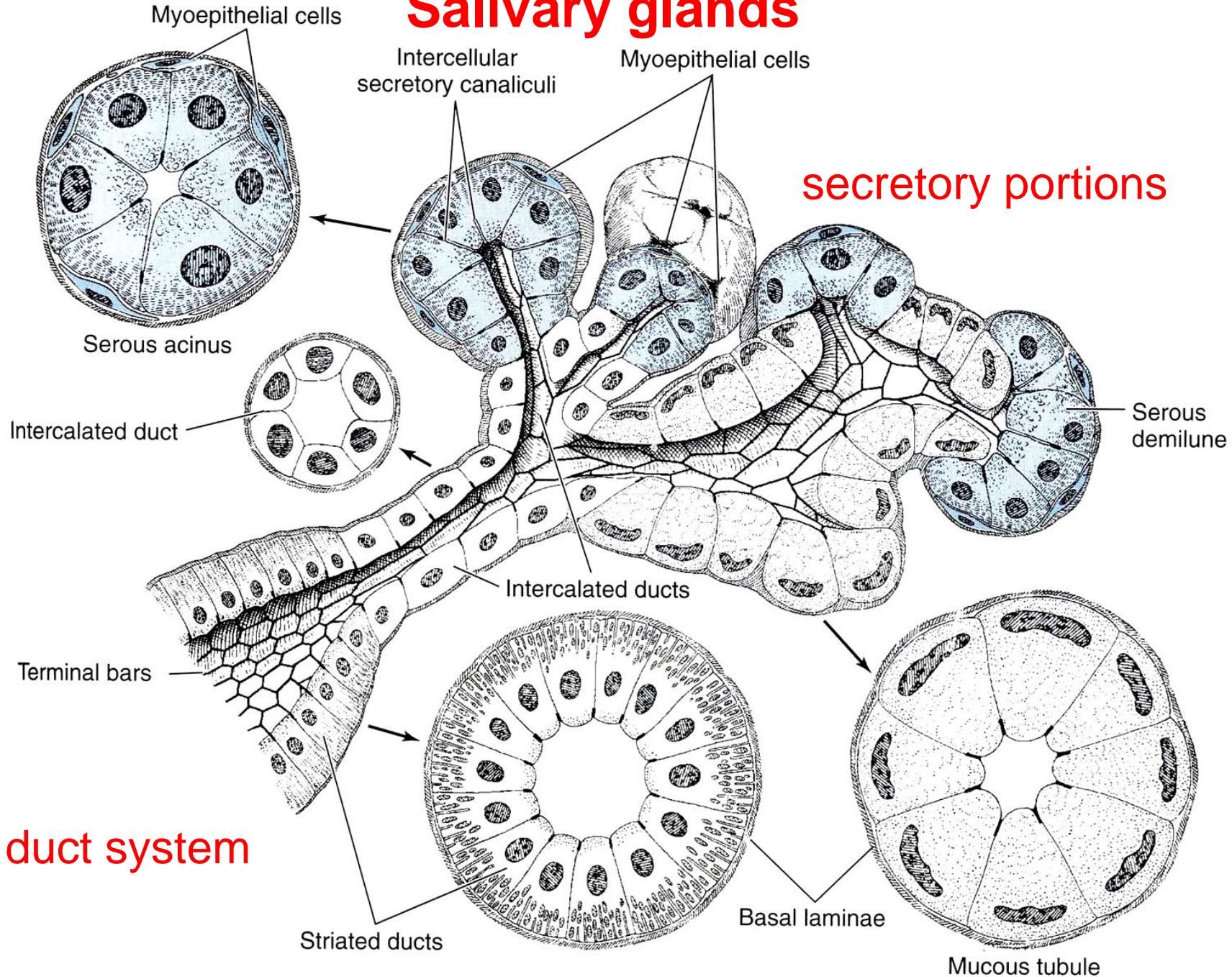


**Glands associated to the
digestive tube
(salivary glands, pancreas, liver,
bile ducts)**

Salivary glands



mucous tubules

A light micrograph of a salivary gland section. The image shows various glandular structures. In the upper left, a large, irregularly shaped cluster of pale-staining, vacuolated cells is labeled "mucous tubules". To the right, several larger, more rounded clusters of cells with darker-staining nuclei are labeled "serous acini". Below these, a layer of smaller, polygonal cells with dark nuclei is labeled "serous demilunes". The overall structure is organized into a complex network of ducts and secretory units.

serous acini

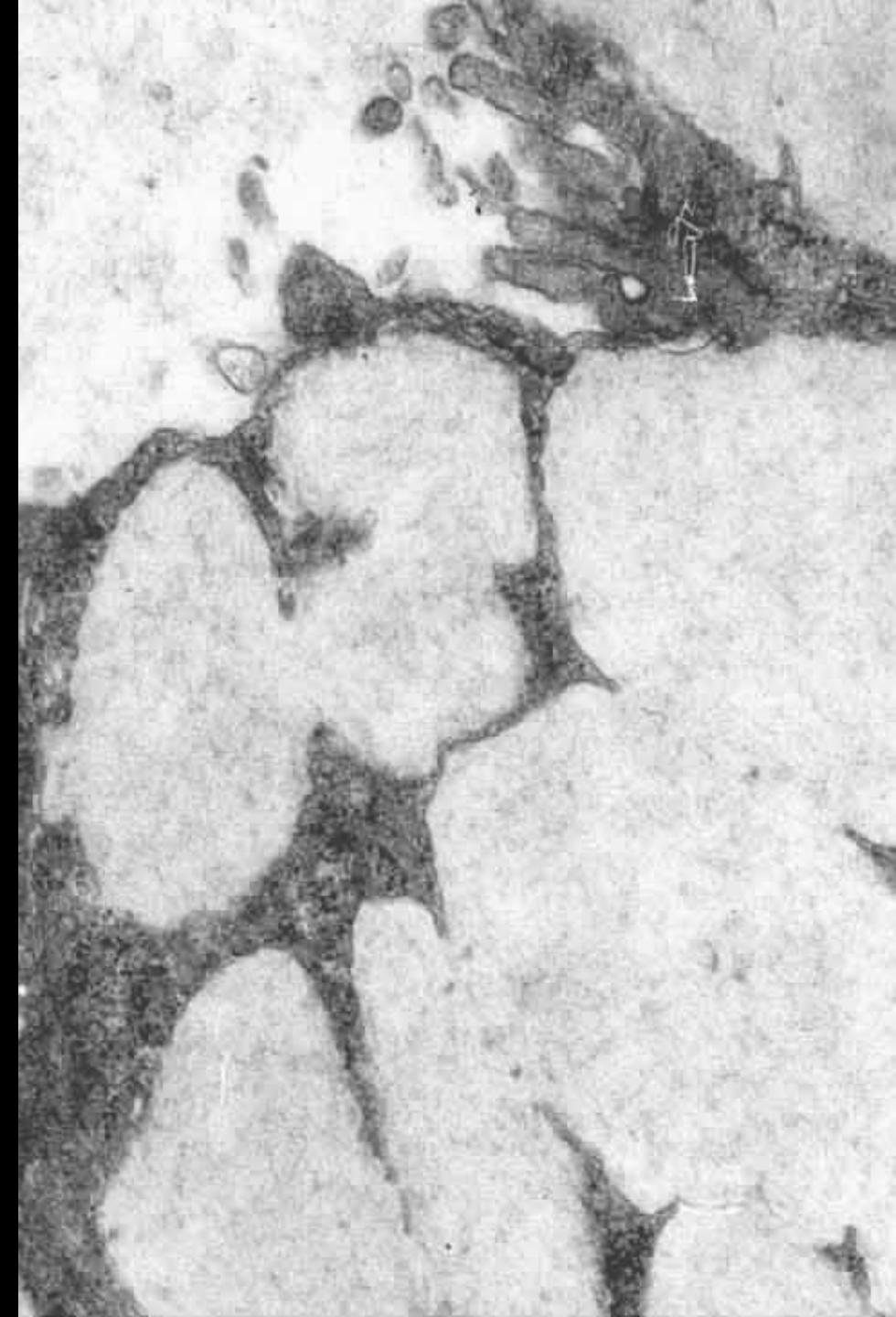
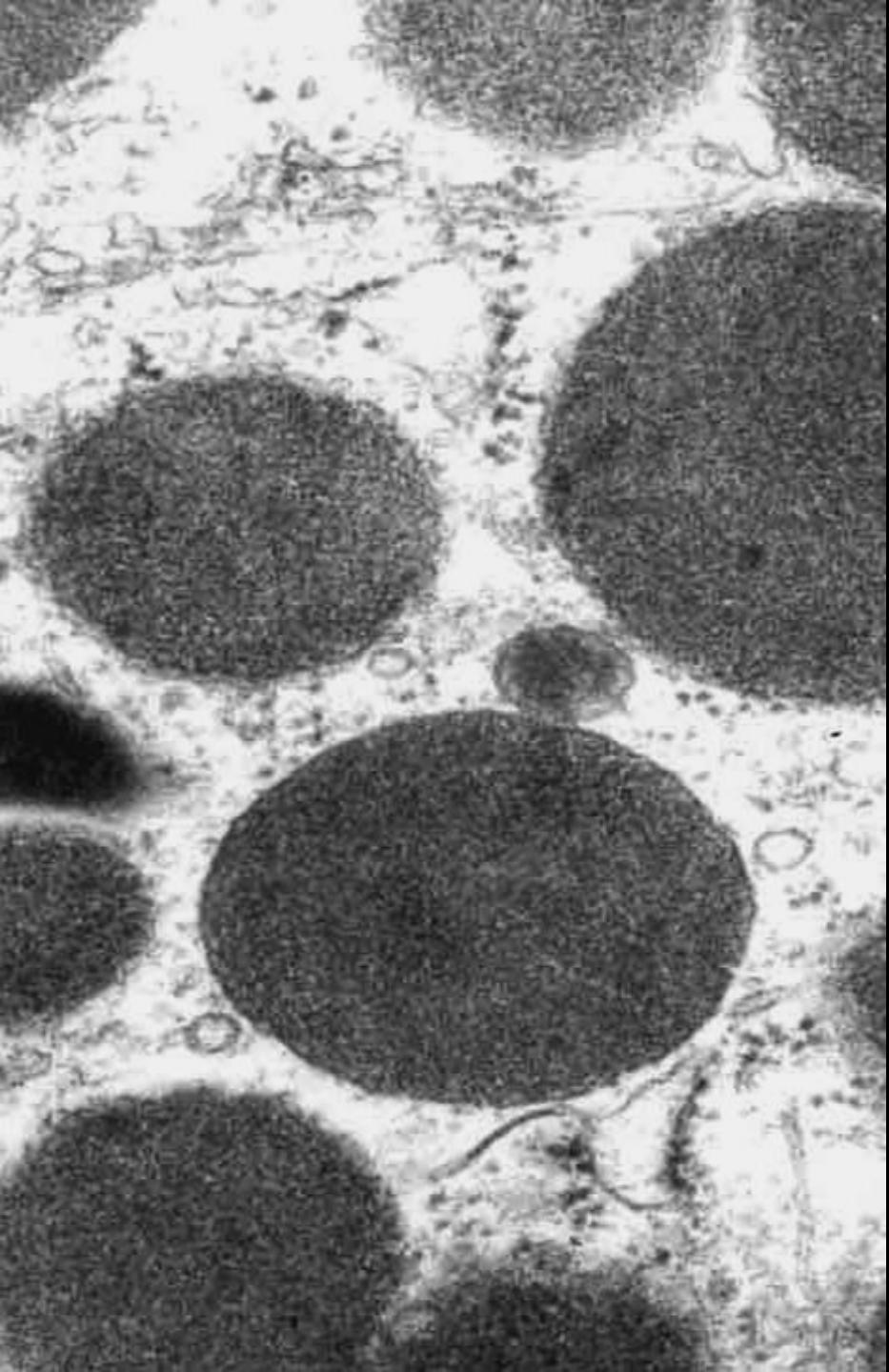
serous demilunes

