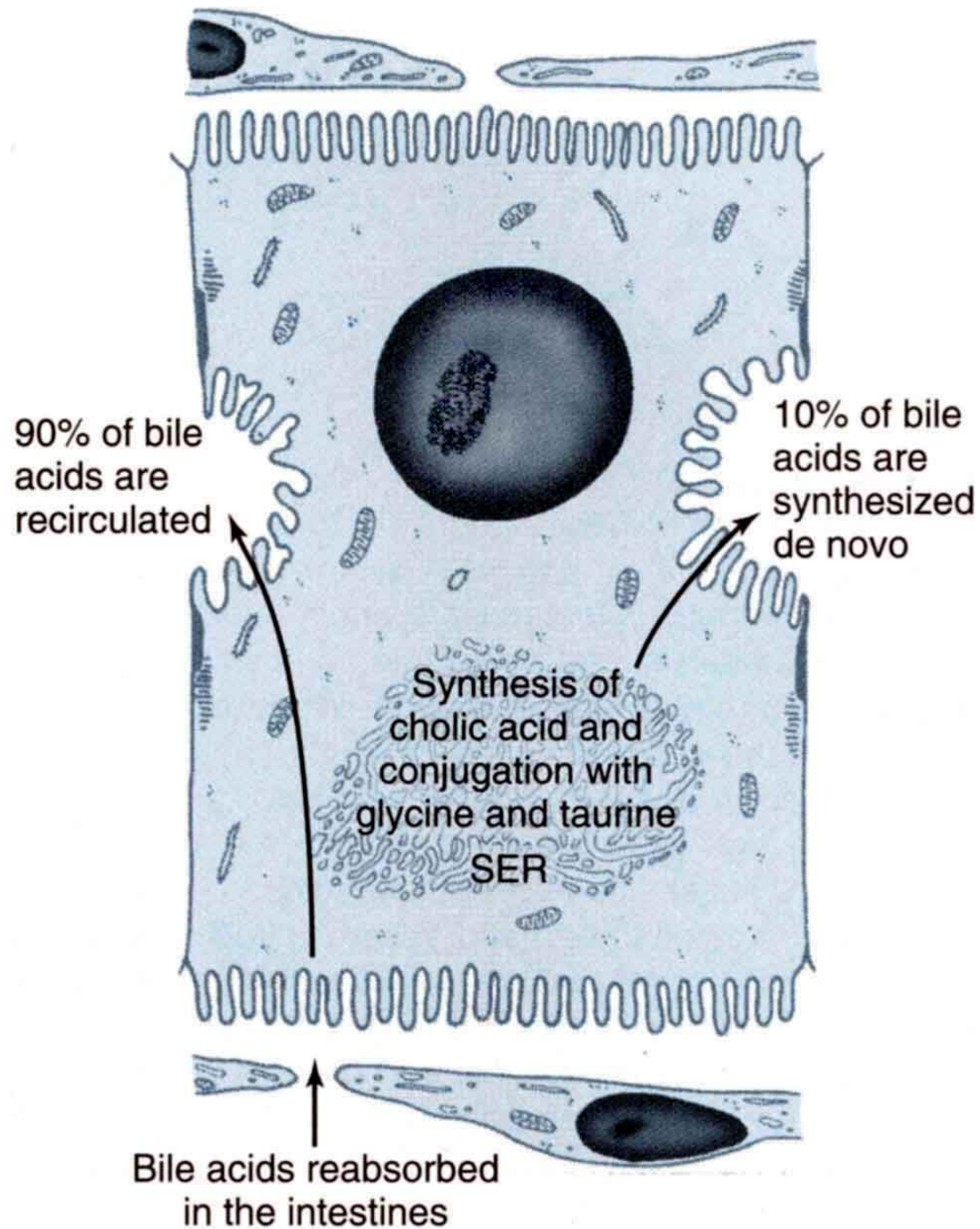


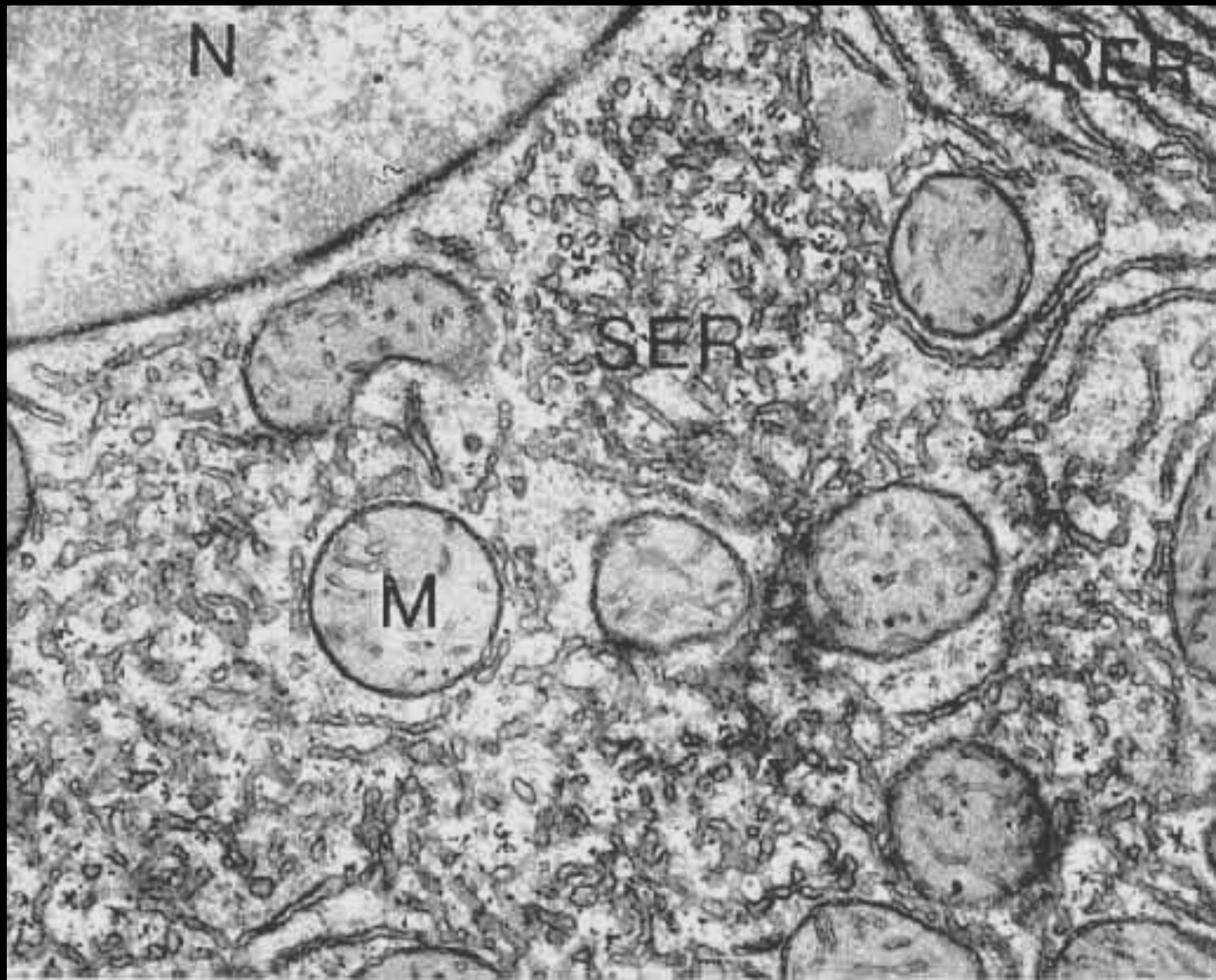


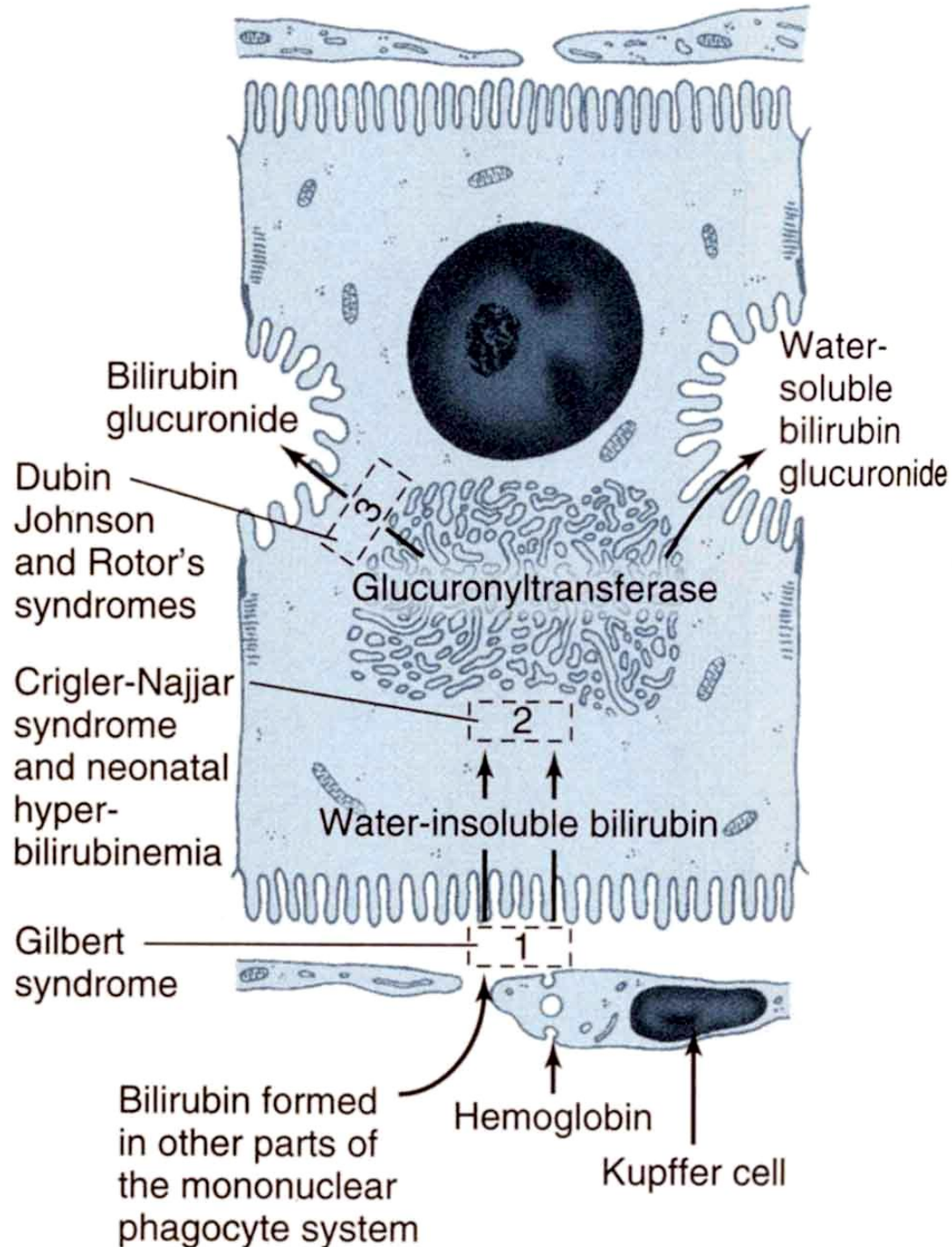


glykogen (Bestův karmín)