mucous tubule

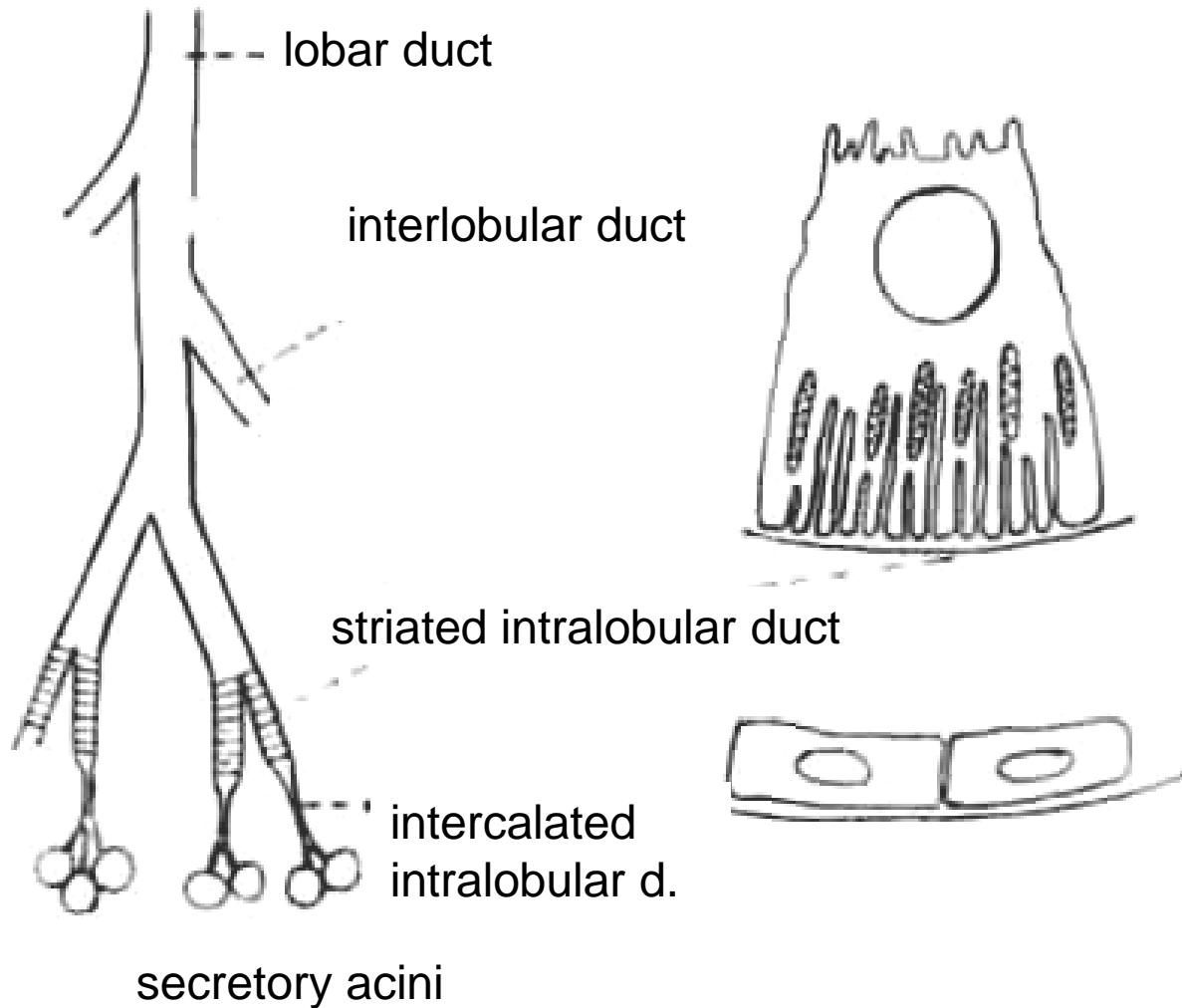
mucous tubule

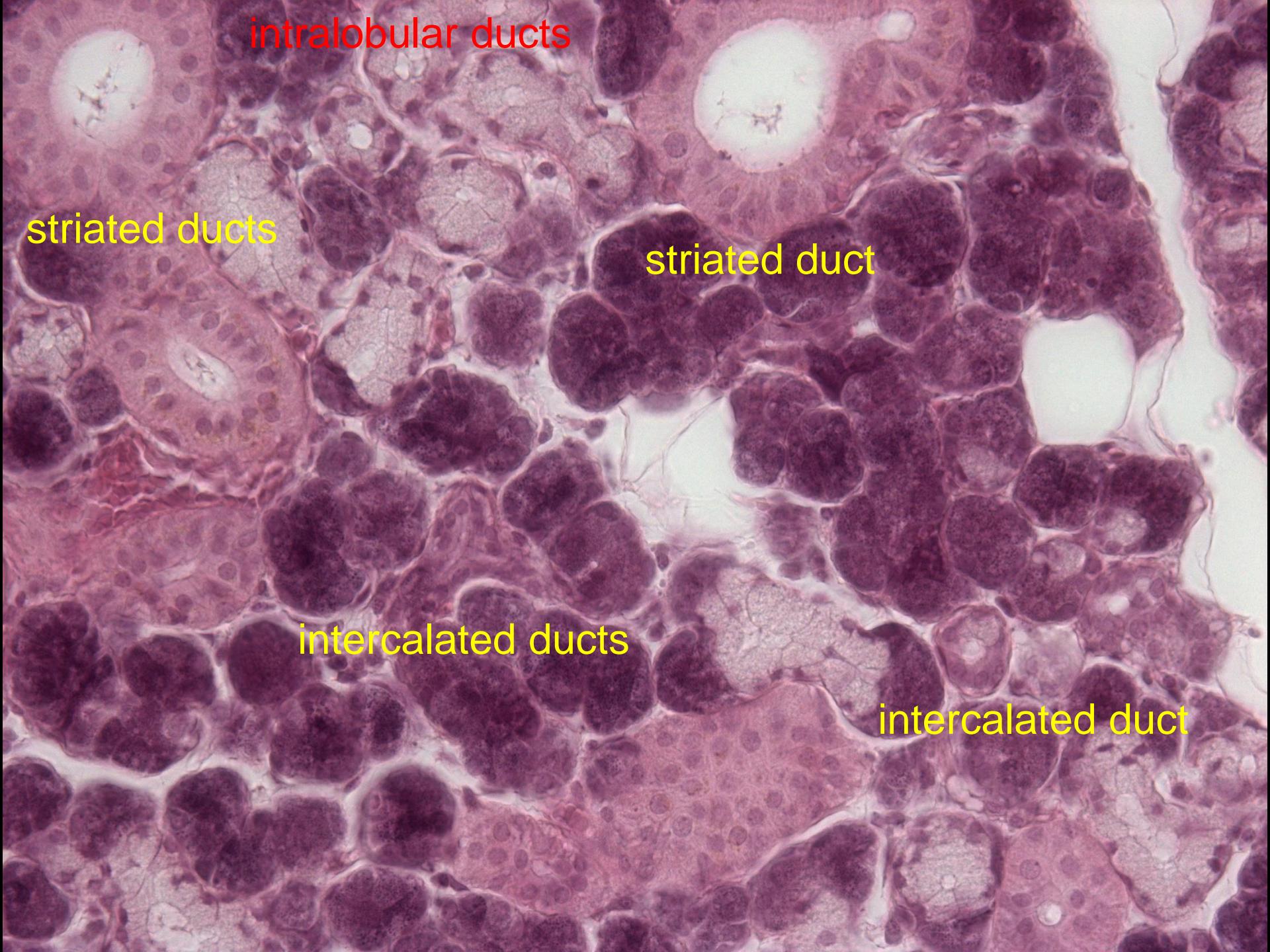
serous acinus

serous demilune



DUCTS OF LARGE SALIVARY GLANDS



A light micrograph of breast tissue. It shows several types of ductal structures. In the upper left, a duct is labeled "intralobular ducts". In the upper right, a larger duct is labeled "striated duct". In the lower left, a duct is labeled "intercalated ducts". In the lower right, another duct is labeled "intercalated duct". The tissue consists of clusters of pink-stained epithelial cells and surrounding stroma.

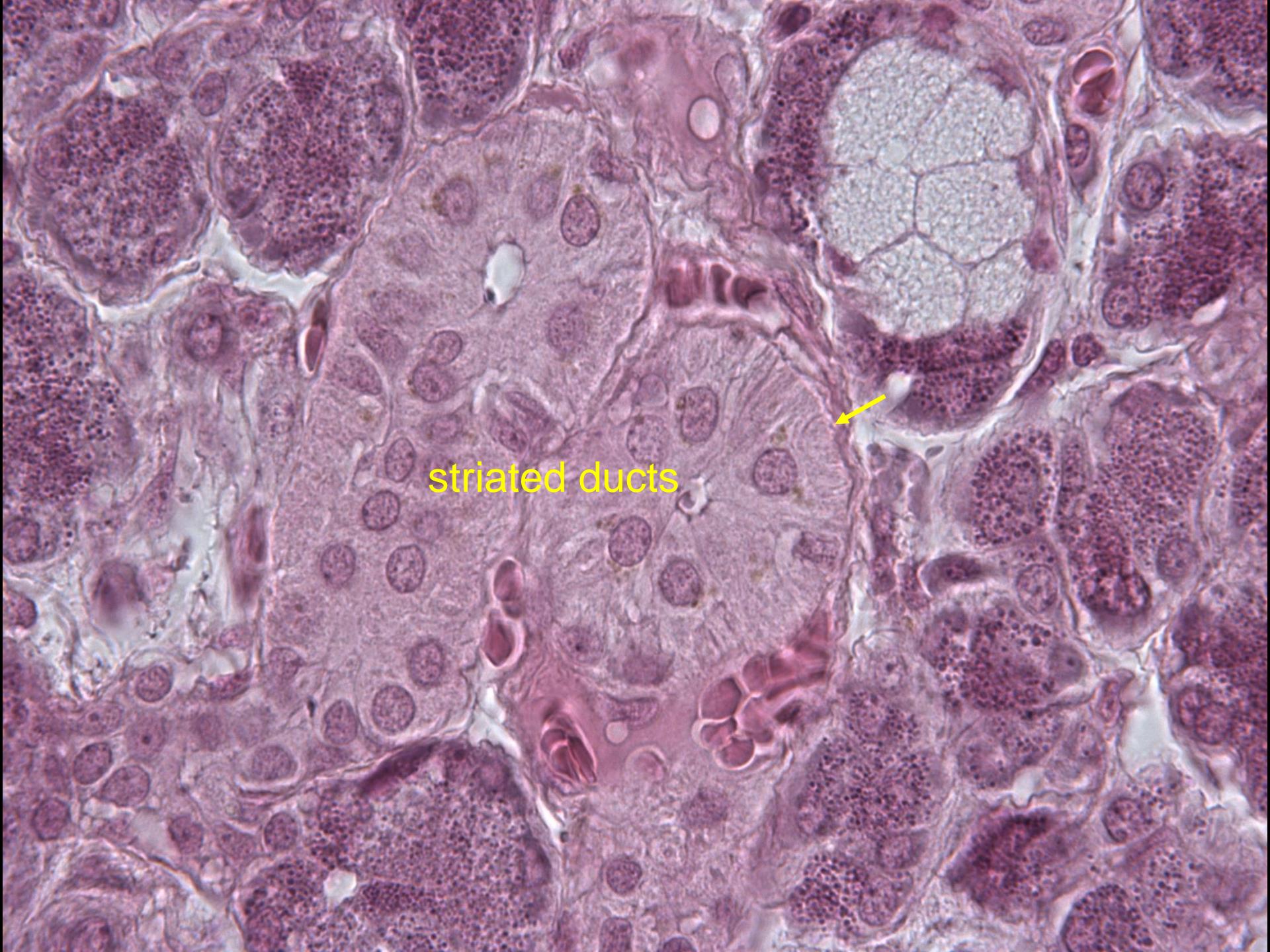
intralobular ducts

striated ducts

striated duct

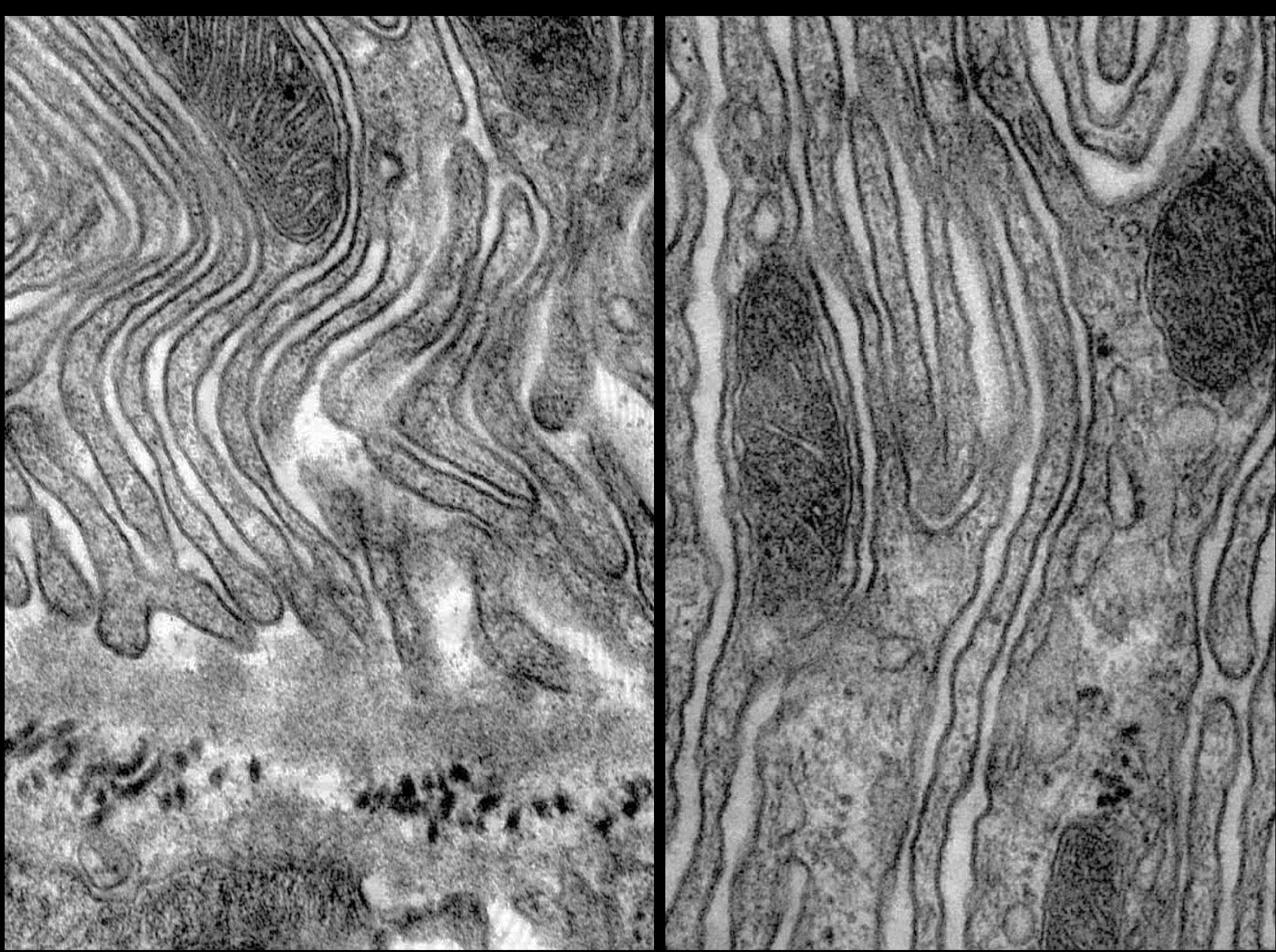
intercalated ducts

intercalated duct



This image shows a histological section of breast tissue. It features several clusters of glandular structures, known as lobules, which are composed of epithelial cells with pinkish-purple nuclei. Interspersed between these lobules are darker, more elongated structures representing the mammary ducts. A yellow arrow points to one such duct, specifically highlighting a region where the epithelial lining appears more organized and layered, characteristic of a striated duct. The overall color palette is dominated by shades of pink, purple, and grey, typical of hematoxylin and eosin (H&E) staining.

striated ducts



A histological section of breast tissue stained with hematoxylin. The image shows several clusters of acinar structures, which are rounded groups of epithelial cells. A prominent feature is a larger, irregularly shaped space containing a small amount of pinkish-red material, labeled as an interlobular duct. The surrounding tissue consists of dense, pink-stained connective tissue and smaller, more uniform epithelial structures.