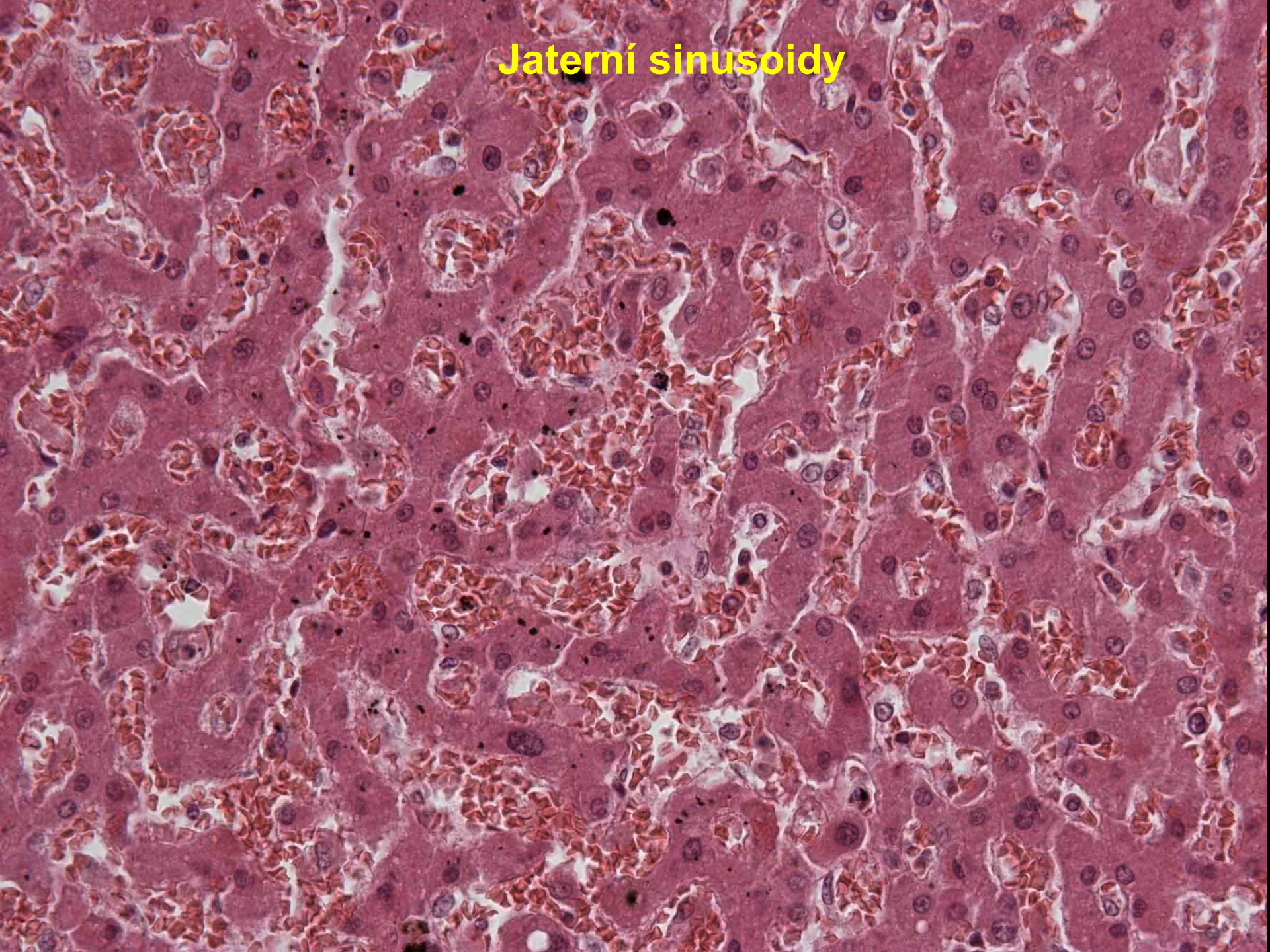


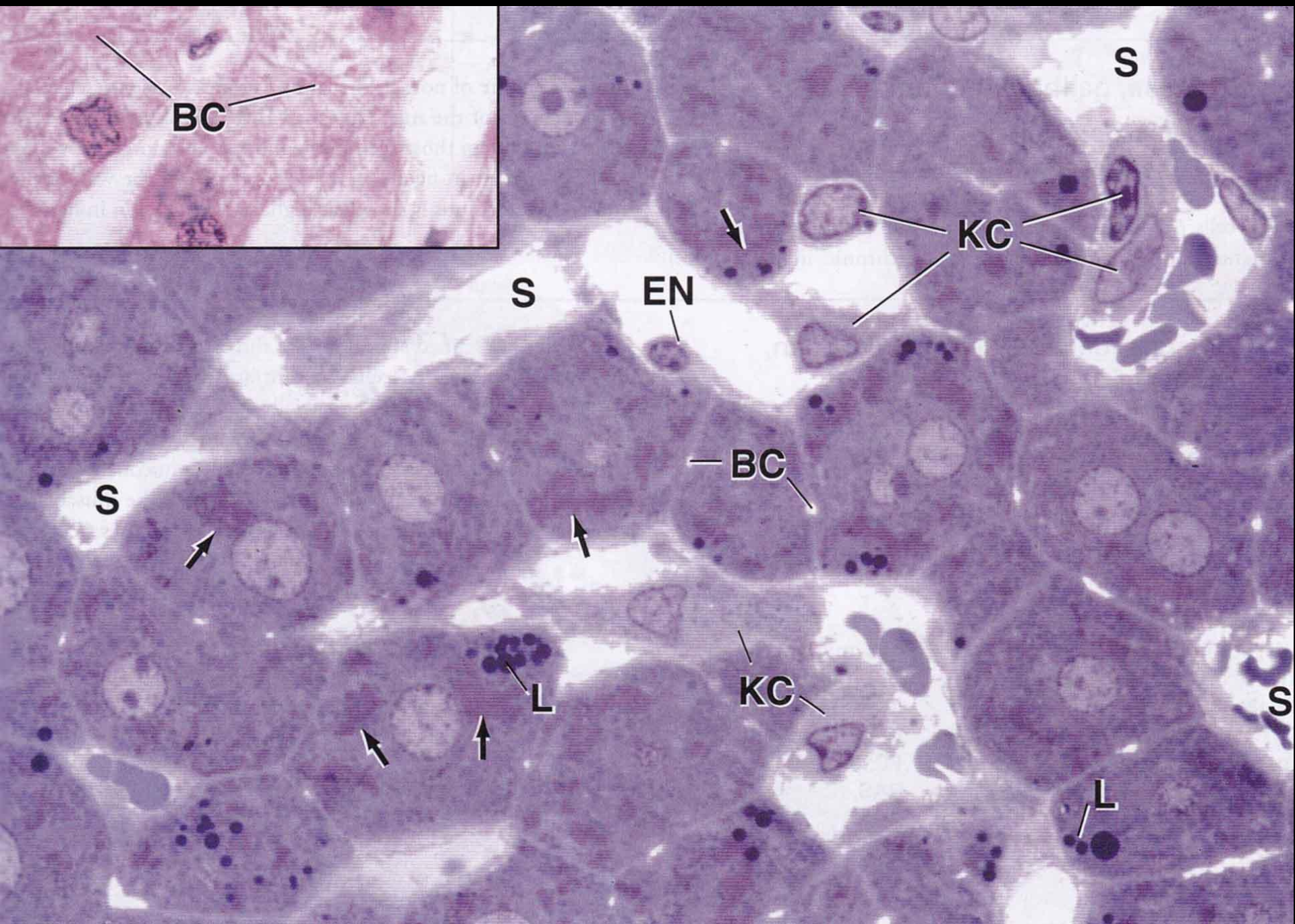
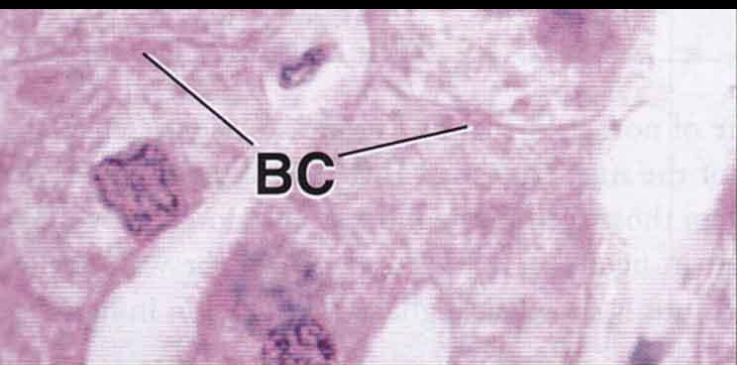