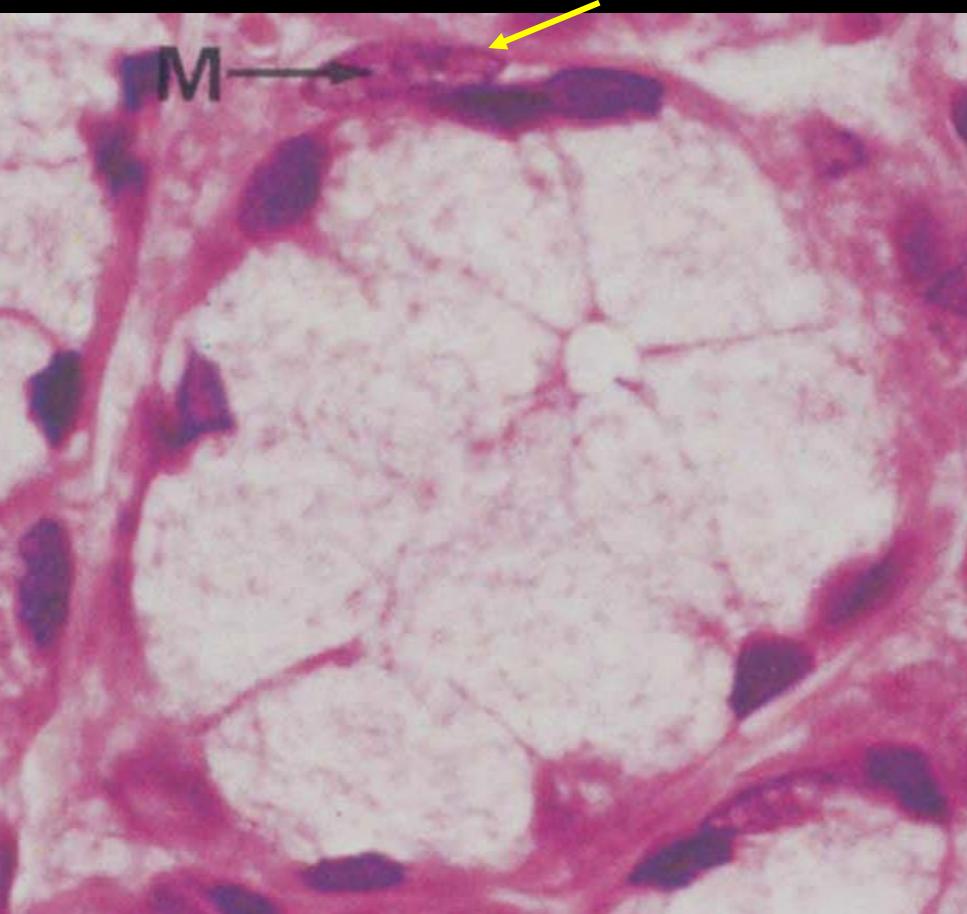
interlobular duct

A histological section of breast tissue stained with hematoxylin. The image shows several lobules, each consisting of a central terminal duct surrounded by a cluster of acinar structures. A prominent, larger ductal structure, the lobar duct, is visible in the upper right quadrant, characterized by its thick, pink-stained wall and irregular, finger-like projections called papillae. The surrounding stroma is composed of loose connective tissue with scattered fibroblasts and small blood vessels. The overall pattern is glandular and lobular.

lobar duct



myoepithelial cells



immunohistochemistry - actin

Salivary glands

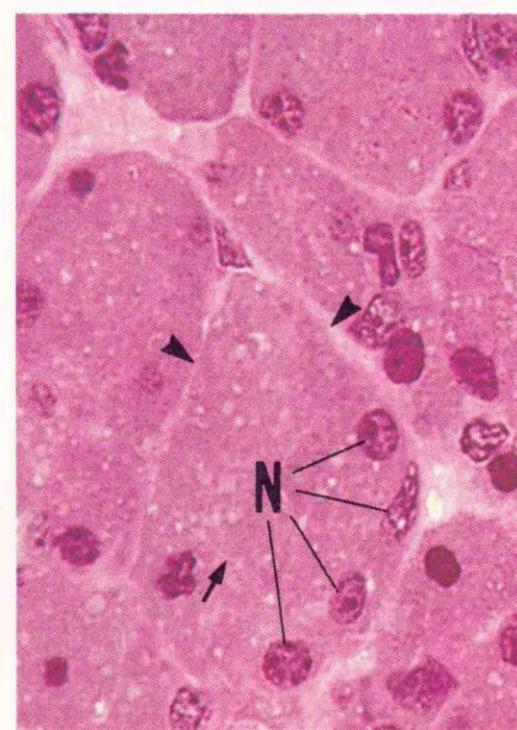
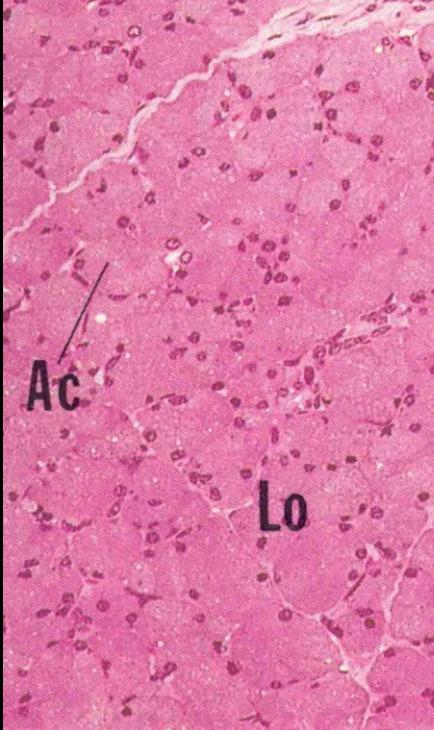
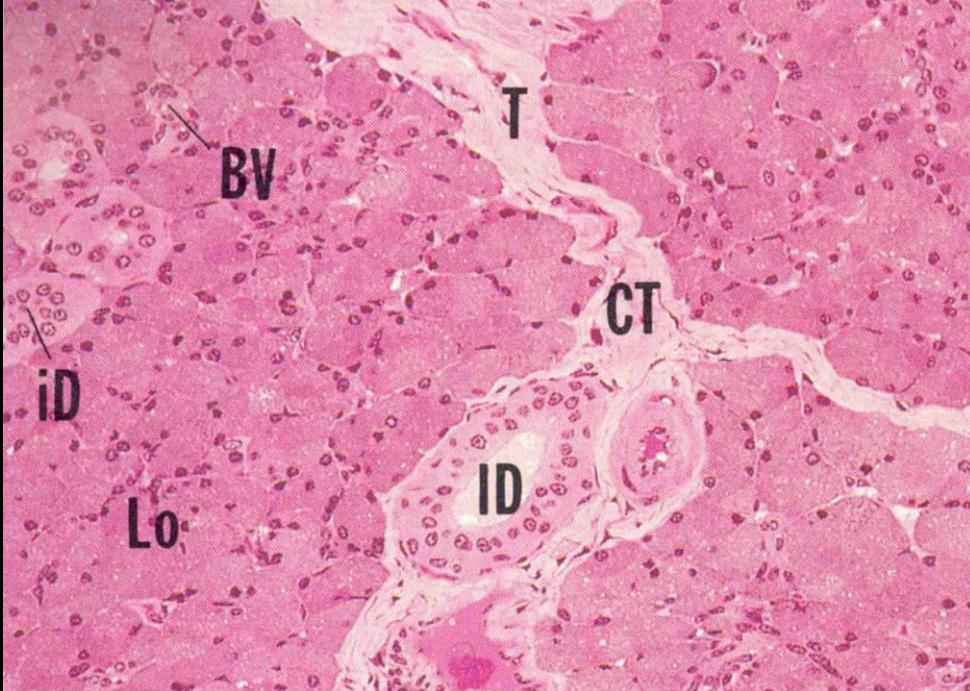
a/ large - compound

- parotid (gl. parotis) – acinar, **serous**
- submandibular (gl. submandibularis) – tuboacinar, **seromucous with prevailing serous component**
- sublingual (gl. sublingualis) - tuboacinar, **seromucous with prevailing mucous component**

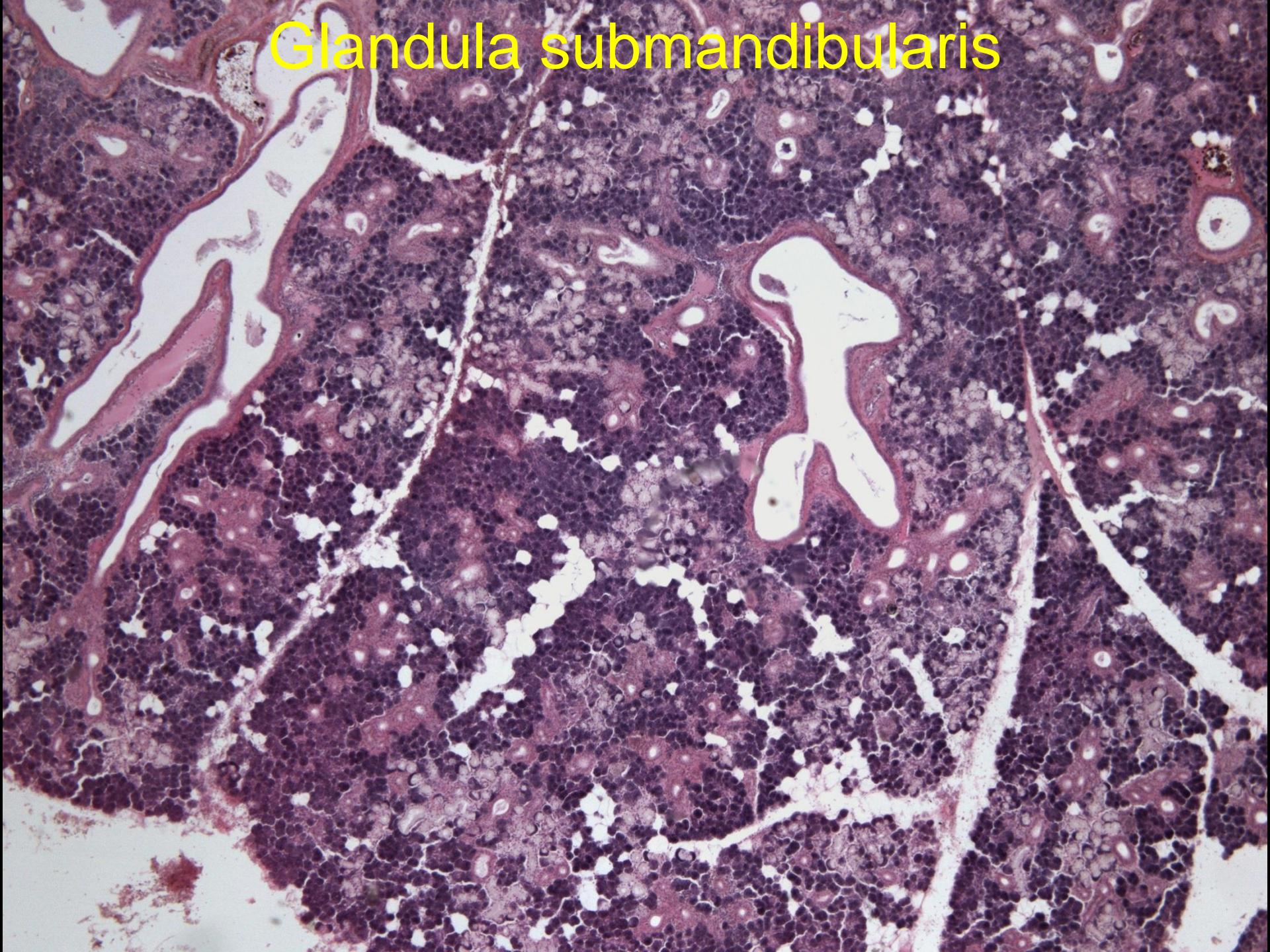
b/ small - branched

- gl. labiales, gl. buccales, gl. retromolares, gl. apicis linguae – tuboacinar, **seromucous**
- gl. palatinae, Weber's glands of tongue – tubular, **mucous**
- Ebner's glands of tongue – acinar, **serous**

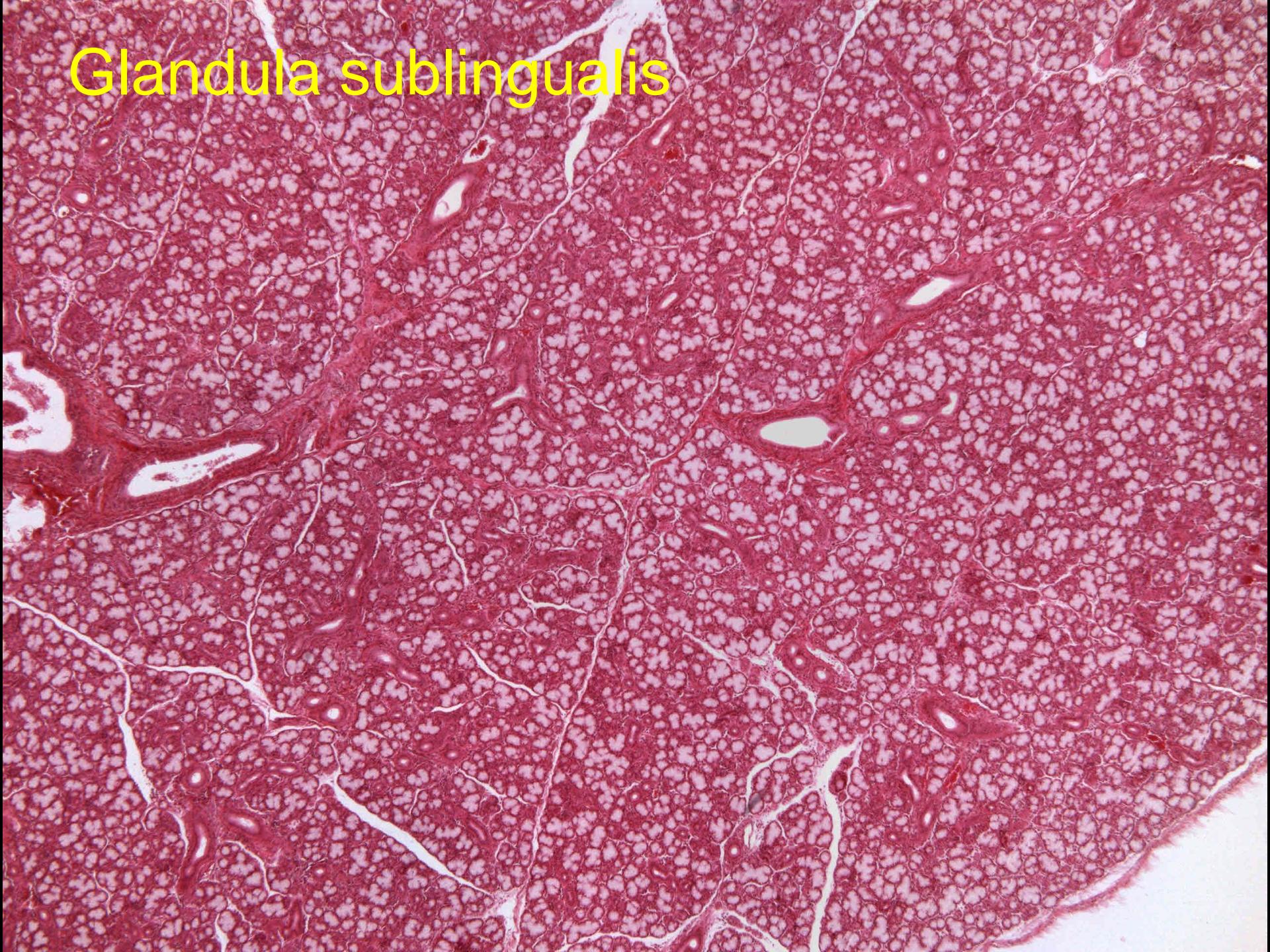
Glandula parotis



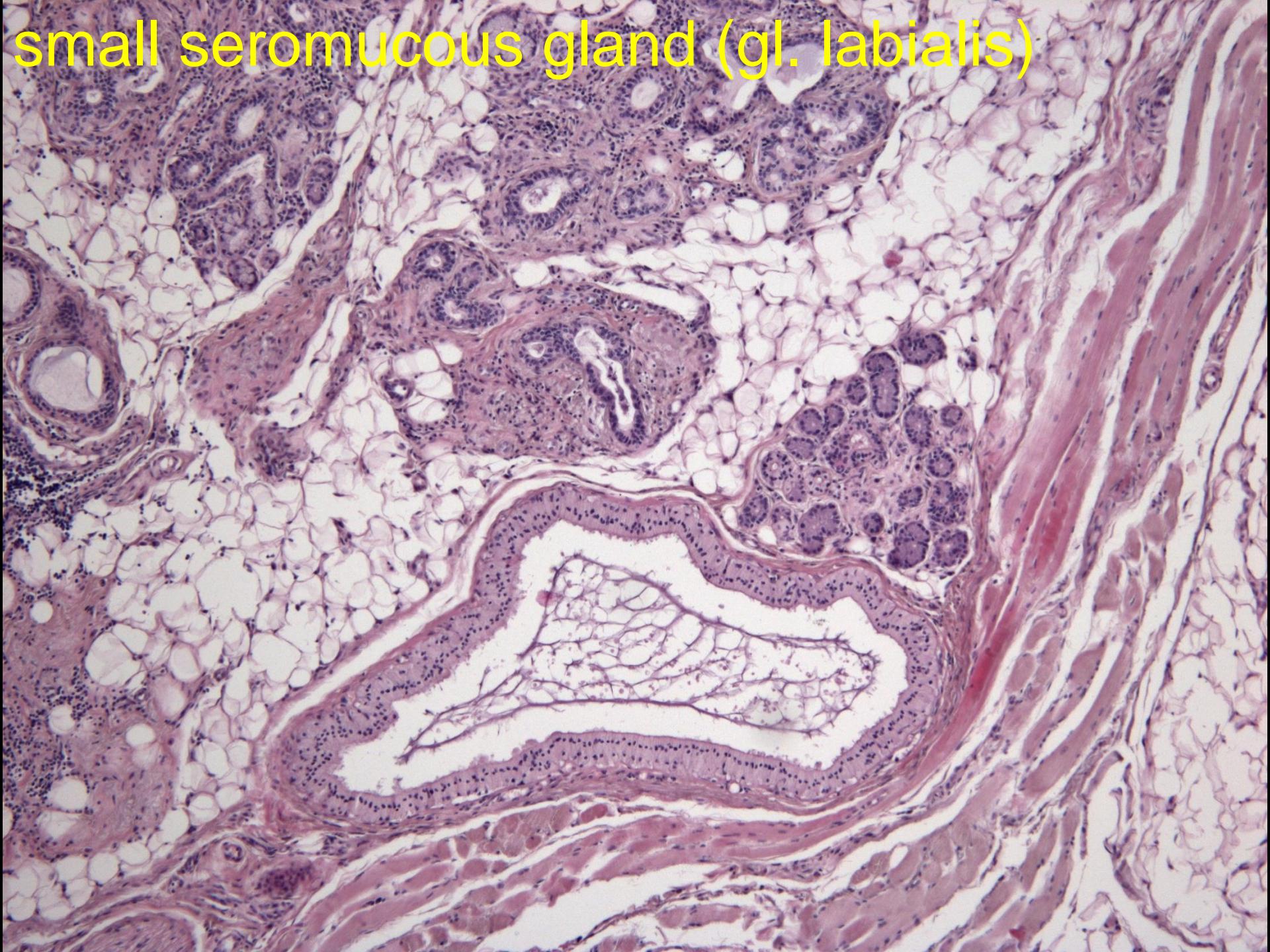
Glandula submandibularis



Glandula sublingualis



small seromucous gland (gl. labialis)