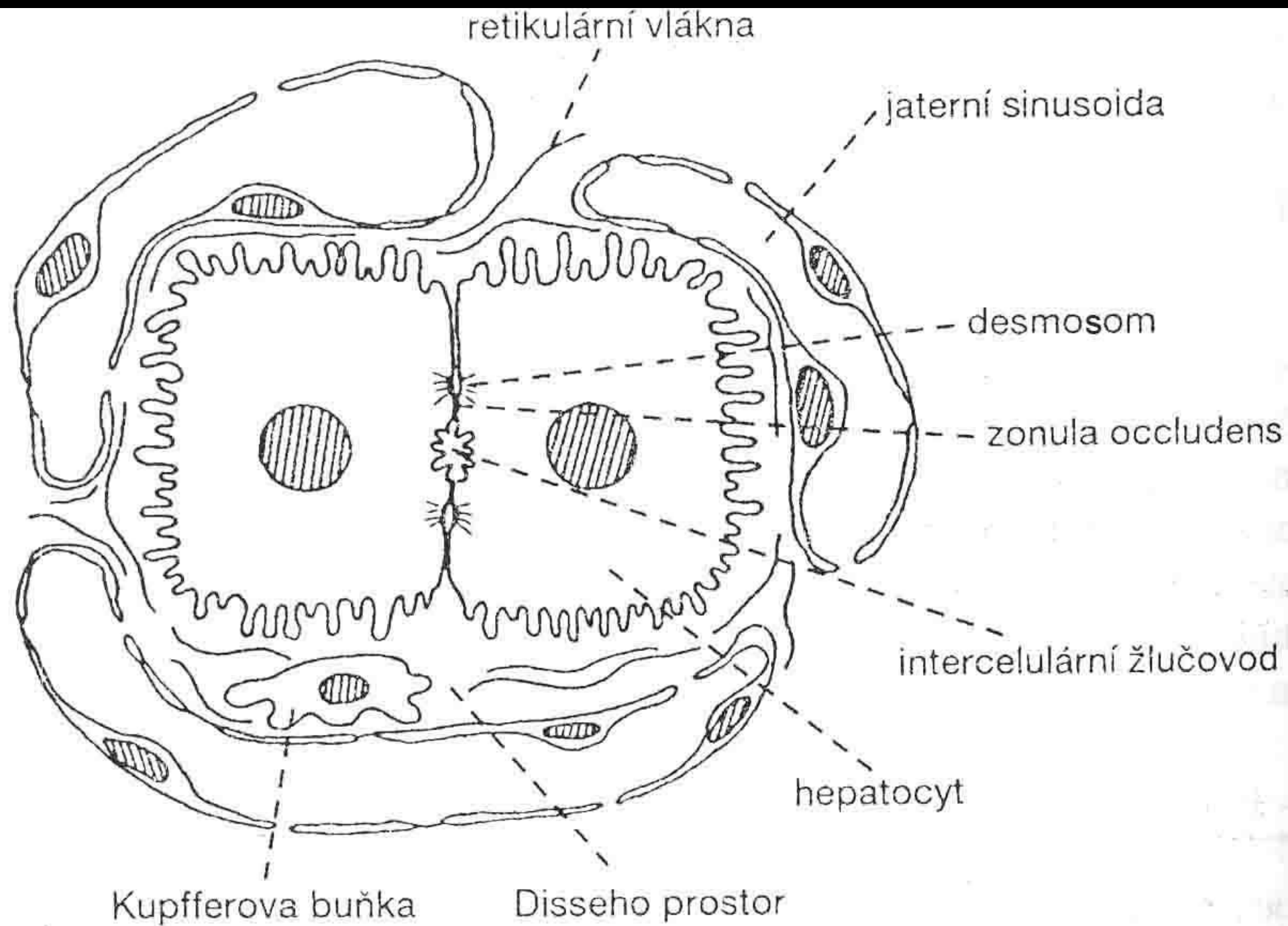


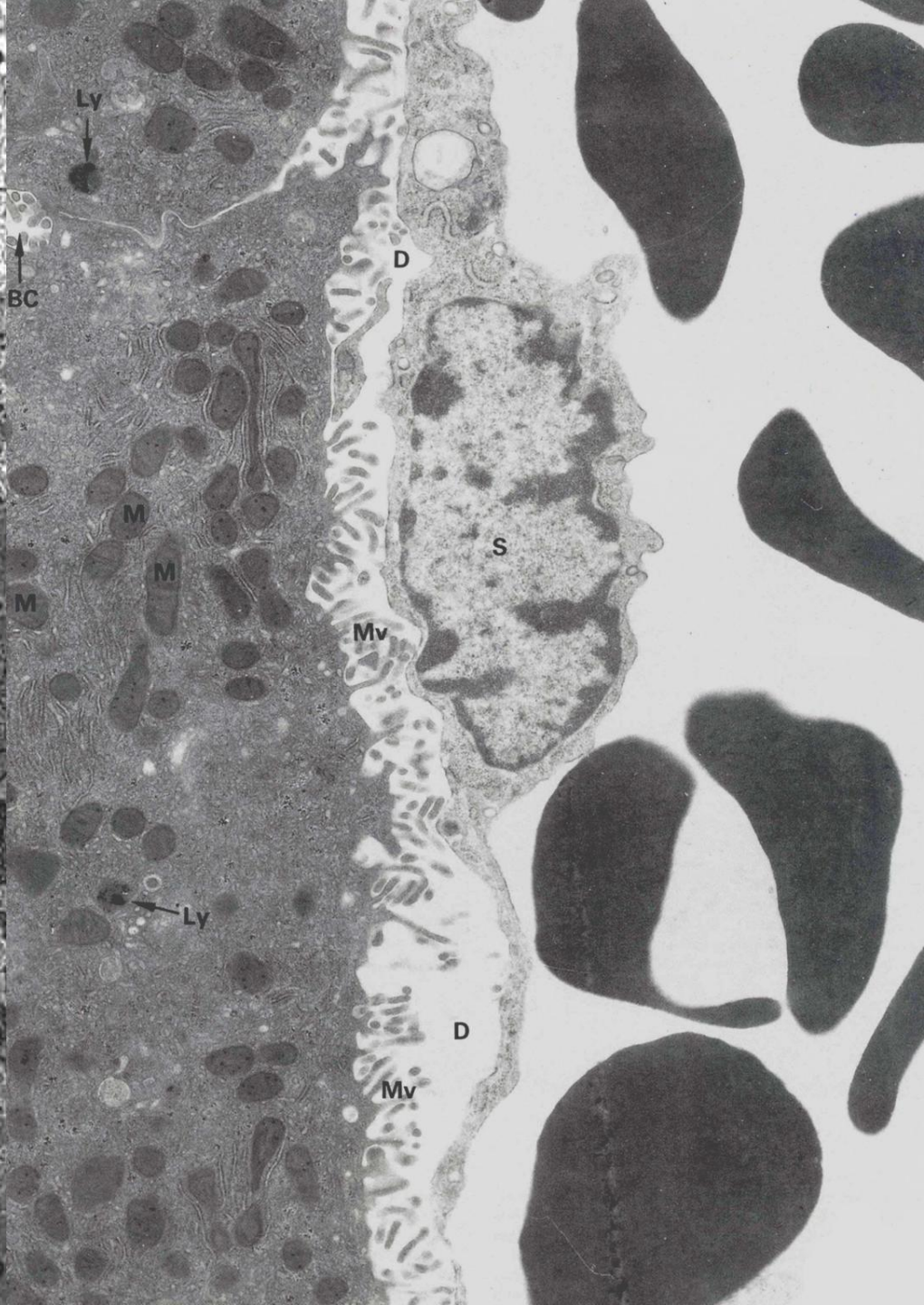


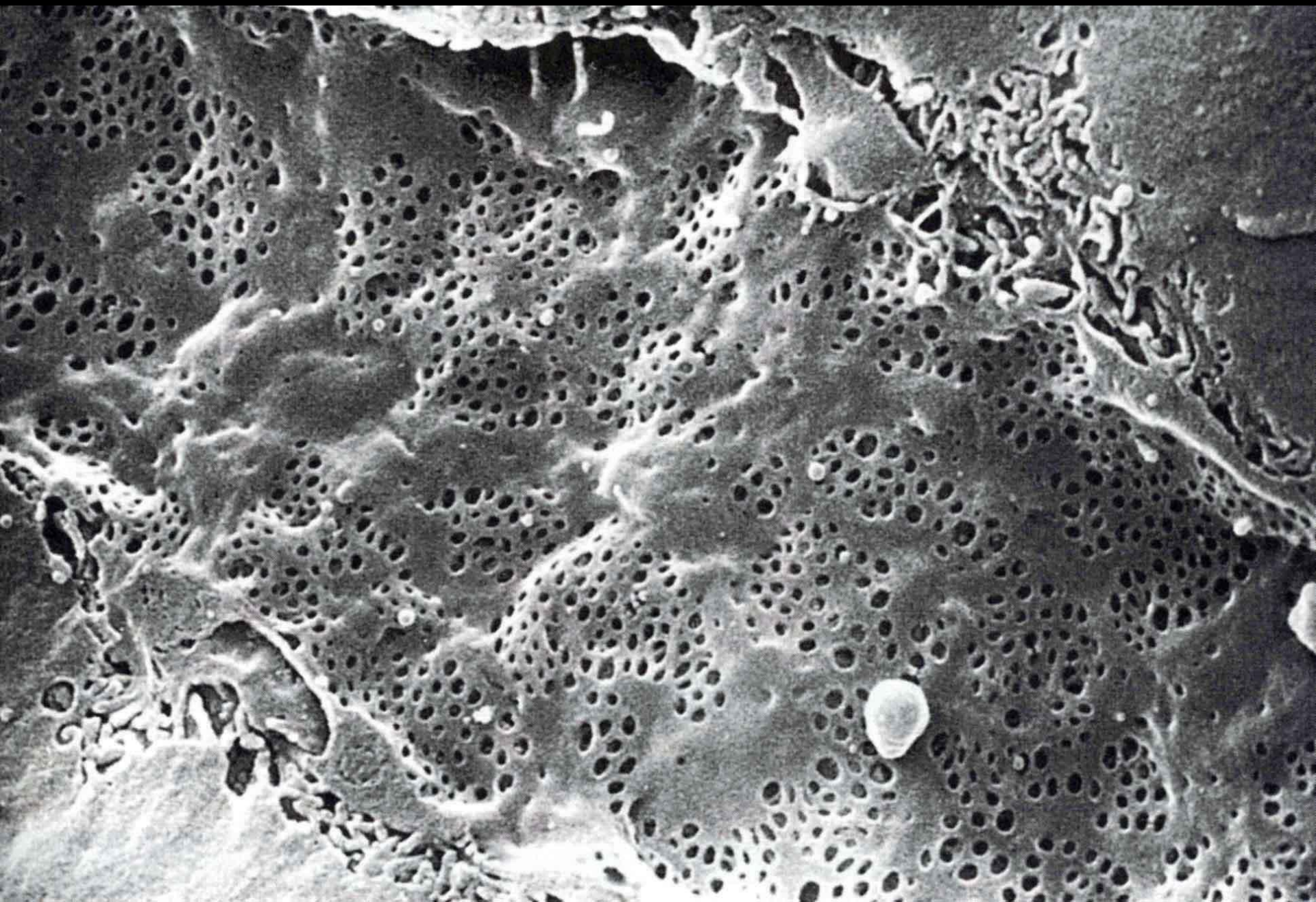
Jaterní sinusoidy



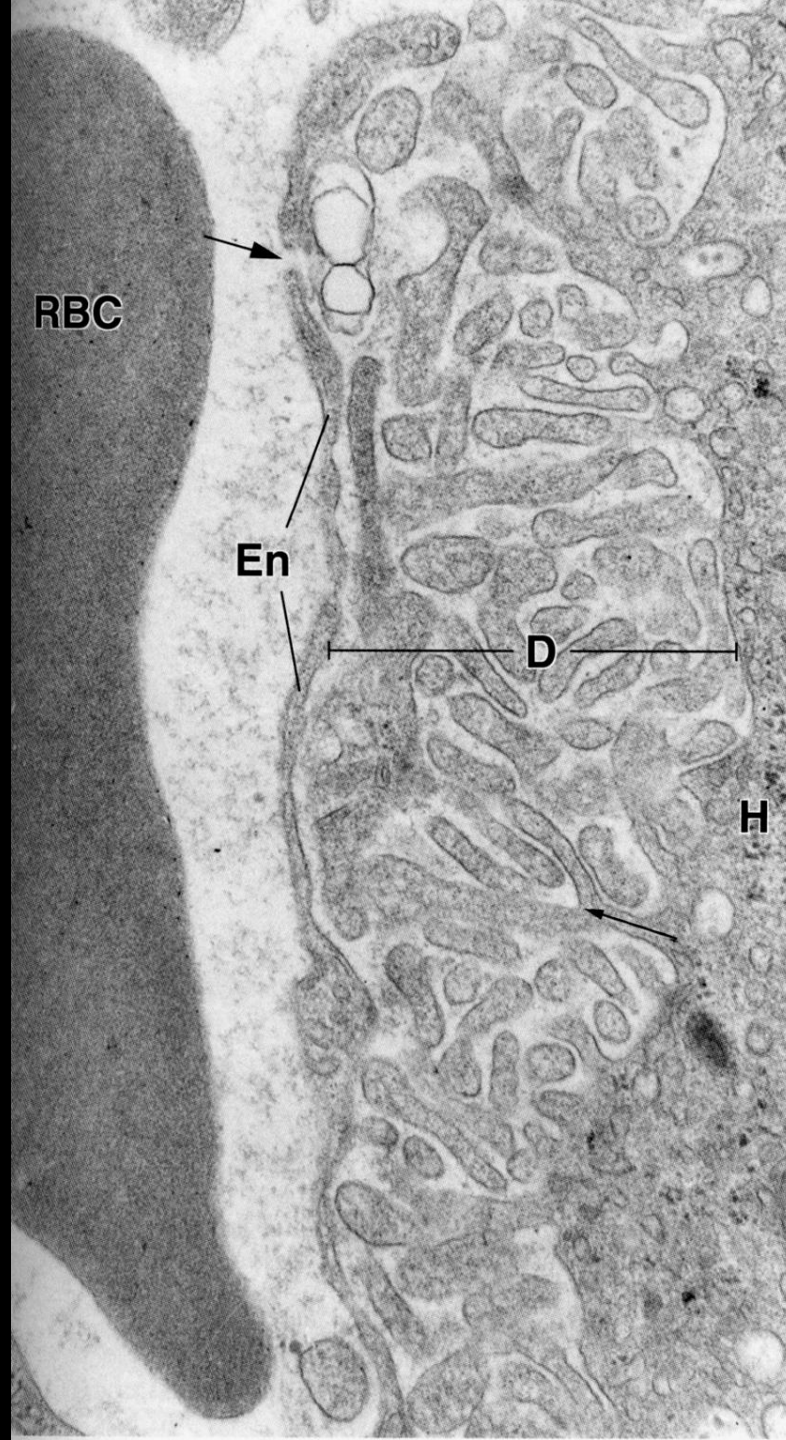




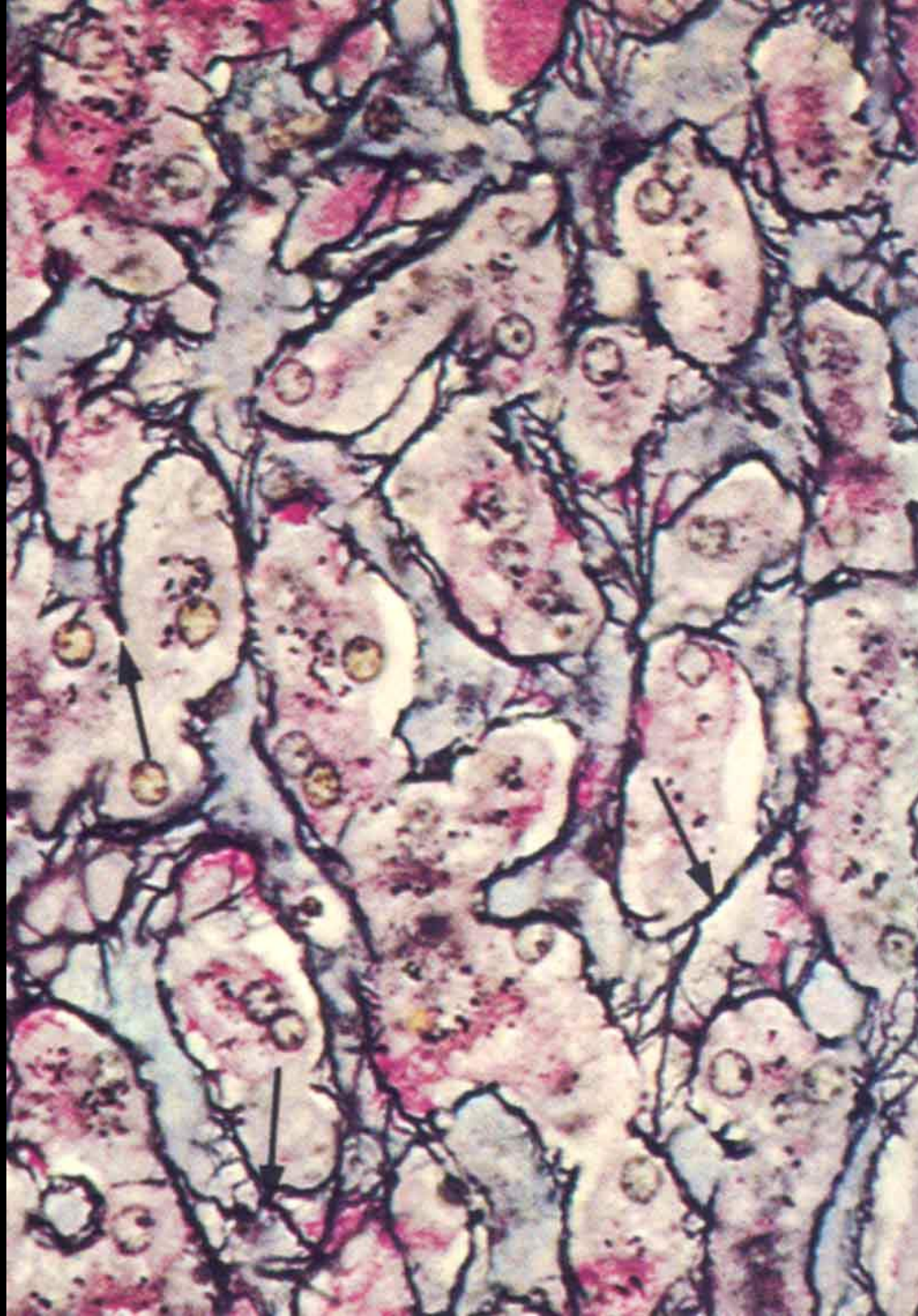




Disseho prostor

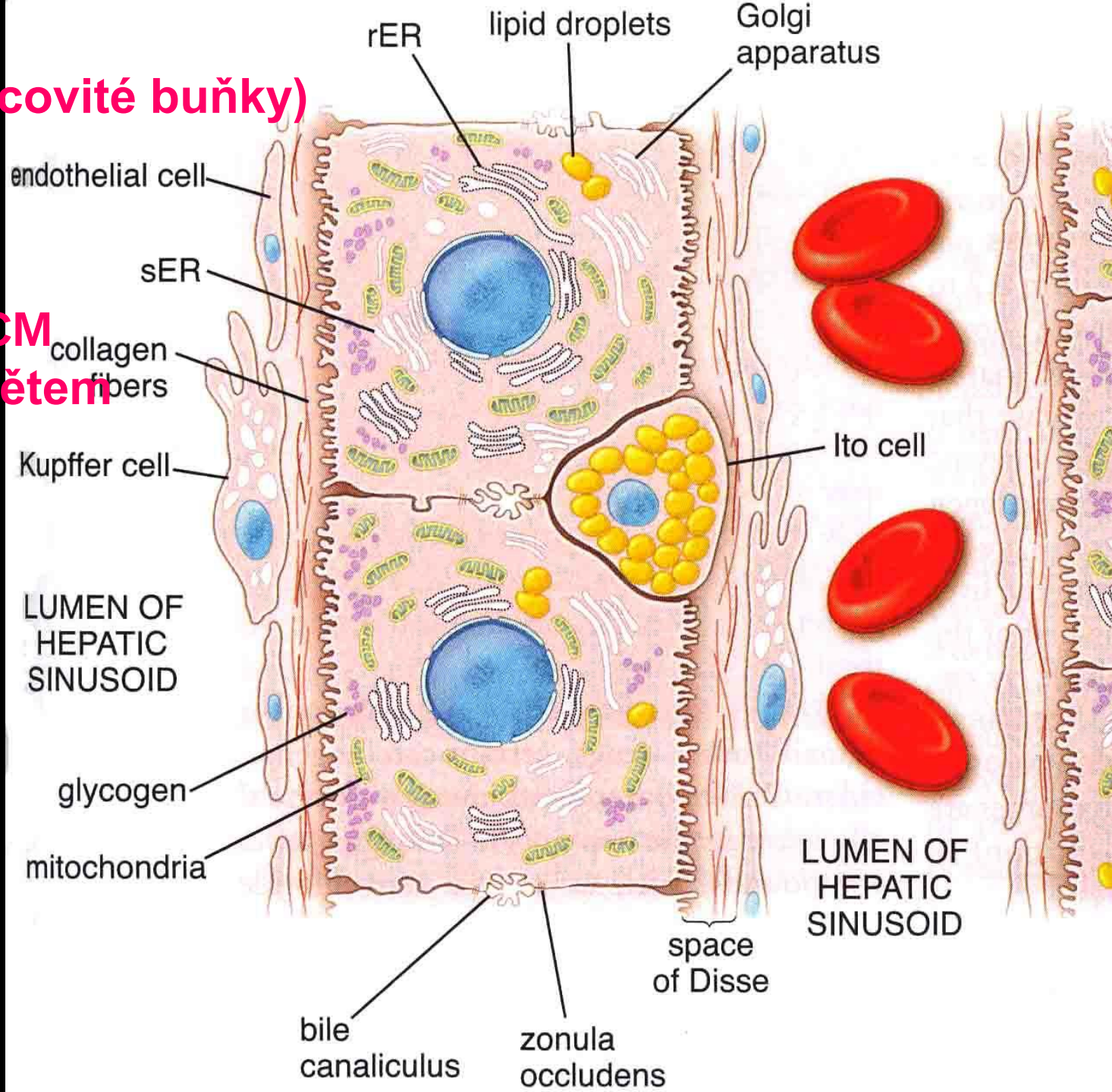


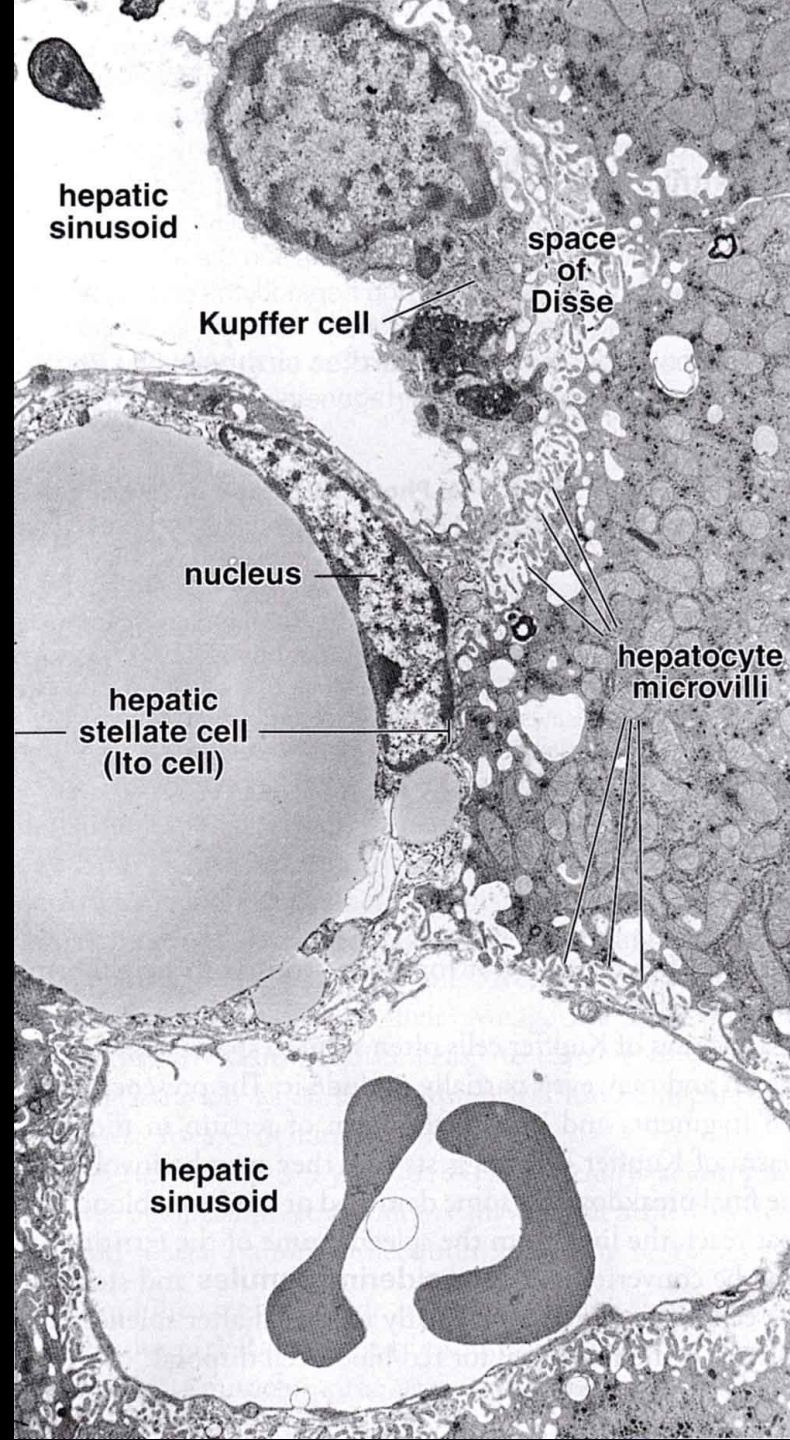
**impregnace
retikulárních
vláken**



Itovy buňky (jaterní hvězdčkovité buňky)

- vitamin A
- lipidy
- kontraktilita
- produkce ECM
- aktivace zánětem





Kupfferovy buňky

KC

KC

S

*

*

*

EN

CV

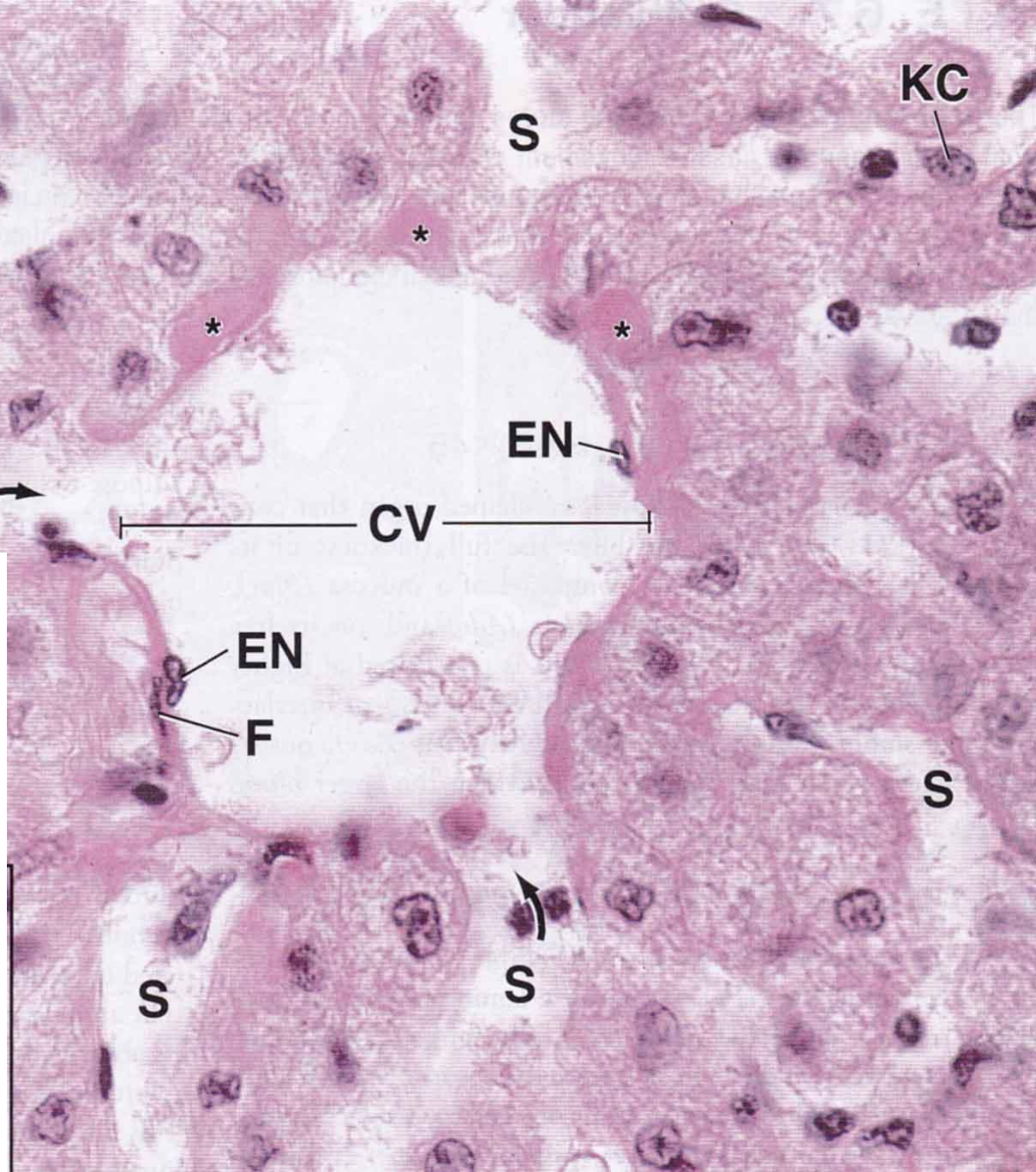
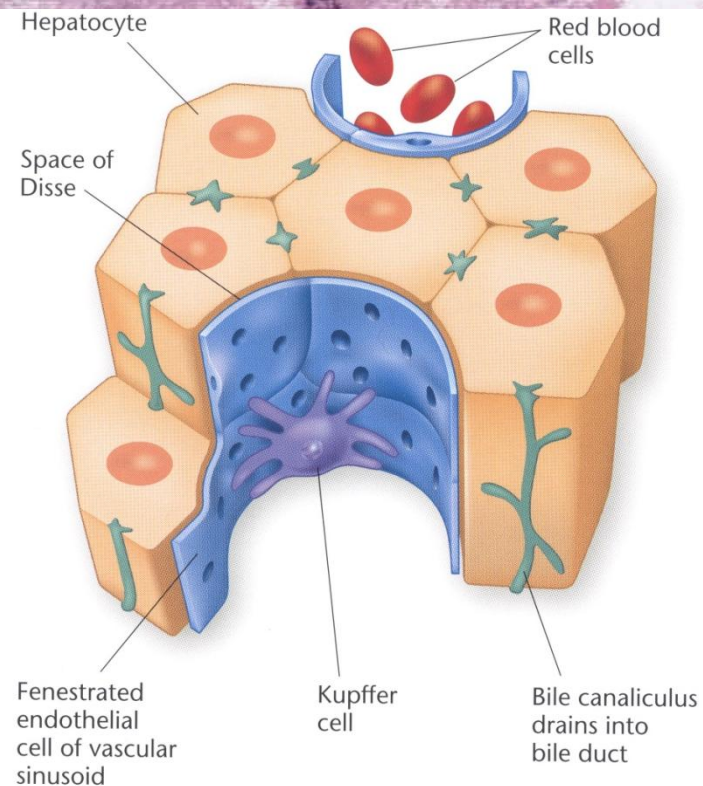
EN

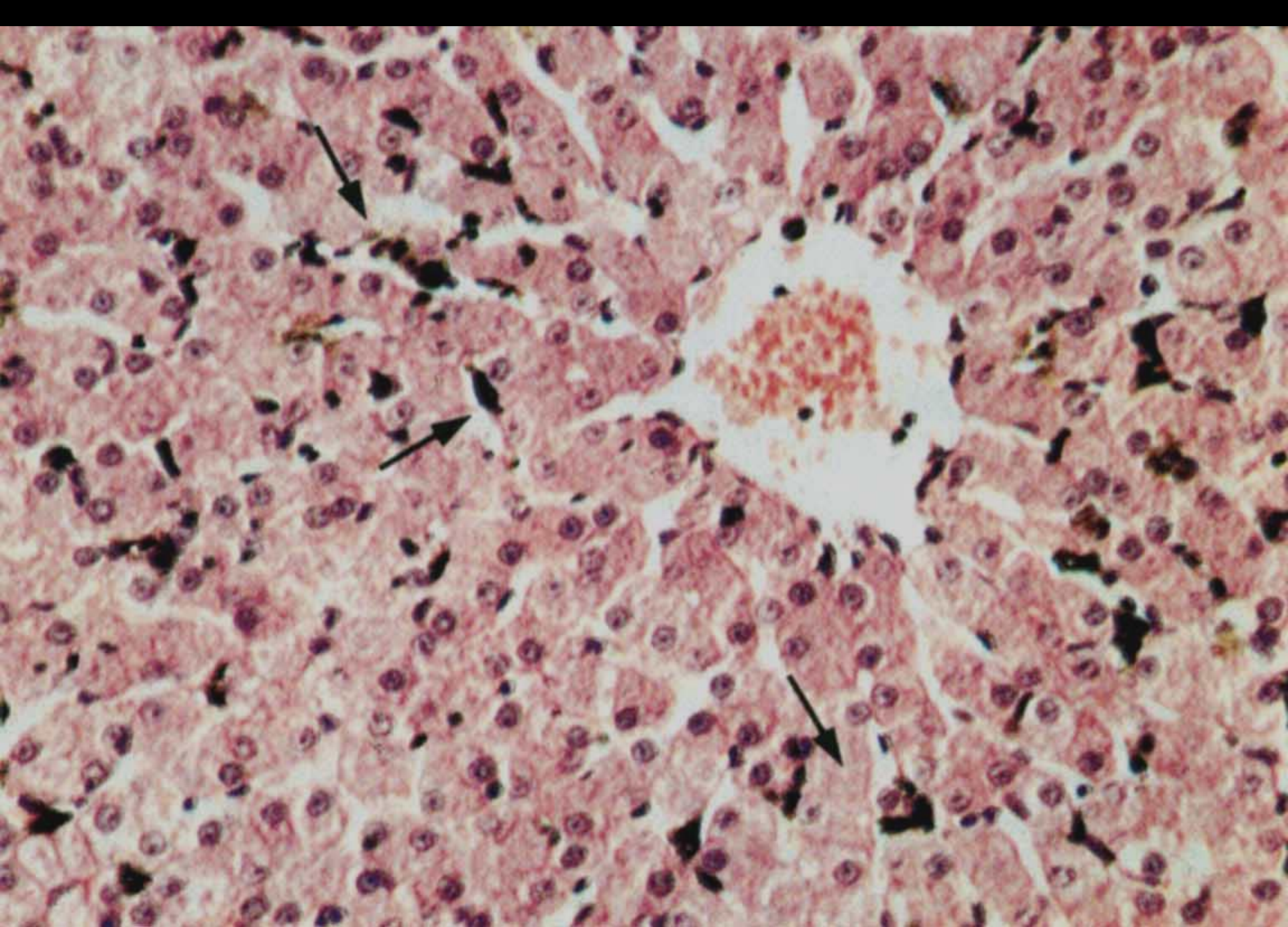
F

S

S

S





Játra – funkce

- syntéza proteinů (kontinuálně uvolňovány do krve)
 - albumin, fibrinogen, protrombin, transferrin, lipoproteiny,...
- sekrece žluči
 - voda, ionty, žlučové kyseliny, fosfolipidy, cholesterol, bilirubin
- metabolické funkce
 - střádání metabolitů: triacylglyceroly, glykogen, vitamín A
 - glukoneogeneze, glykogenolýza, deaminace AK
 - detoxikace: oxidace, metylace, konjugace
- tvorba tepla
- krvetvorba – za vývoje

Žlučové cesty, žlučník

Nitrožaterní (intrahepatální) žlučové cesty

intercelulární žlučovody (*canaliculi biliferi*,
žlučové vlásečnice)

- nemají vlastní stěnu (průsvit 0,5 µm)

→ intralobulární žlučovody (Heringovy
kanálky; *canales (ductuli) biliferi*)

- stěnu tvoří hepatocyty a cholangiocyty

→ interlobulární žlučovody (*ductus biliferi
interlobulares*) – v portální triádě

- cholangiocyty, zvenku vazivová pochva

→ **ductus hepaticus dx. et sin.**

Bile canaliculi

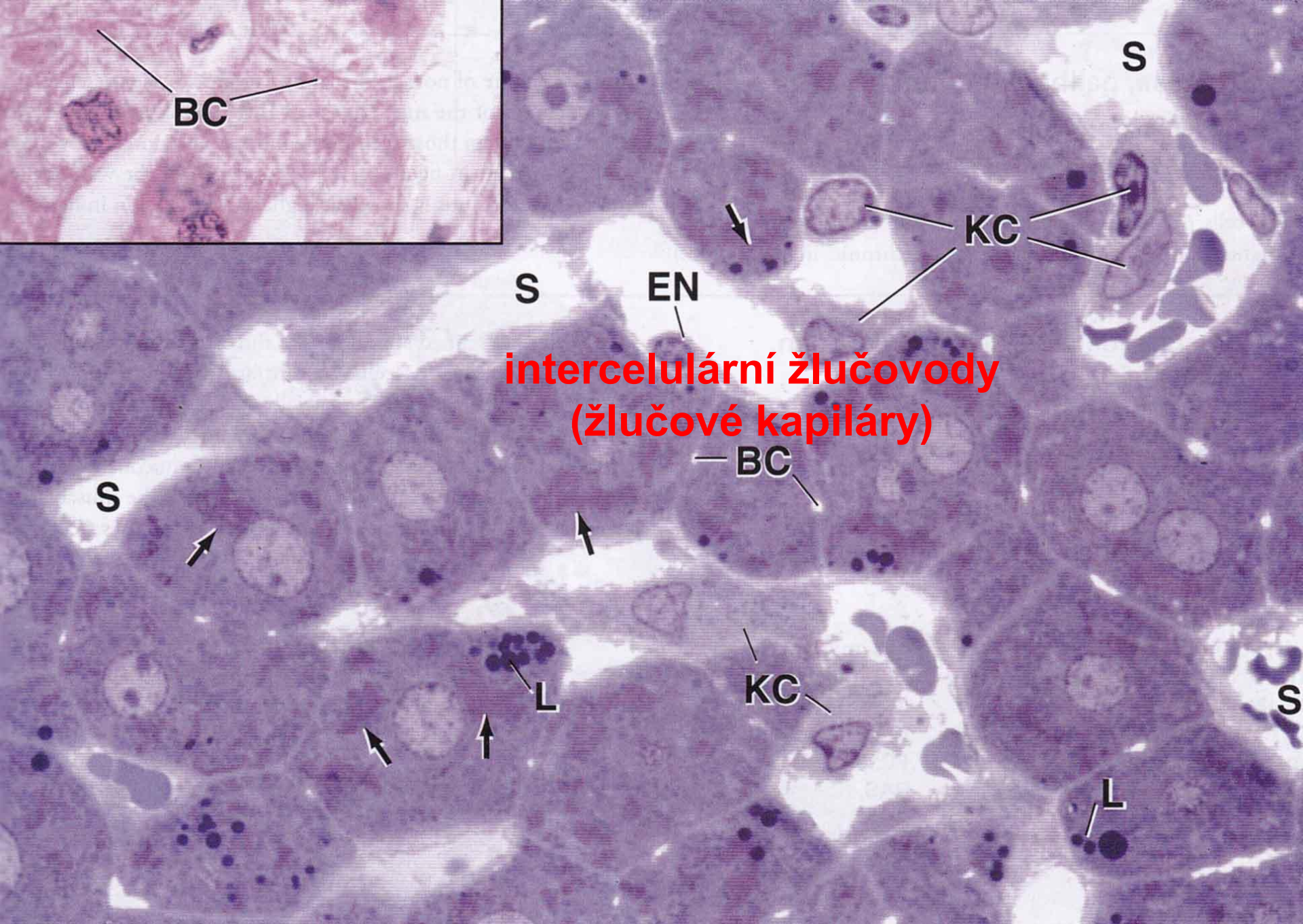
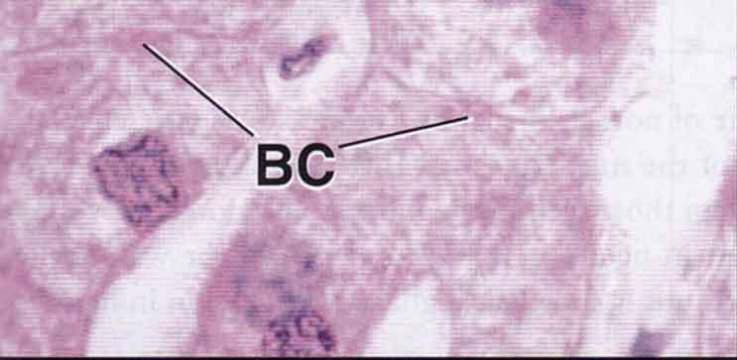