Ebner's gland

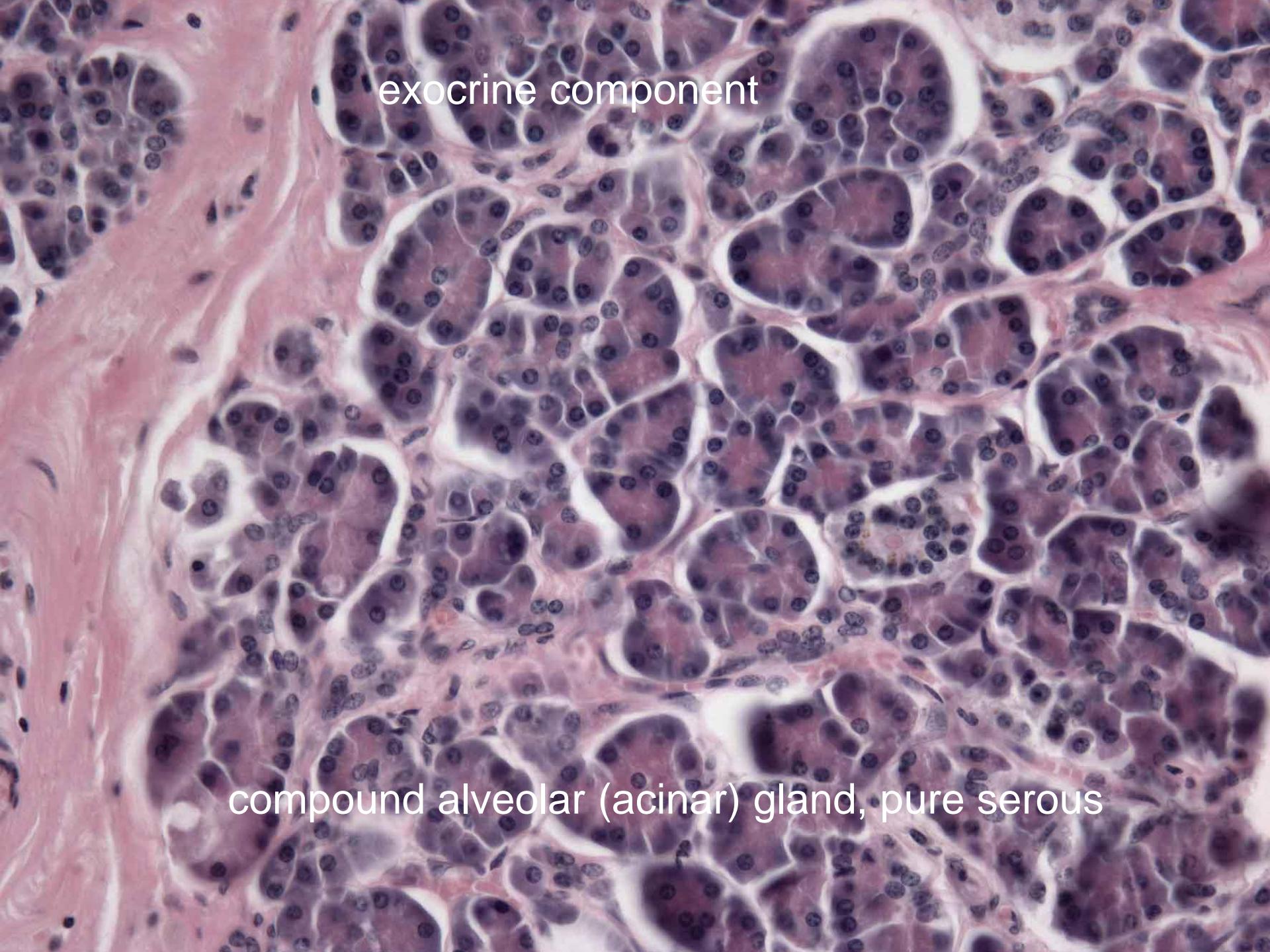
A light micrograph of a skin cross-section. A large, elongated, pale-staining structure, characteristic of an eccrine sweat gland, runs diagonally across the center. The surrounding tissue is densely packed with smaller, rounded, pinkish-purple structures, which are the epidermal appendages called Ebner's glands. The overall color palette is dominated by shades of pink, purple, and white.

Weber's gland

Pancreas

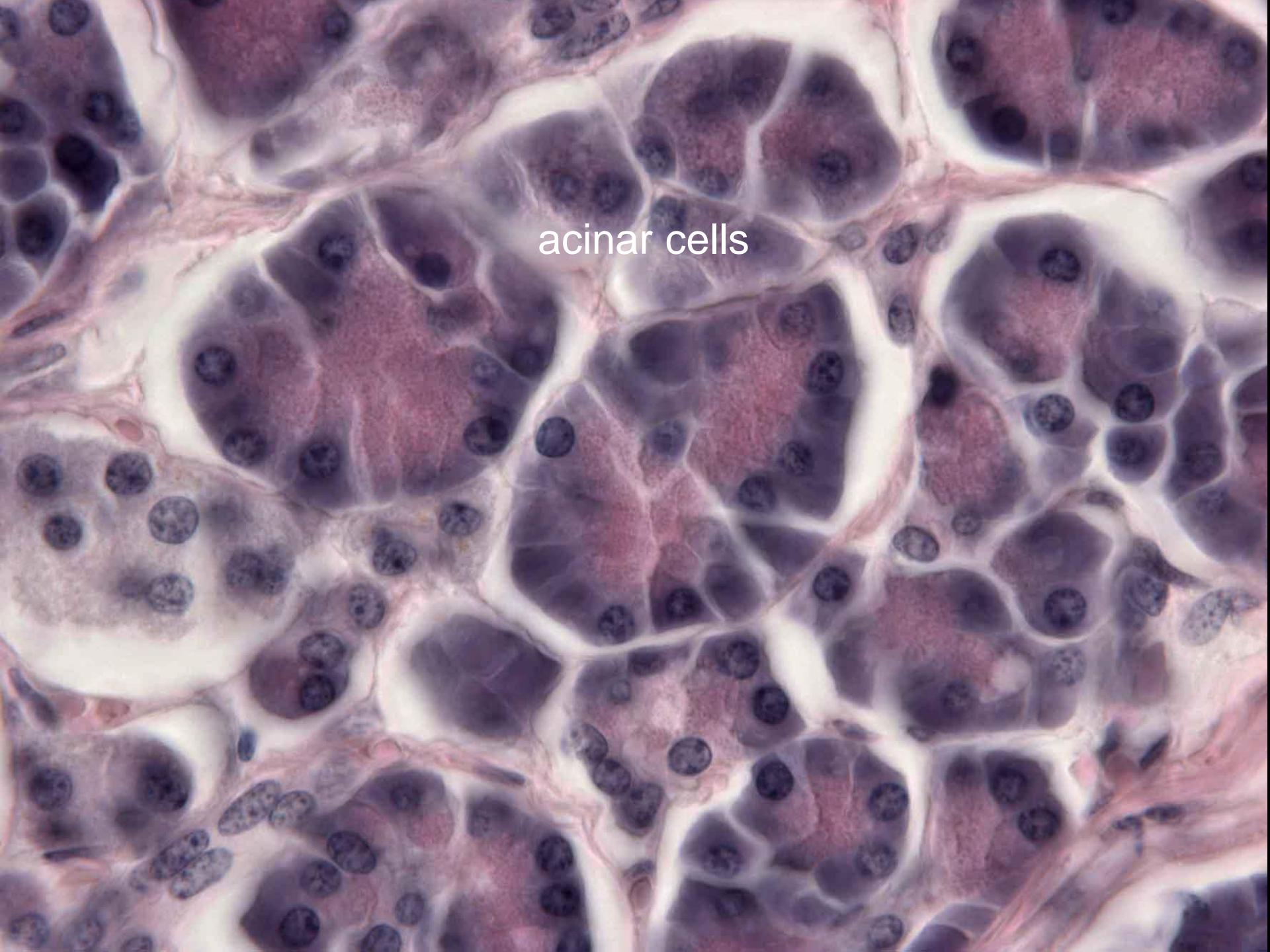
endocrine component

exocrine component

A light micrograph of a tissue section, likely stained with hematoxylin. The image shows a dense arrangement of small, rounded cells with dark, centrally located nuclei. These cells are organized into larger, irregular clusters and some individual cells are scattered throughout. The overall pattern is one of a glandular structure.