Bile ductule

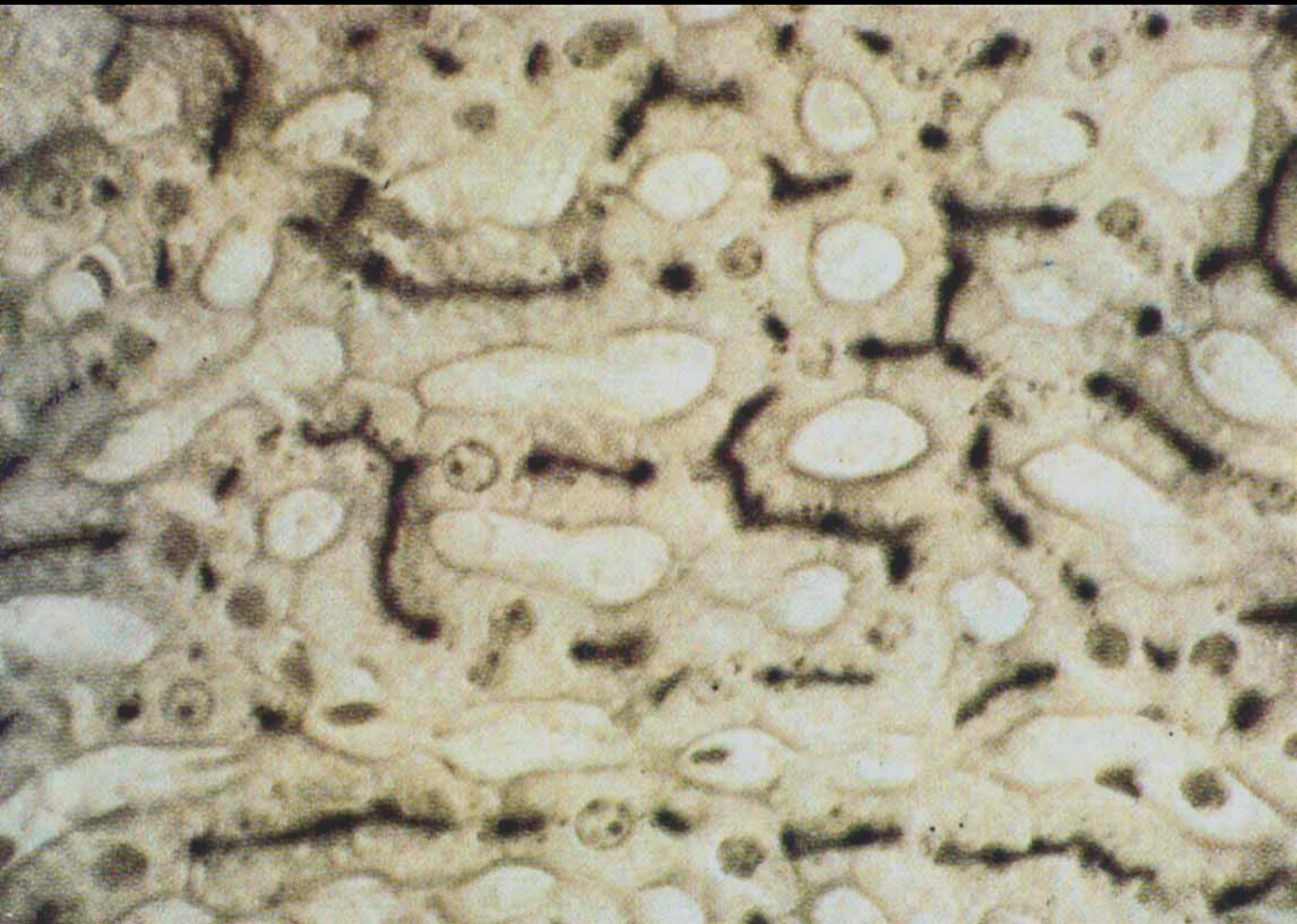
Hepatocytes

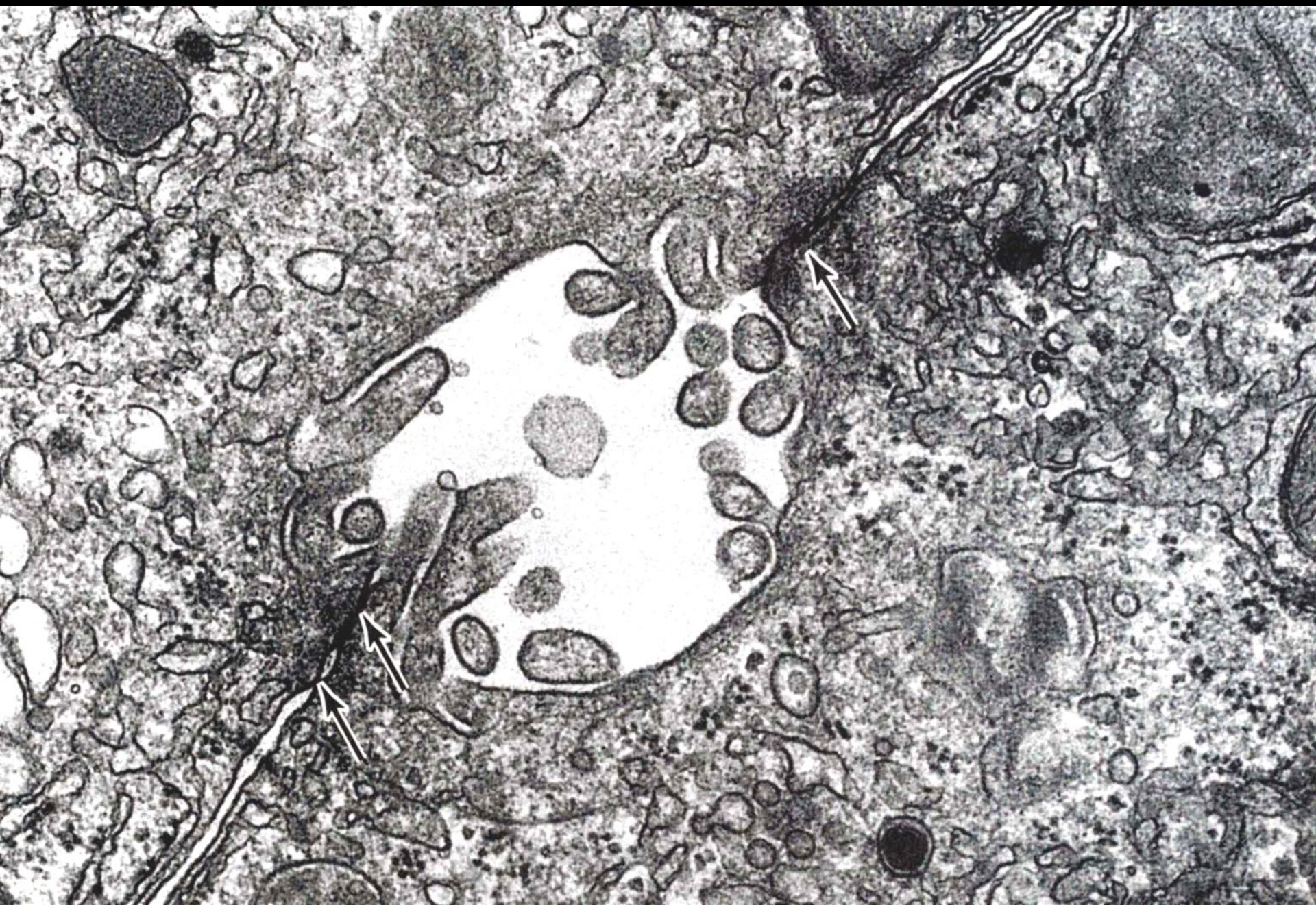
Bile canals
of Hering

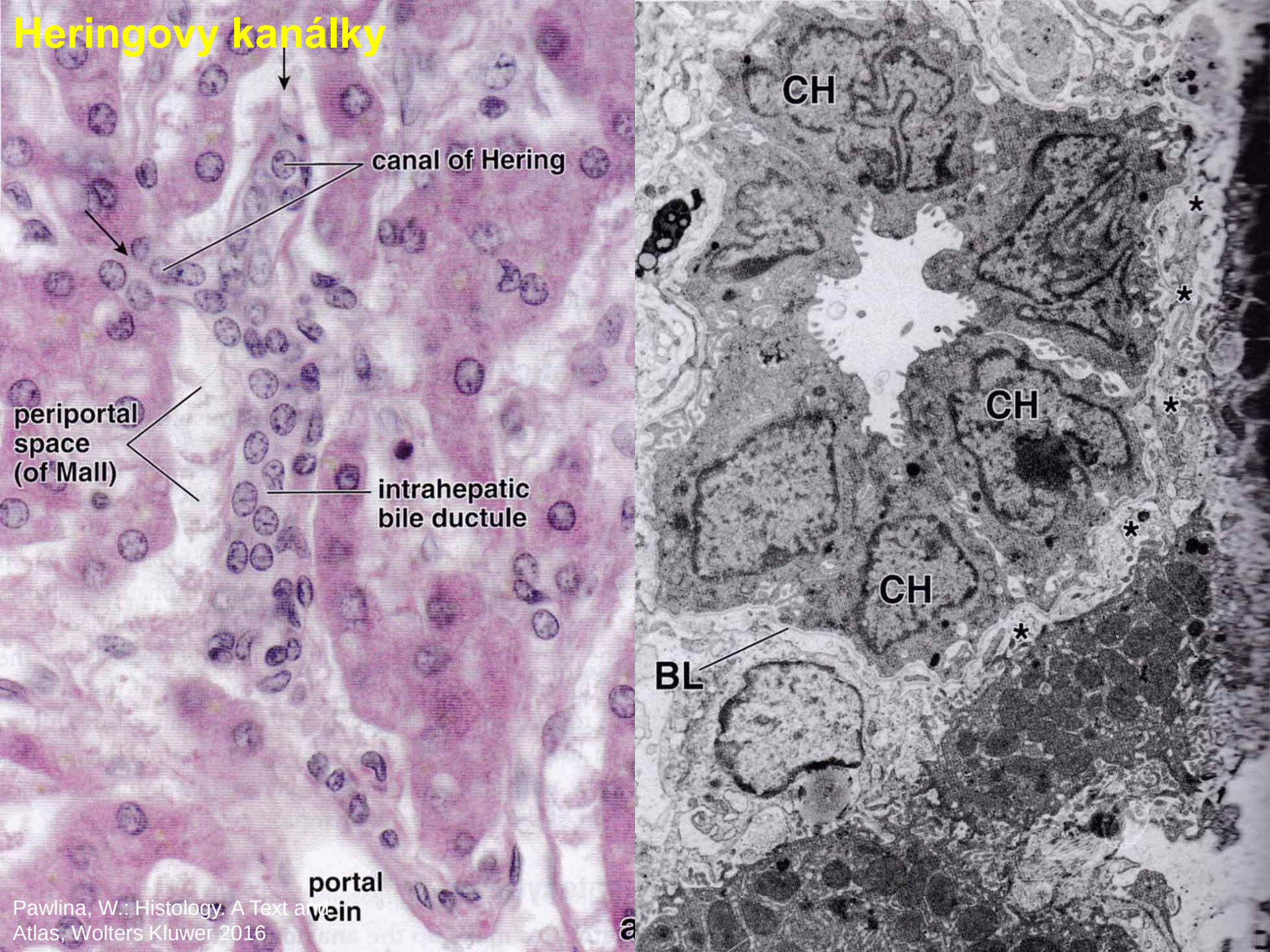
Cholangiocytes



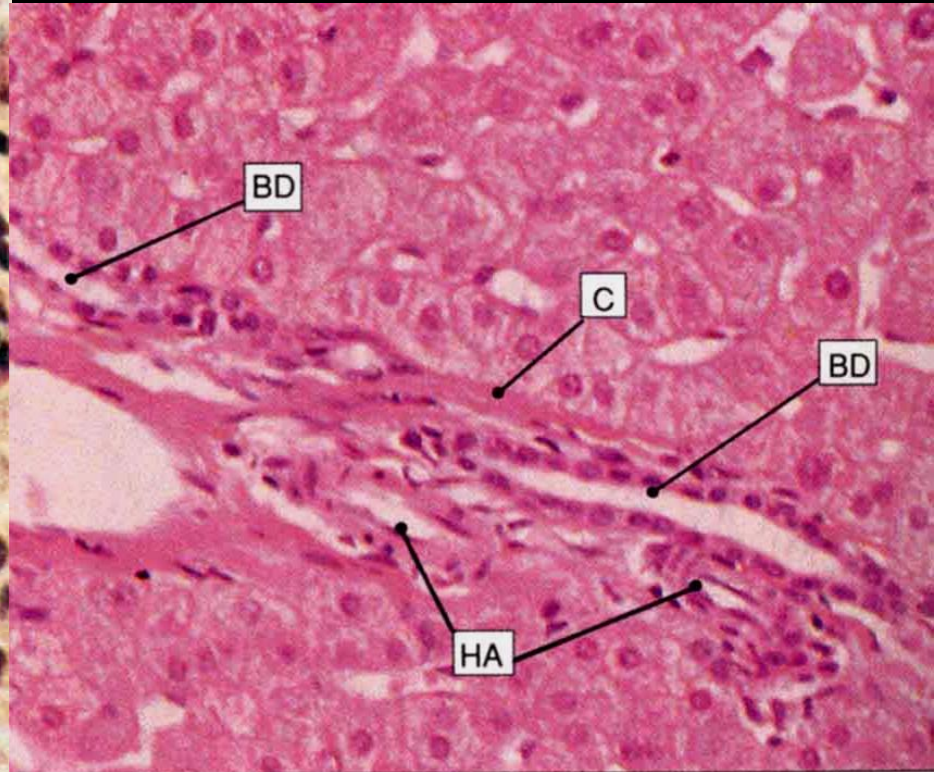
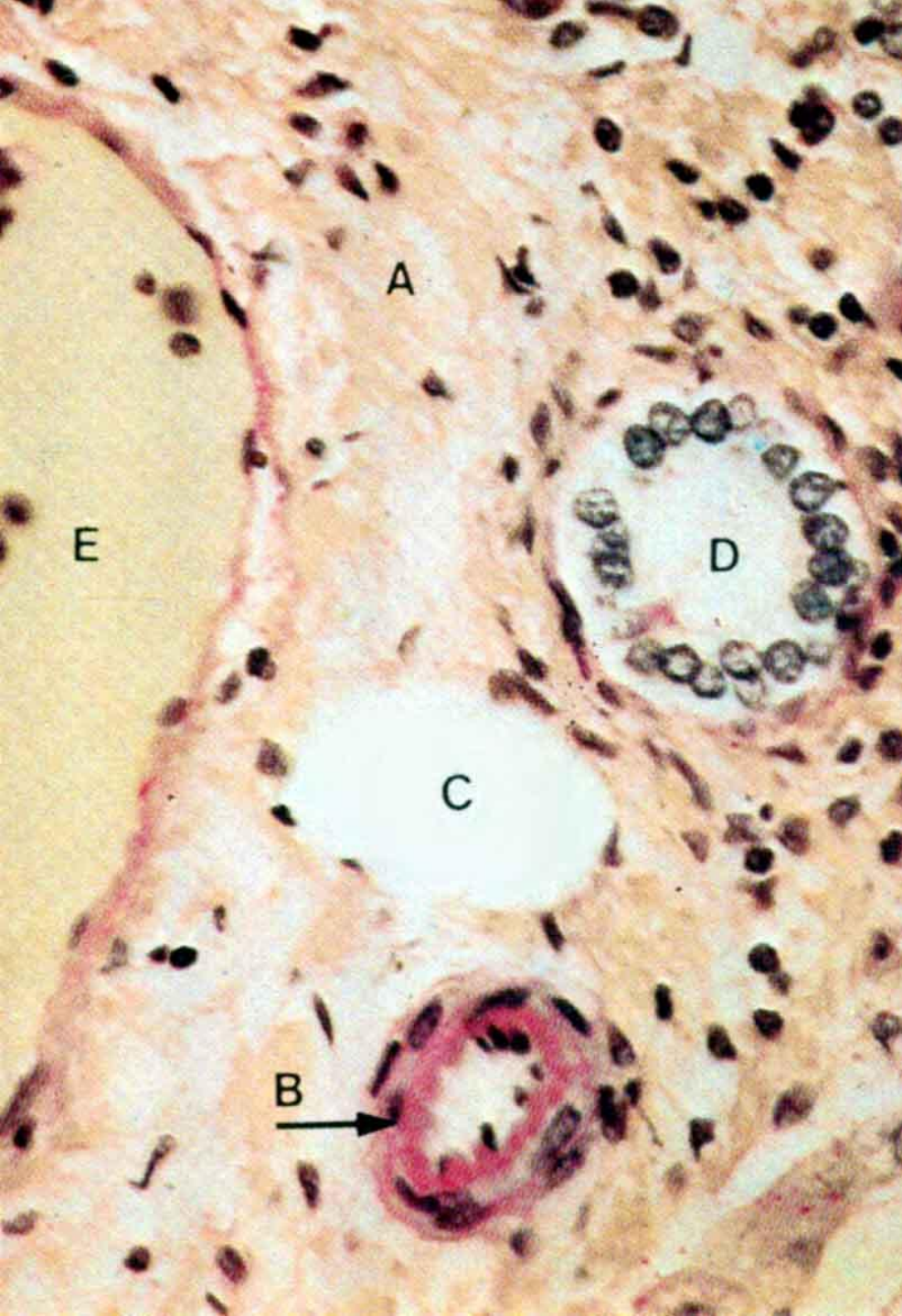
průkaz alkalické fosfatázy







Interlobulární žlučovody



větší intrahepatální žlučovod



Mimojaterní (extrahepatální) žlučové cesty

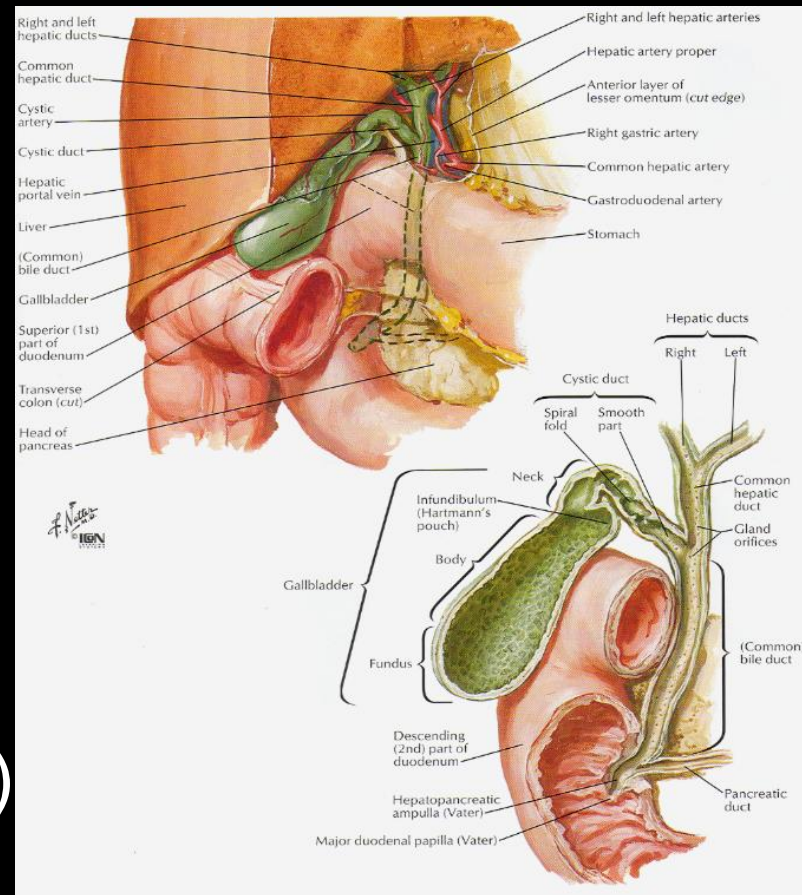
nitrojaterní žlučové cesty

→ ductus hepaticus dx. et sin.
(přibírají vývod z lobus caudatus)

→ ductus hepaticus communis

po spojení s ductus cysticus → ductus choledochus (m.
sphincter ductus choledochi)

→ ampulla hepatopancreatica (m. sphincter ampullae
Oddi) → dvanáctník (na papilla duodeni major *Vateri*)

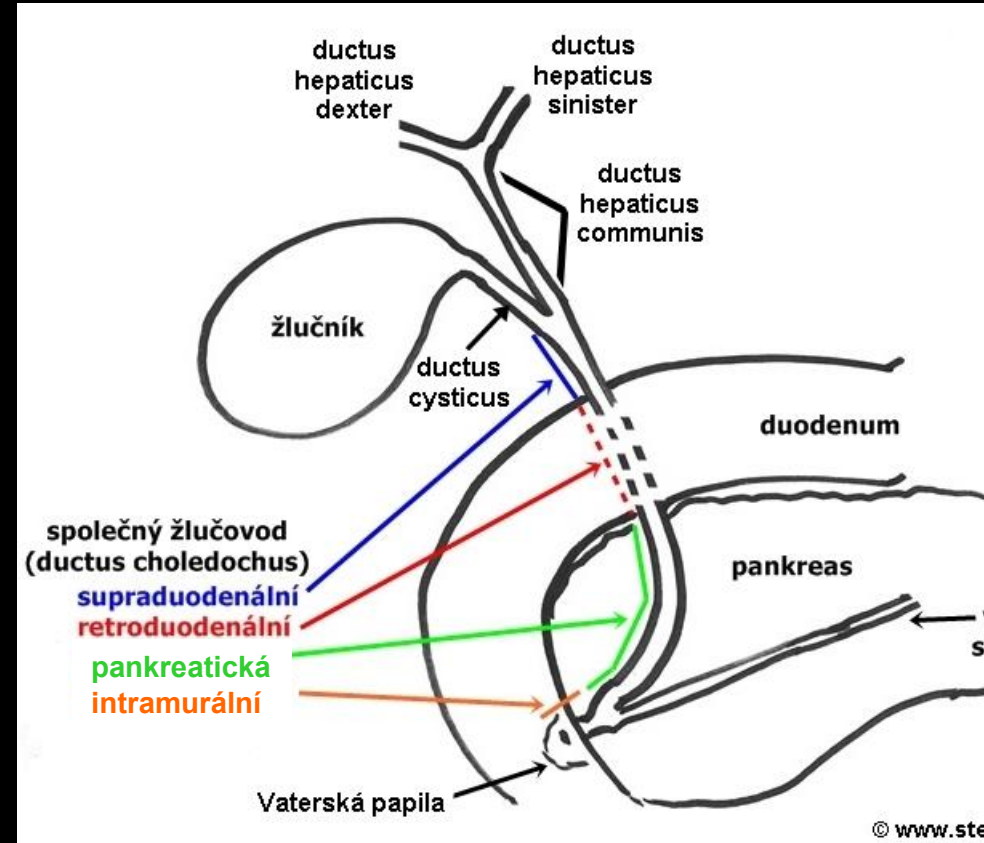


Mimojaterní žlučové cesty – stavba

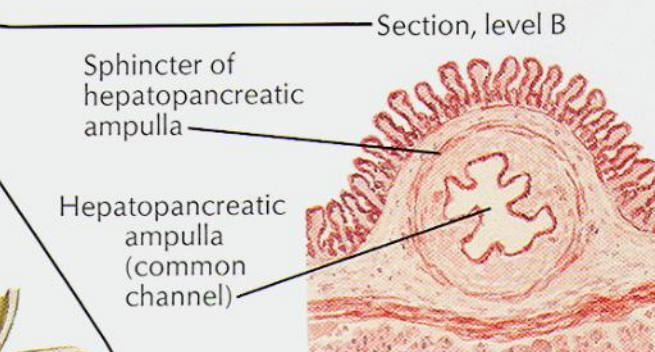
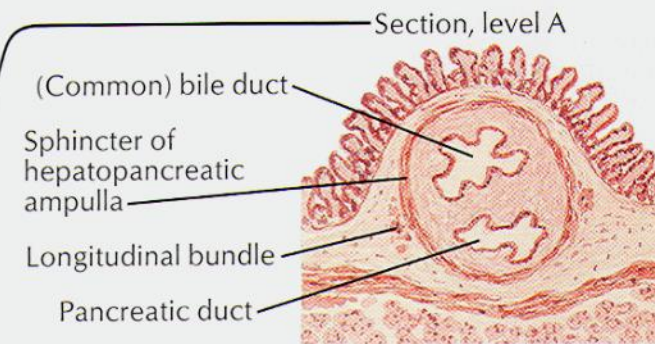
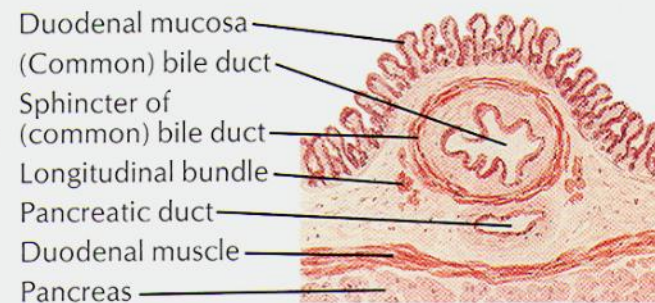
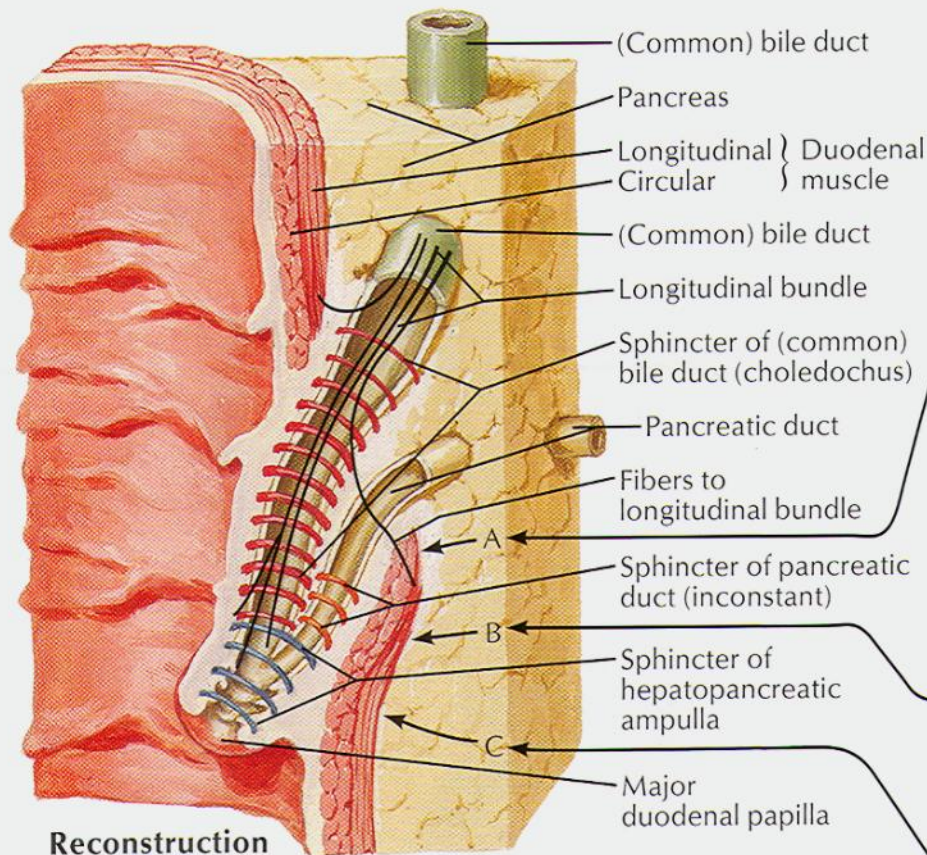
- jednovrstevný cylindrický epitel
 - cholangiocyty
 - roztroušené pohárkové buňky
- glandulae ductus choledochi – mucinózní
- stěna tvořena zejména vazivem
- chybí spojitá vrstva svaloviny
- *tenká stěna snadno utlačitelná zvenku → žloutenka (ikterus)*

Ductus choledochus – žlučovod

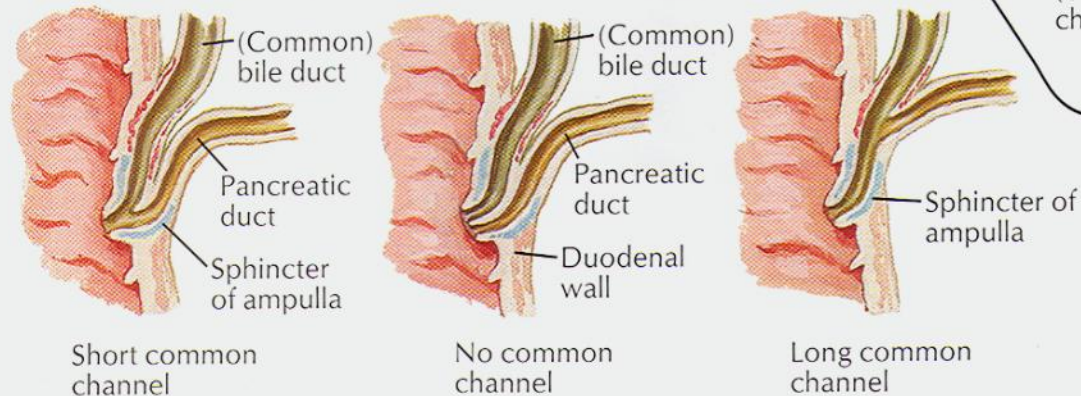
- 6–9 cm dlouhý
- 8–9 mm široký
- pars supraduodenalis
- pars retroduodenalis
- pars pancreatica
- pars intramuralis
- ampulla
hepatopancreatica (77 %)



Žluč = fel, bilis, cholé



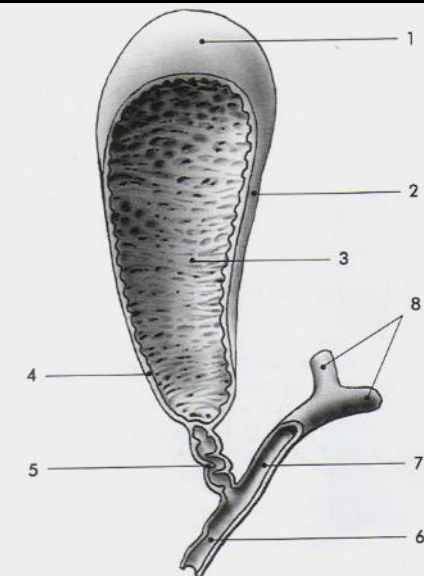
Variations in union of bile and pancreatic ducts



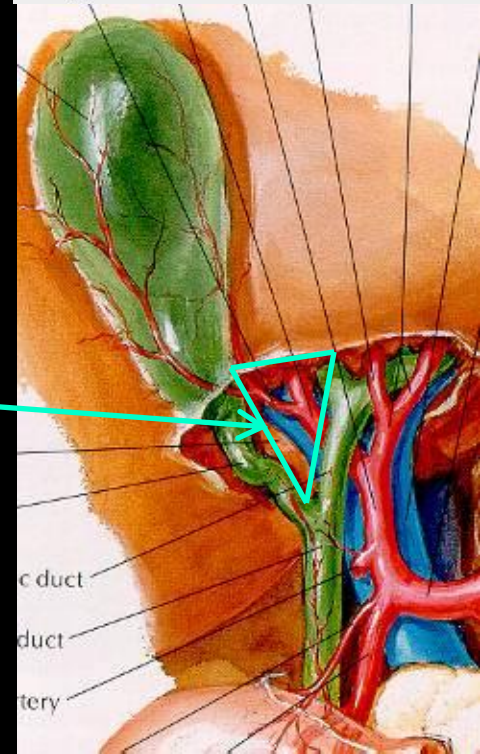
Vesica biliaris / fellea

Žlučník

- 7-10 cm, objem 30-50 ml
- fundus, corpus, infundibulum (+ Hartmannova výchlipka), collum
- ductus cysticus
 - 2-5 cm dlouhý, 3-5 mm široký
 - plica spiralis *Heisteri*
- trigonum cystohepaticum *Caloti*
- intraperitoneální orgán
 - široce přisedlý k játrům („lůžko žlučníku“)

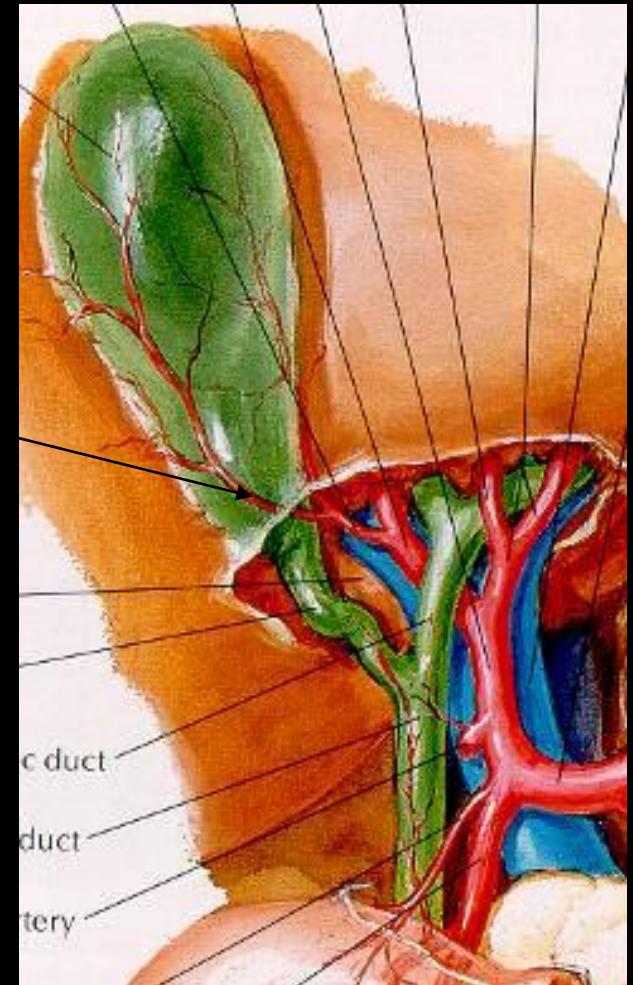


Obr. 5.33. Vesica biliaris a ductus cysticus. 1 – fundus, 2 – corpus, 3 – plicae mucosae, 4 – collum, 5 – ductus cysticus, 6 – ductus choledochus, 7 – ductus hepaticus communis, 8 – ductus hepaticus dx. et sin.



Žlučník – zásobení

- tepny: truncus coeliacus
→ a. hepatica communis
→ a. hepatica propria →
r. dx. → **a. cystica**
– **podvaz v trigonum
cystohepaticum *Caloti***
- žíly odpovídají tepnám
→ v. portae
- míza: n.l. hepatici