exocrine component

compound alveolar (acinar) gland, pure serous

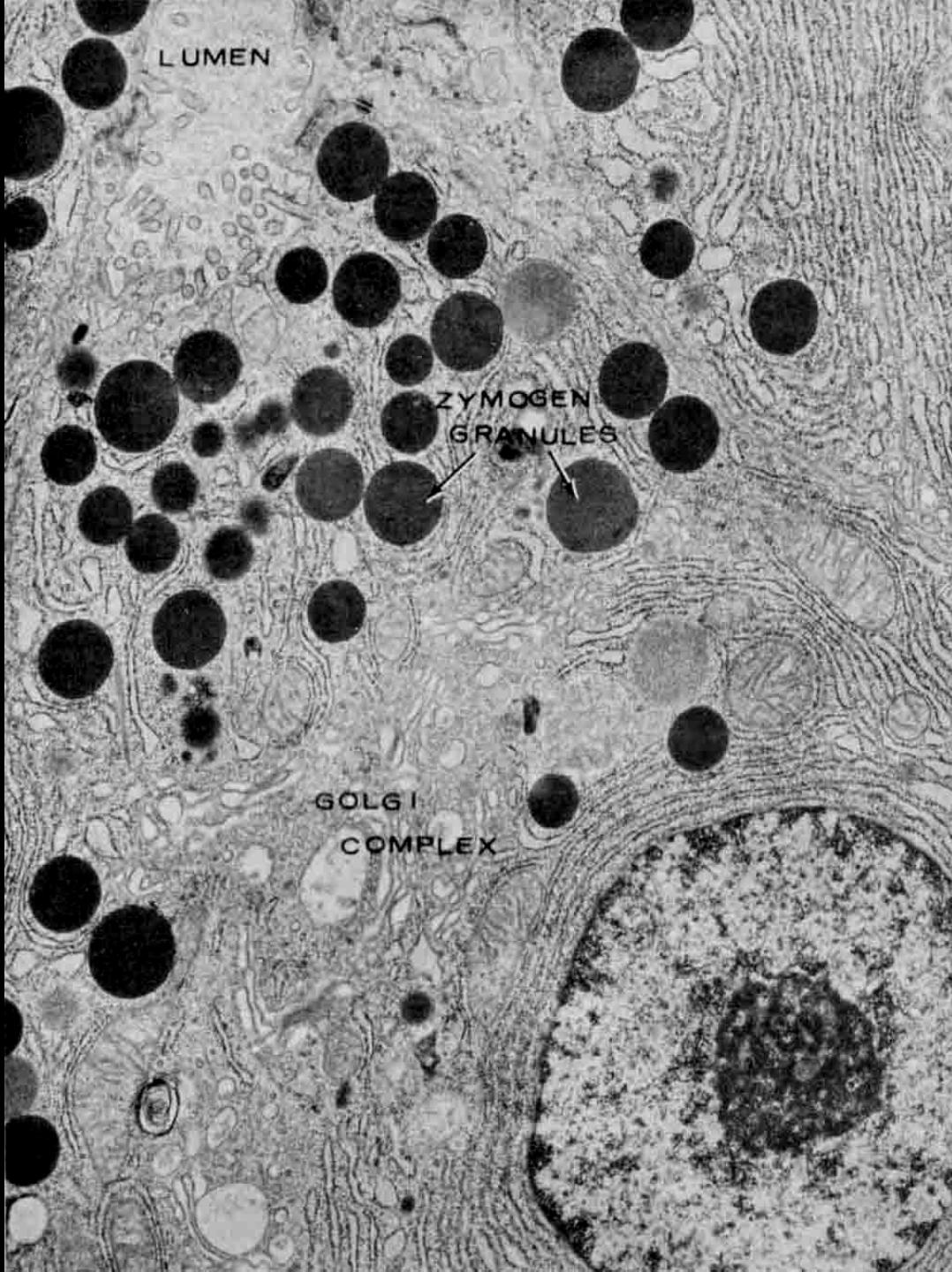
A high-magnification light micrograph showing a cluster of acinar cells. These cells are polygonal with large, dark, centrally located nuclei. They are organized into several distinct, rounded clusters or acini. The interstitium between the acini contains a dense network of pinkish-red-stained connective tissue fibers.