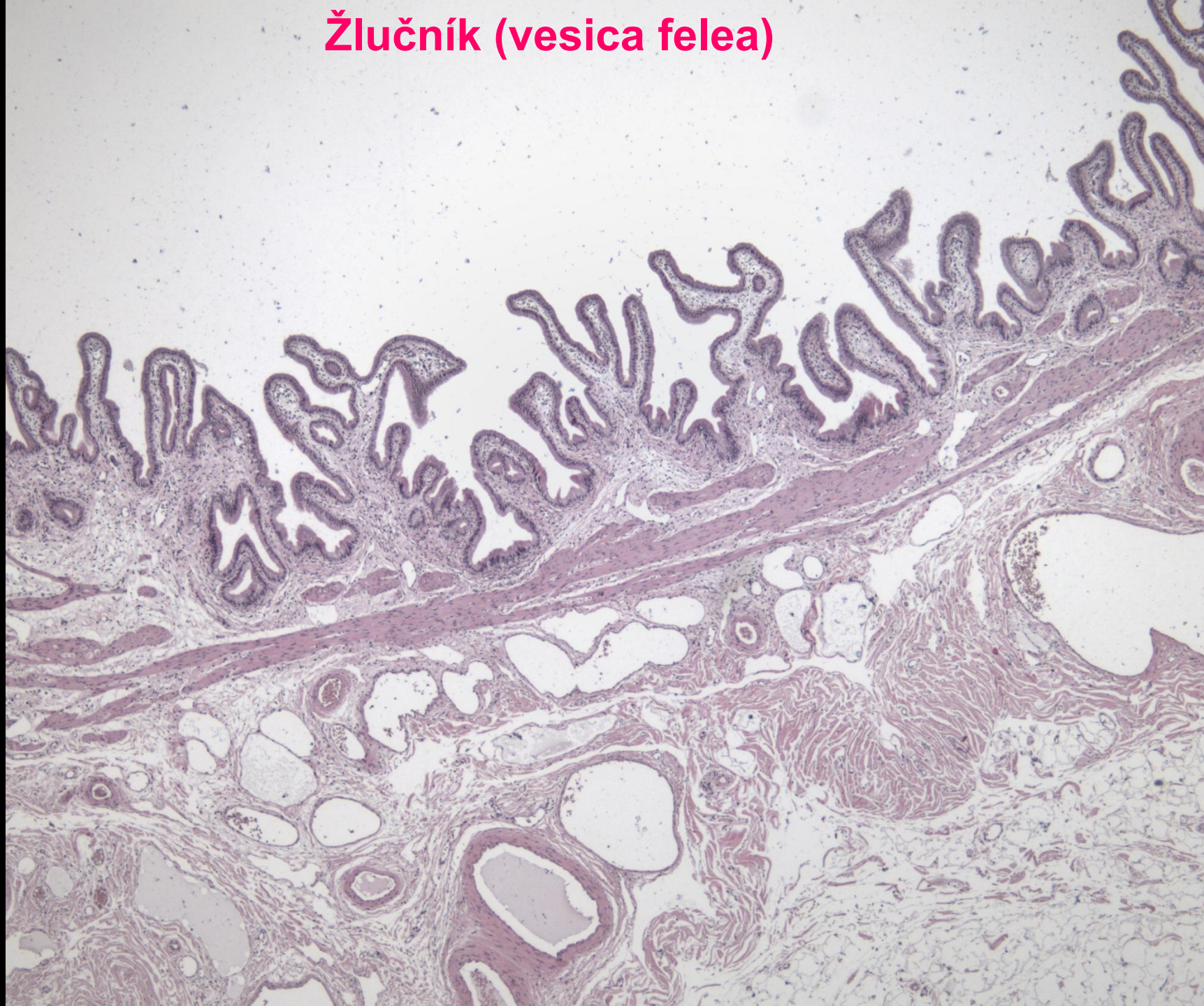
Žlučník – *stavba*

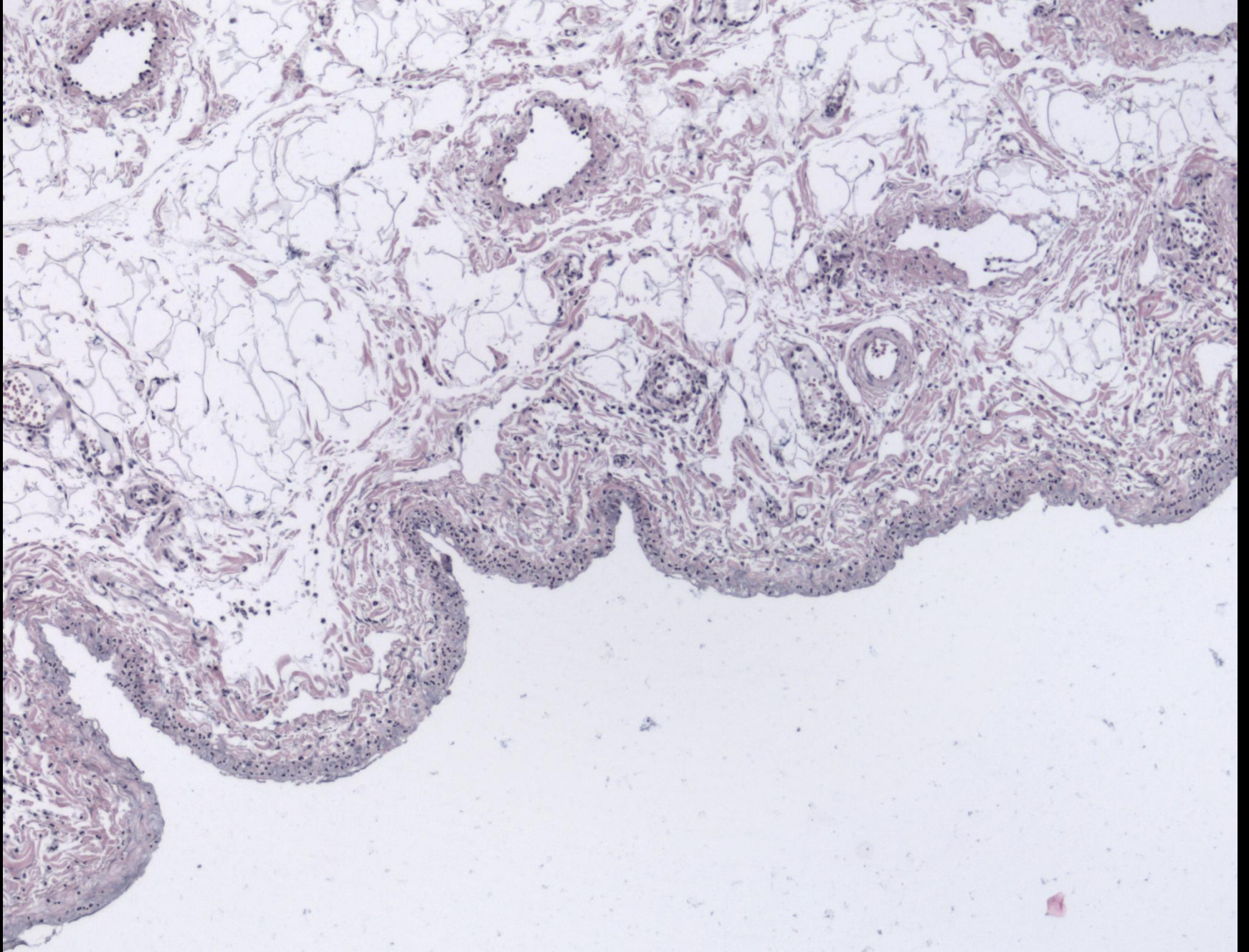
- tunica mucosa
 - jednovrstevný cylindrický epitel s mikrokly
 - tvoří četné řasy
 - chybí lamina muscularis mucosae
 - v krčku tubulózní žlázy → hlen
 - vchlípeniny sliznice až do svaloviny = Aschoffovy-Rokitanského sinusy
- *chybí tela submucosa*

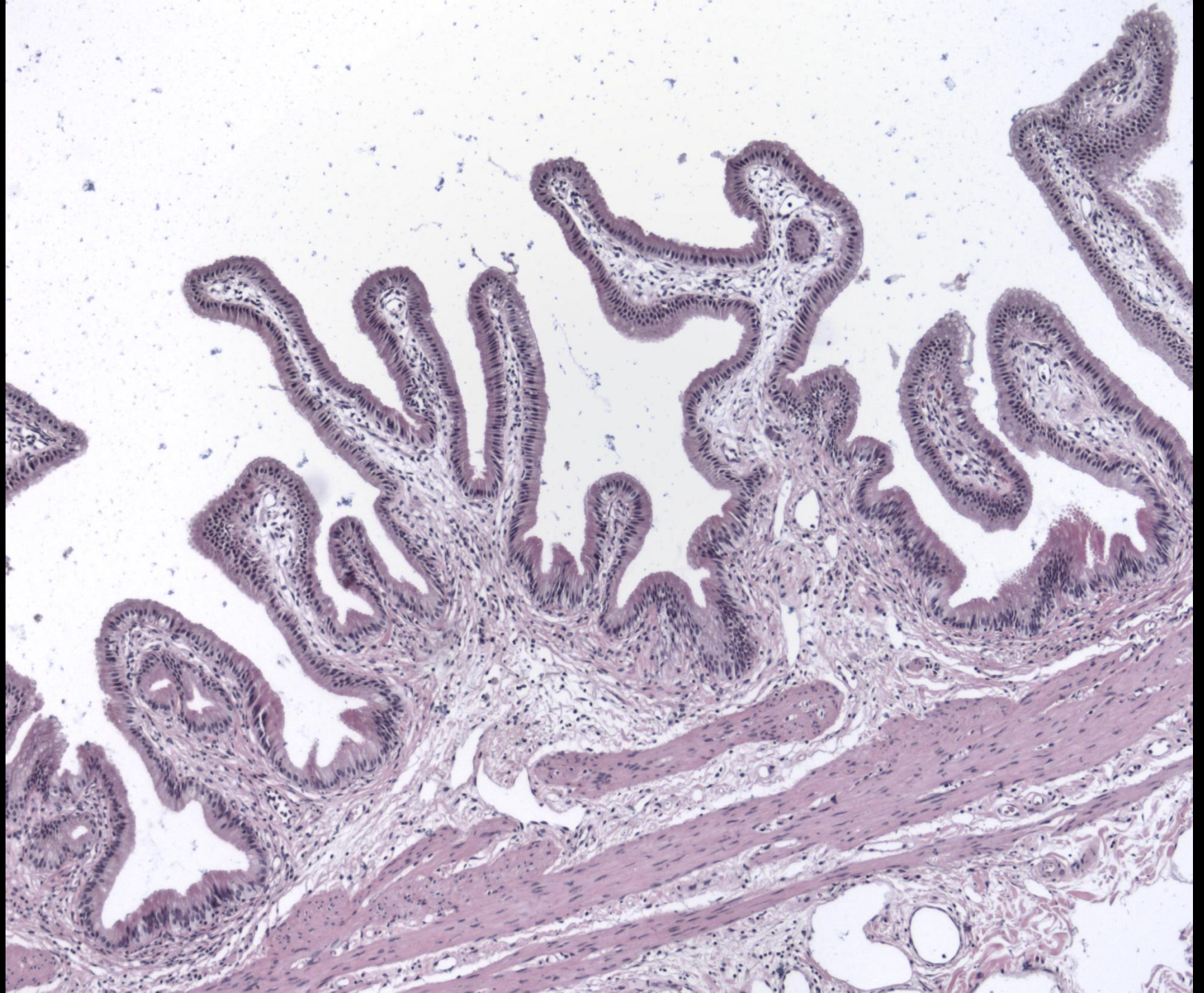
Žlučník – stavba

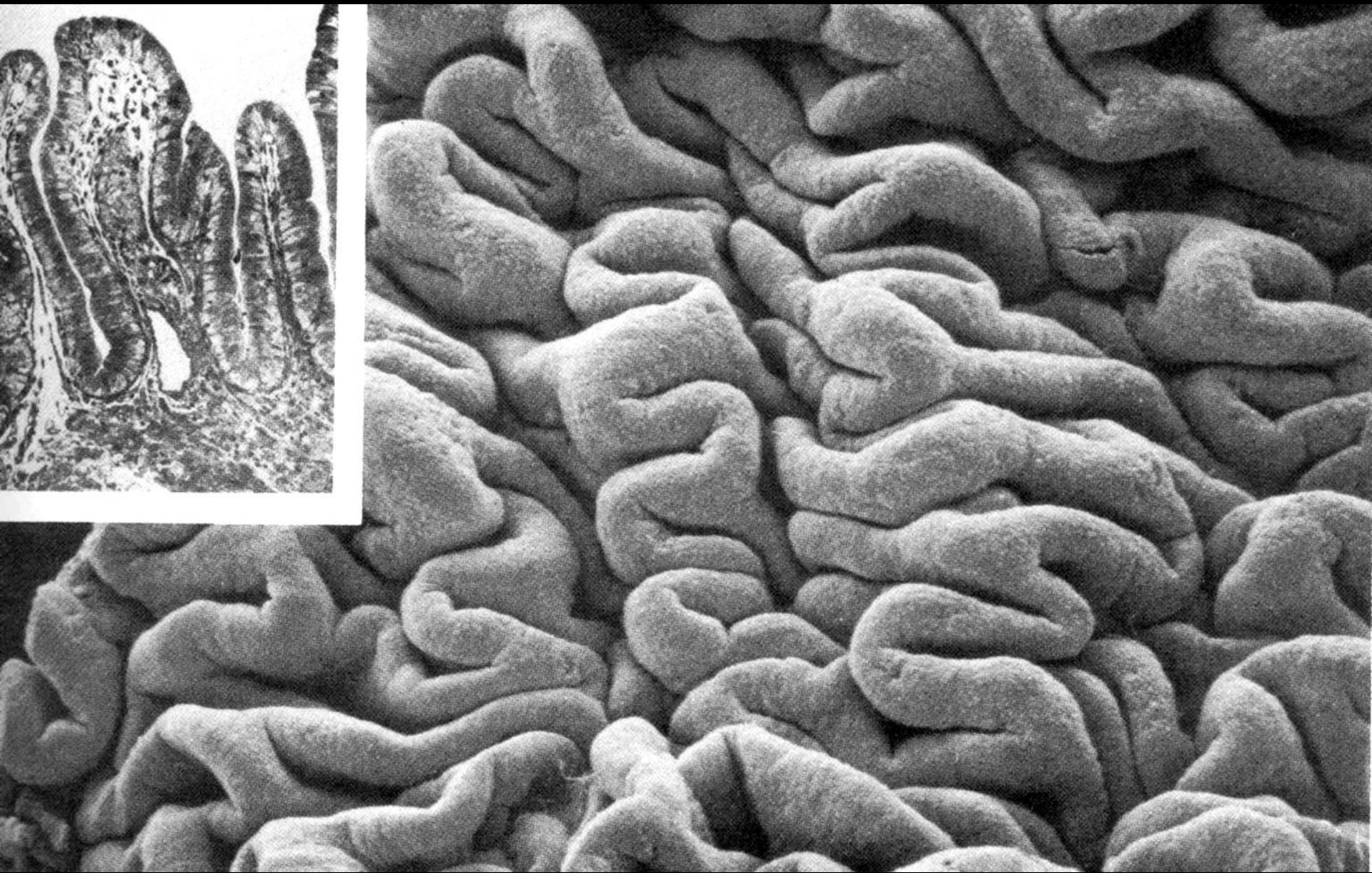
- tunica muscularis
 - síťovitá svalovina
 - cholecystokinin a ANS → stahy
- tunica serosa
 - silná tela subserosa
 - široce přisedlý k játrům ve fossa vesicae biliaris („lůžko žlučníku“)
- funkce:
 - střídat a koncentrovat žluč (absorpce vody na 10 %) → *při nerovnováze koncentrací látek vznikají kameny (**cholelithiasis**)*
 - obsah 30-50 ml

Žlučník (vesica felea)





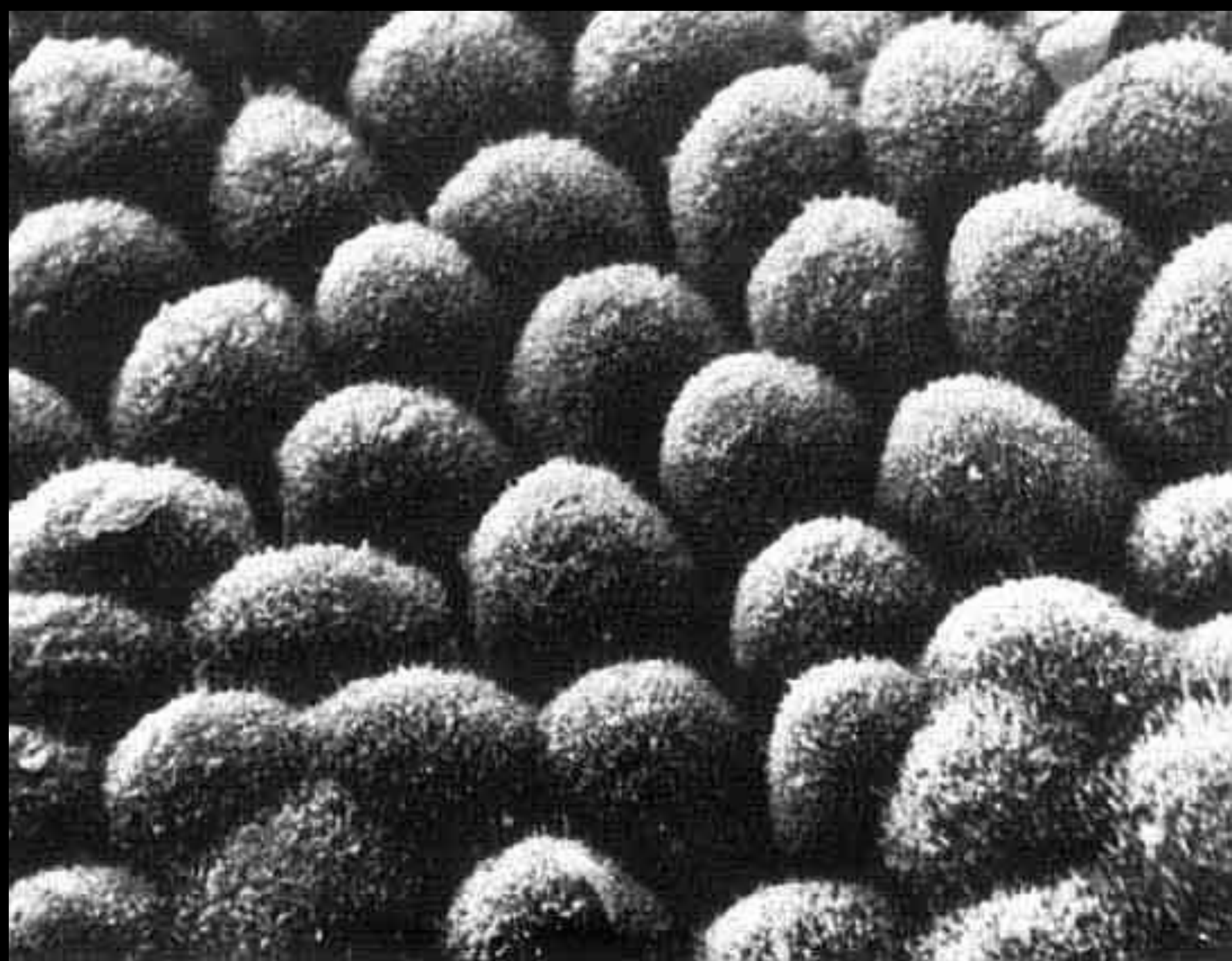


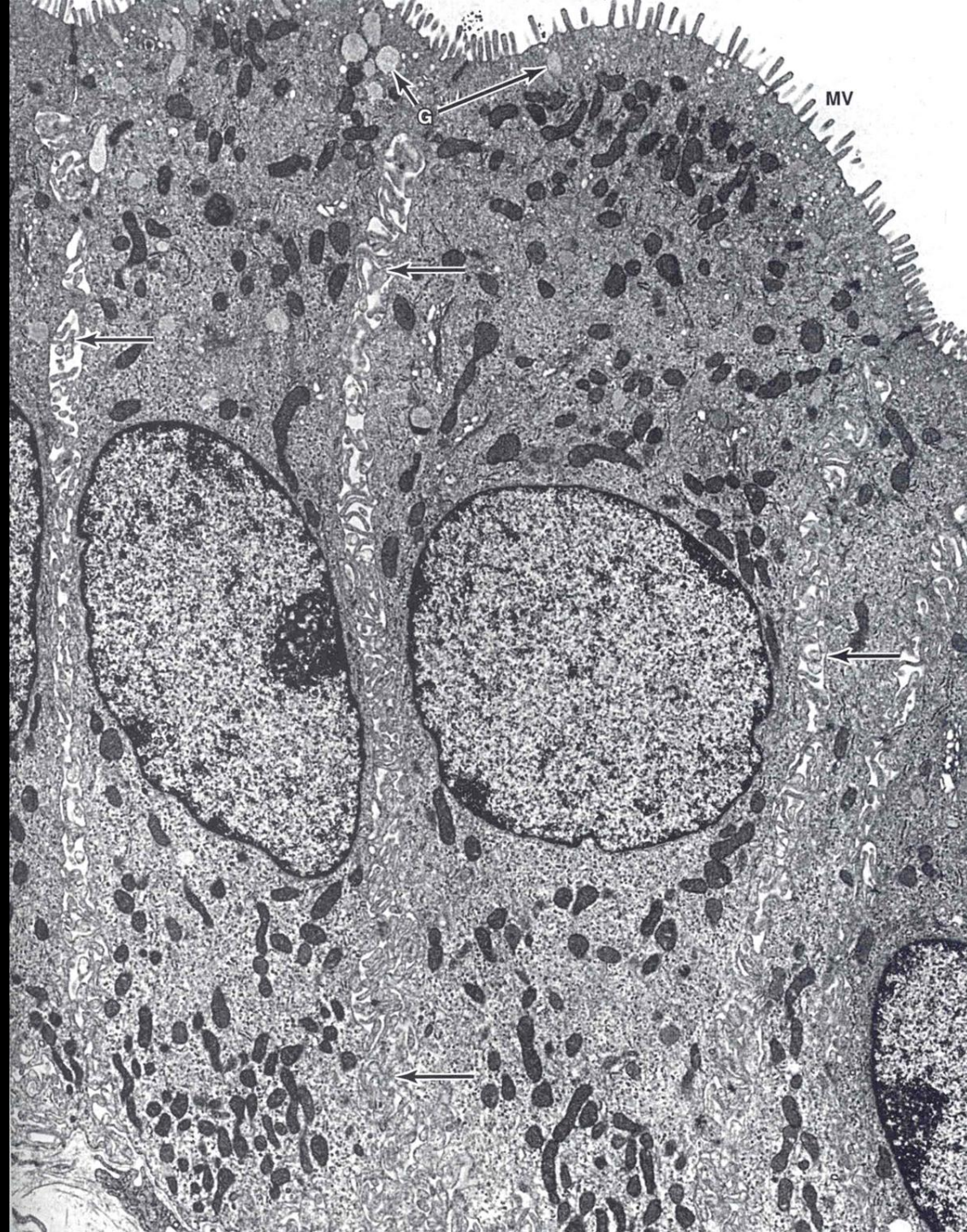




**Rokitansky-Aschoff
sinuses**

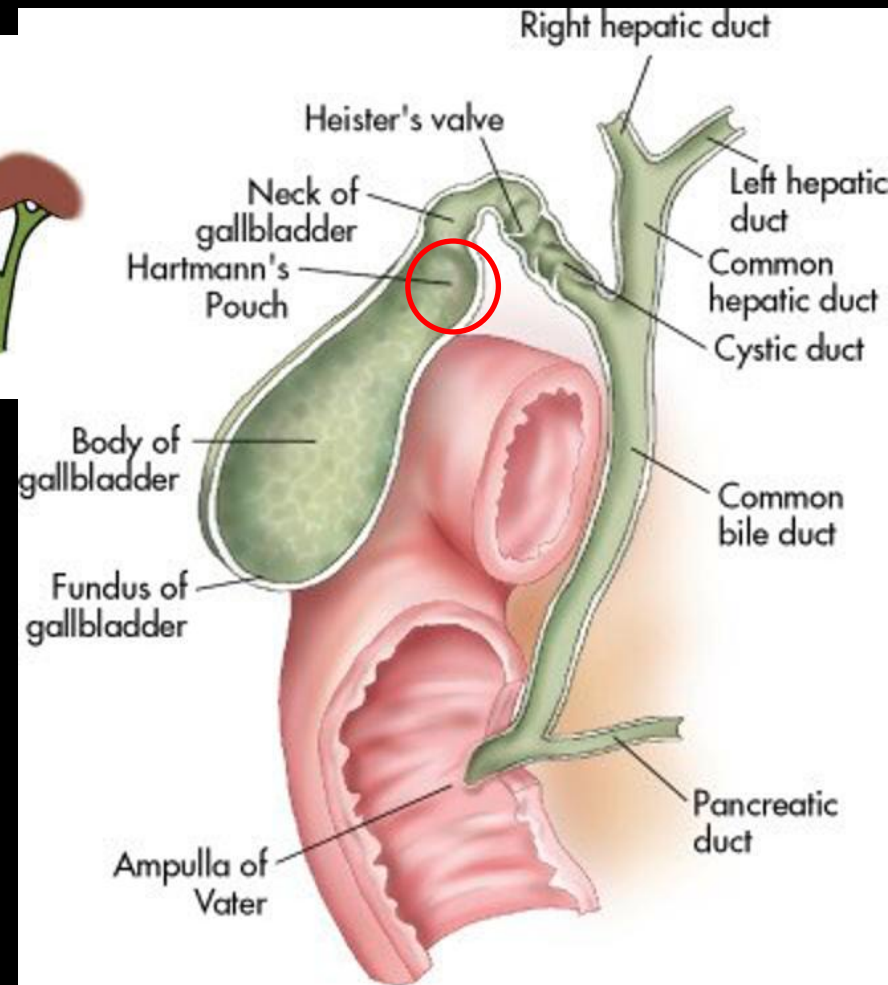
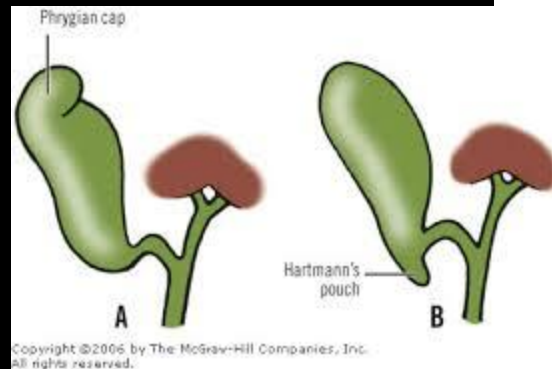


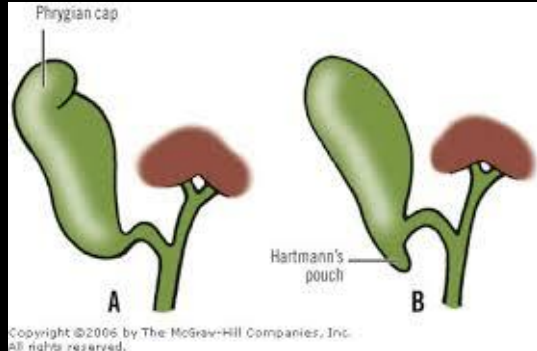




Hartmannova výchlípka – *variabilní*

- na hranici infundibula a krčku žlučníku
- predispoziční místo pro ukládání žlučových kamenů

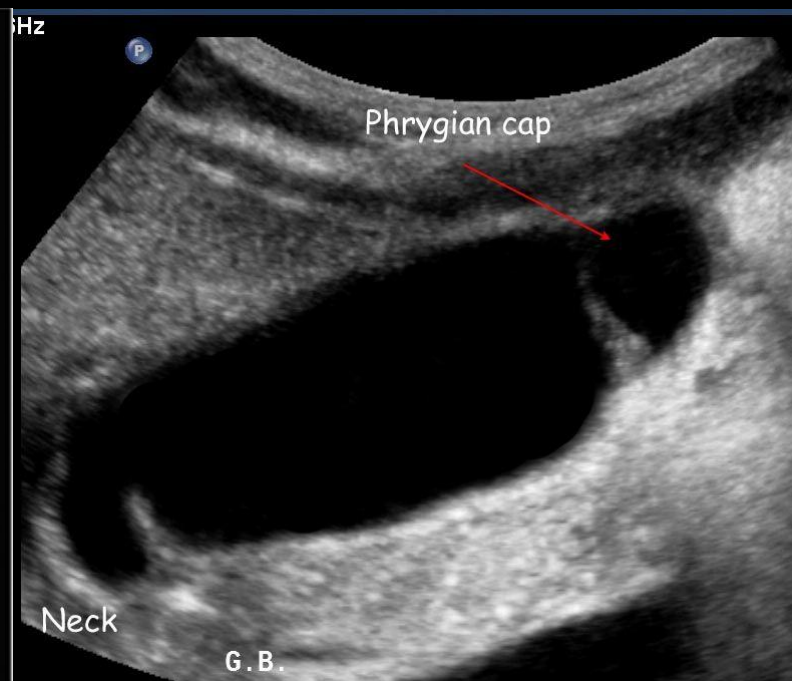
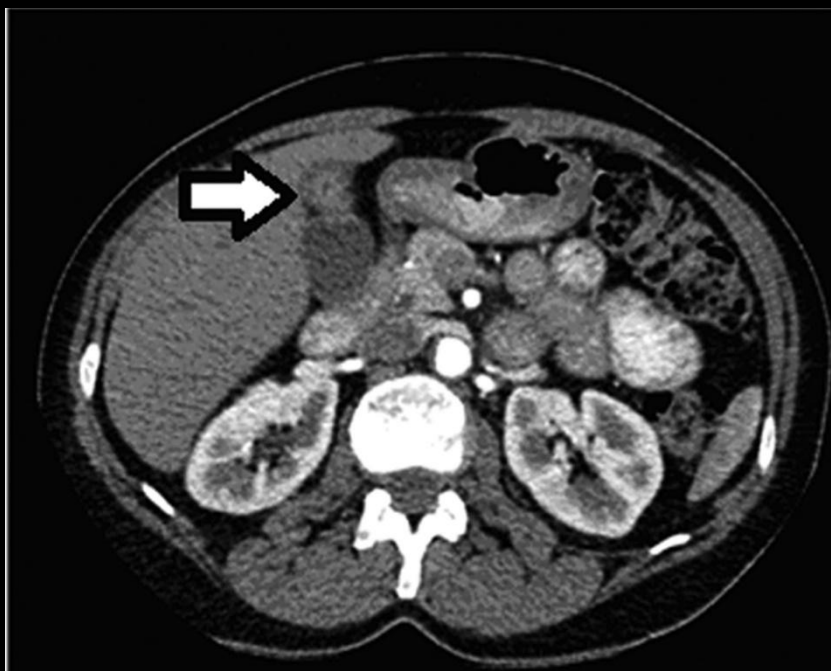




„Phrygian cap“



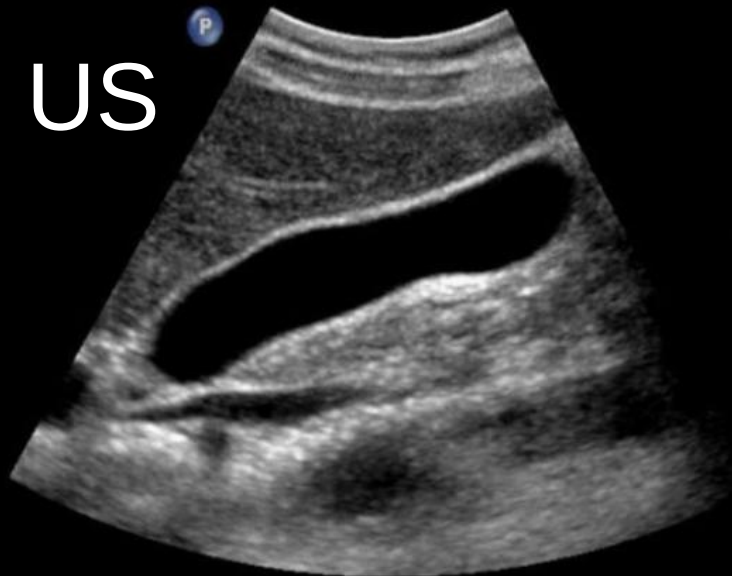
- záhyb žlučníku na hranici fundu a těla žlučníku (1-6 %)
- frygická čapka (fryžská čepice) = měkká kuželová čepice s vytaženou horní částí



CT



US

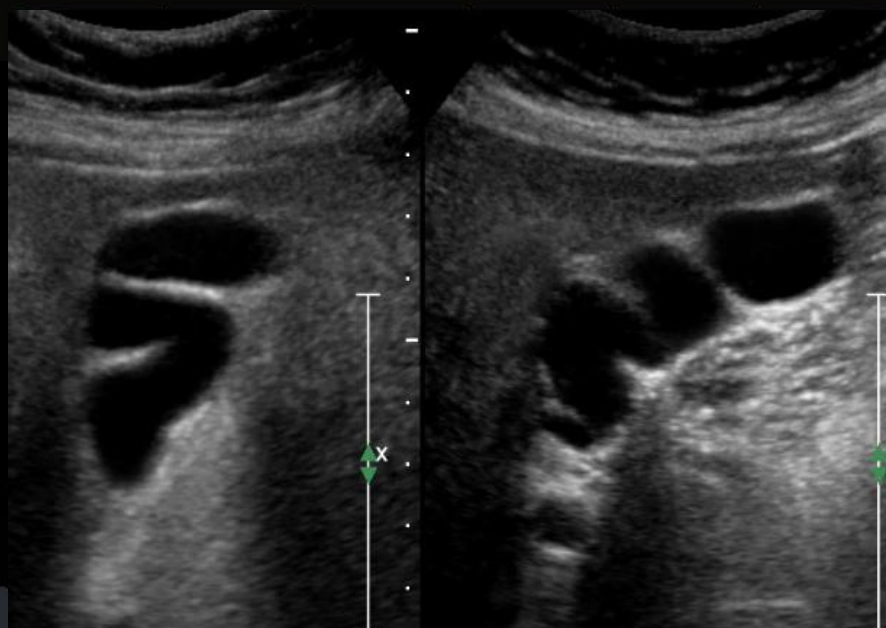
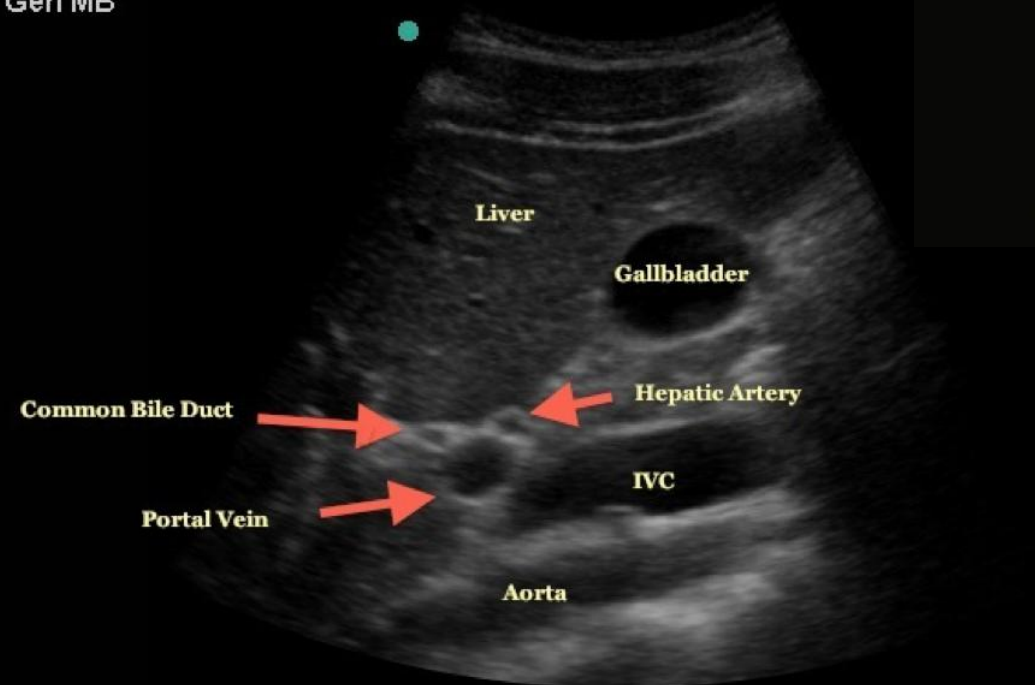


Gen MB

Gen S THI MB



Portal Vein - CBD



3D MR cholangiopankreatografie