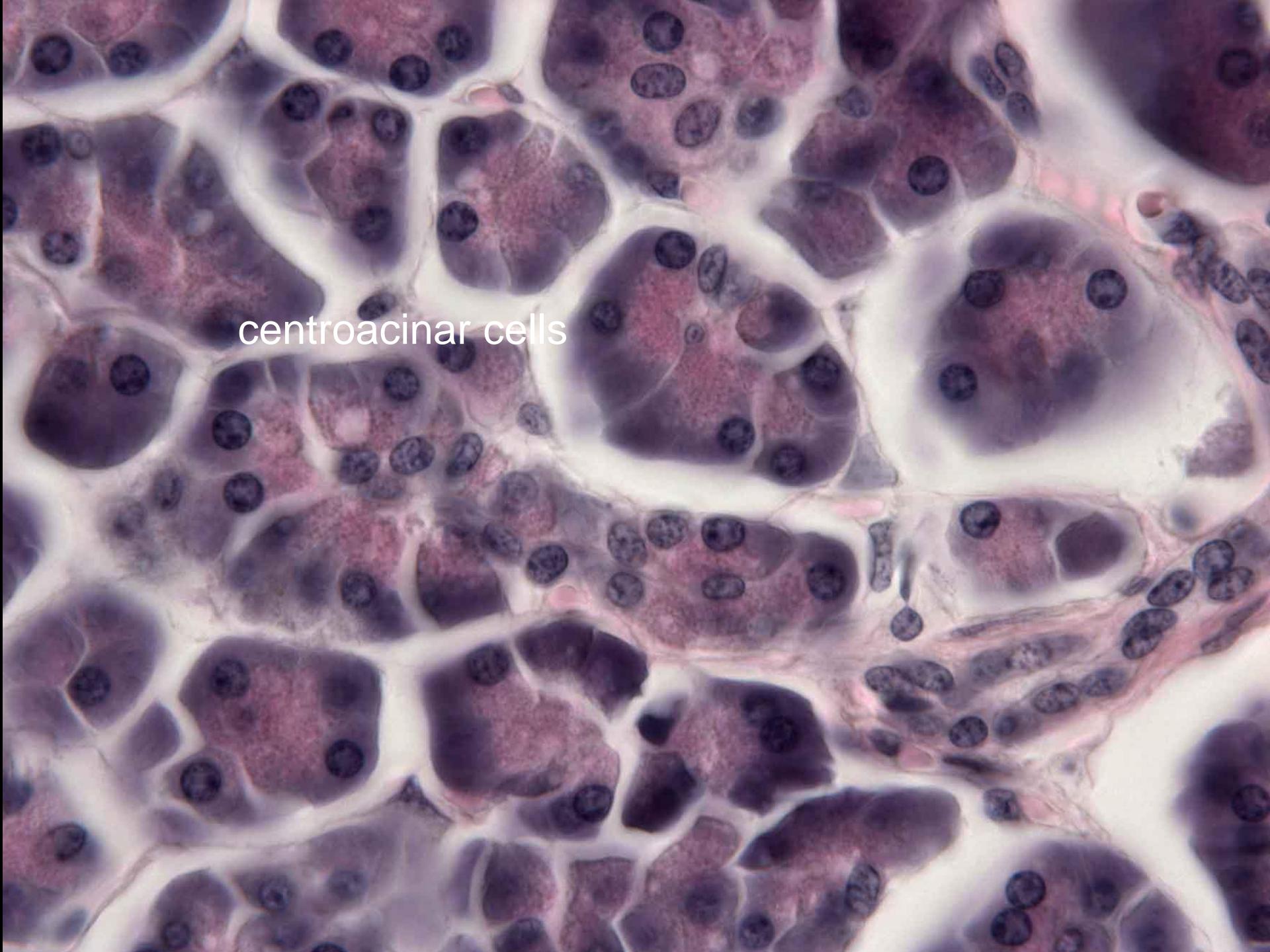
acinar cells

LUMEN

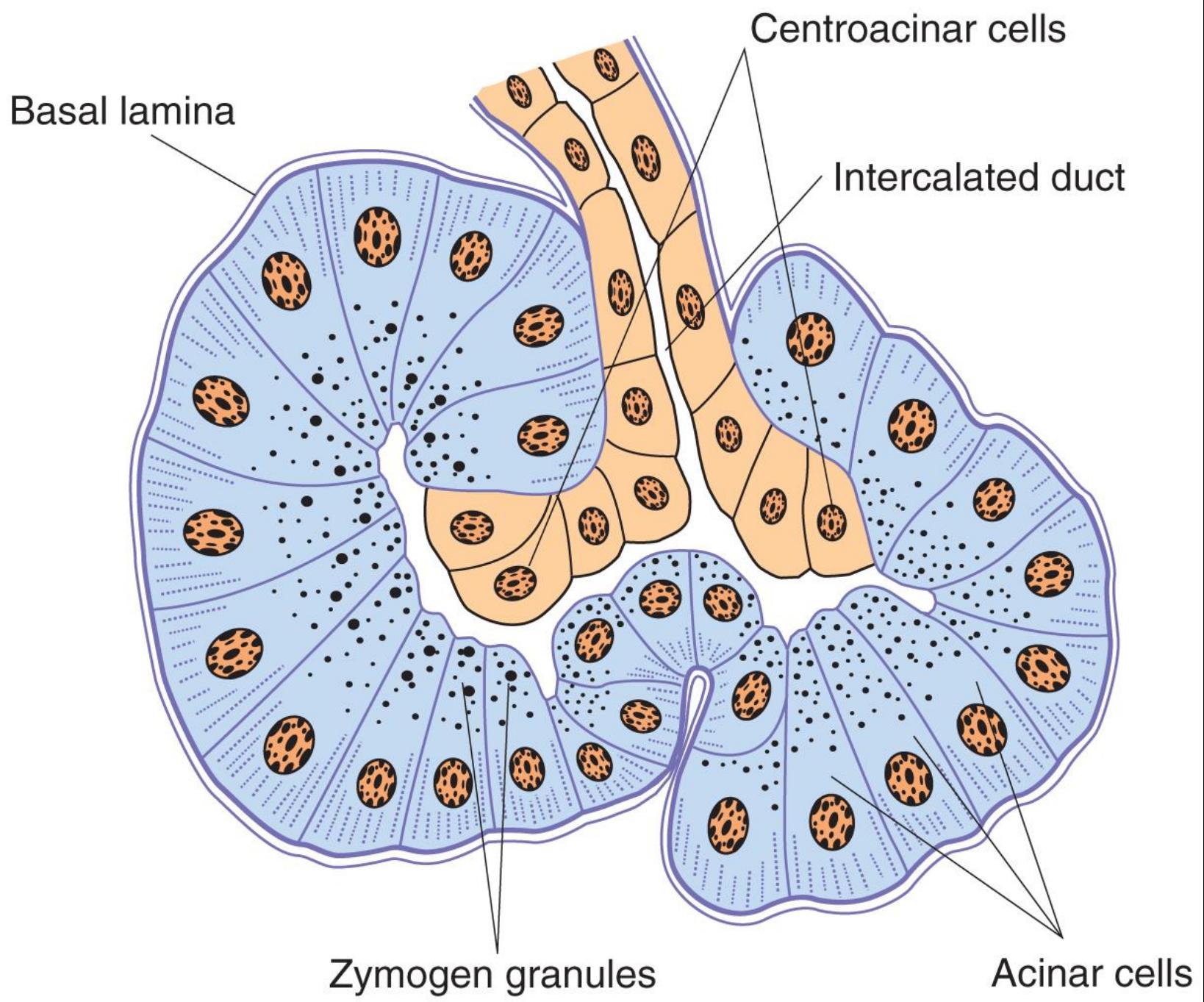
ZYMOGEN
GRANULES

GOLGI
COMPLEX



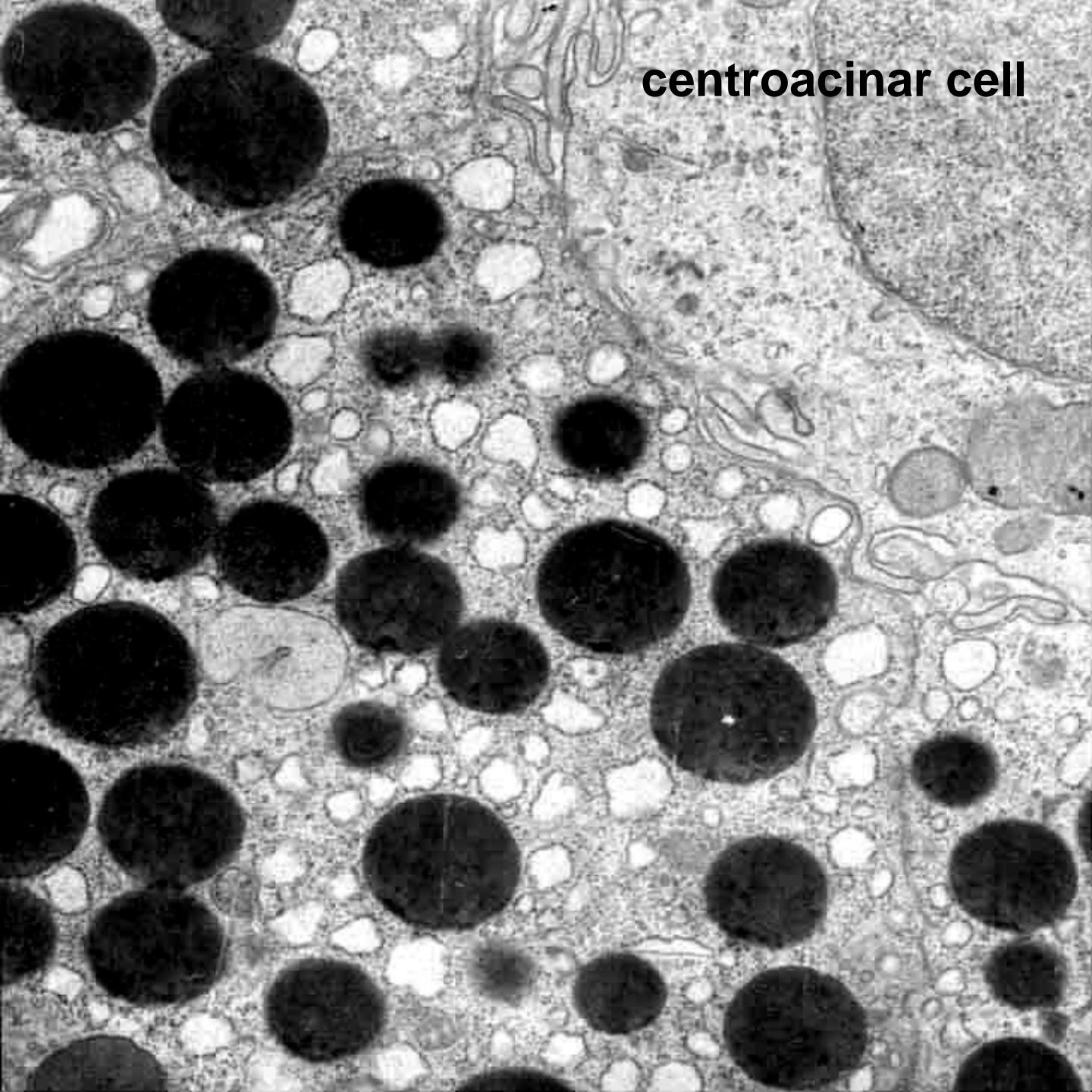
A light micrograph showing a cluster of centroacinar cells within a glandular structure. These cells are characterized by their large, pale, eosinophilic cytoplasmic vacuoles, which represent stored mucus. The nuclei are dark purple and centrally located. The surrounding stroma contains other types of epithelial cells and connective tissue.

centroacinar cells

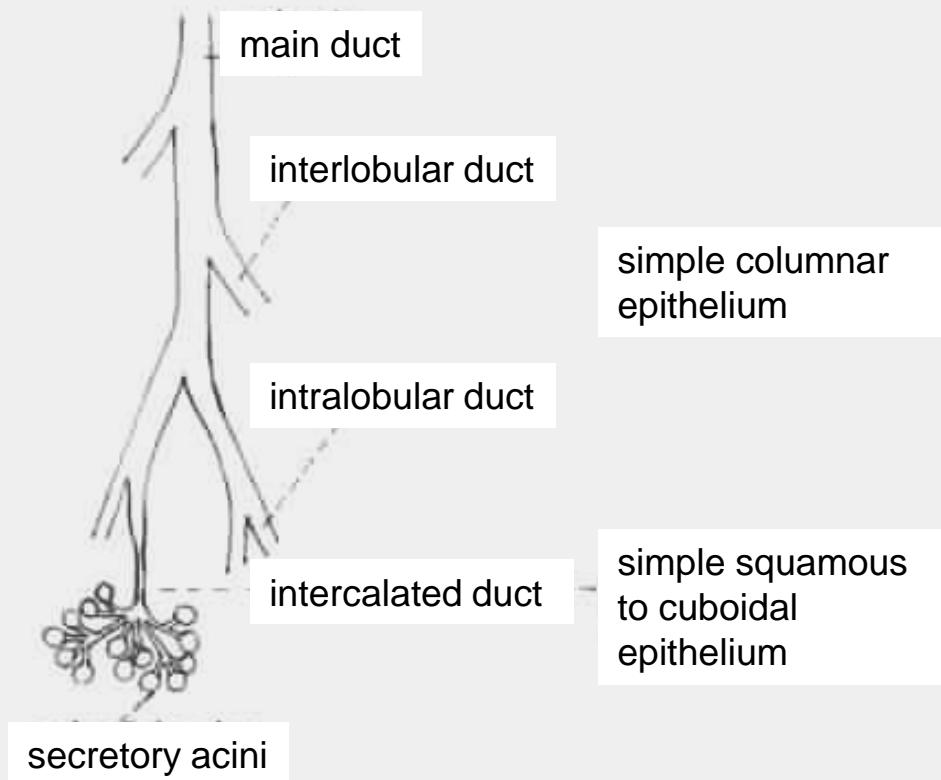
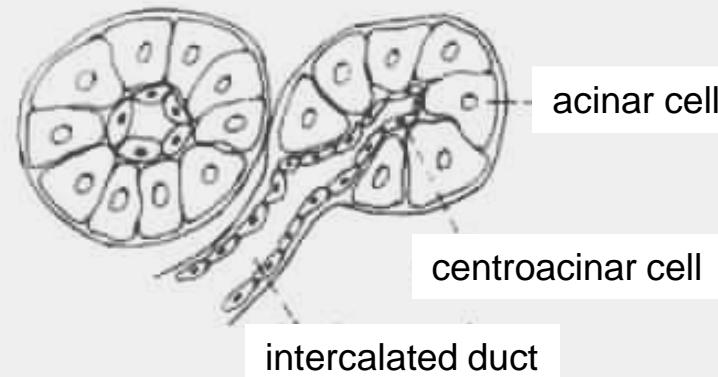


b

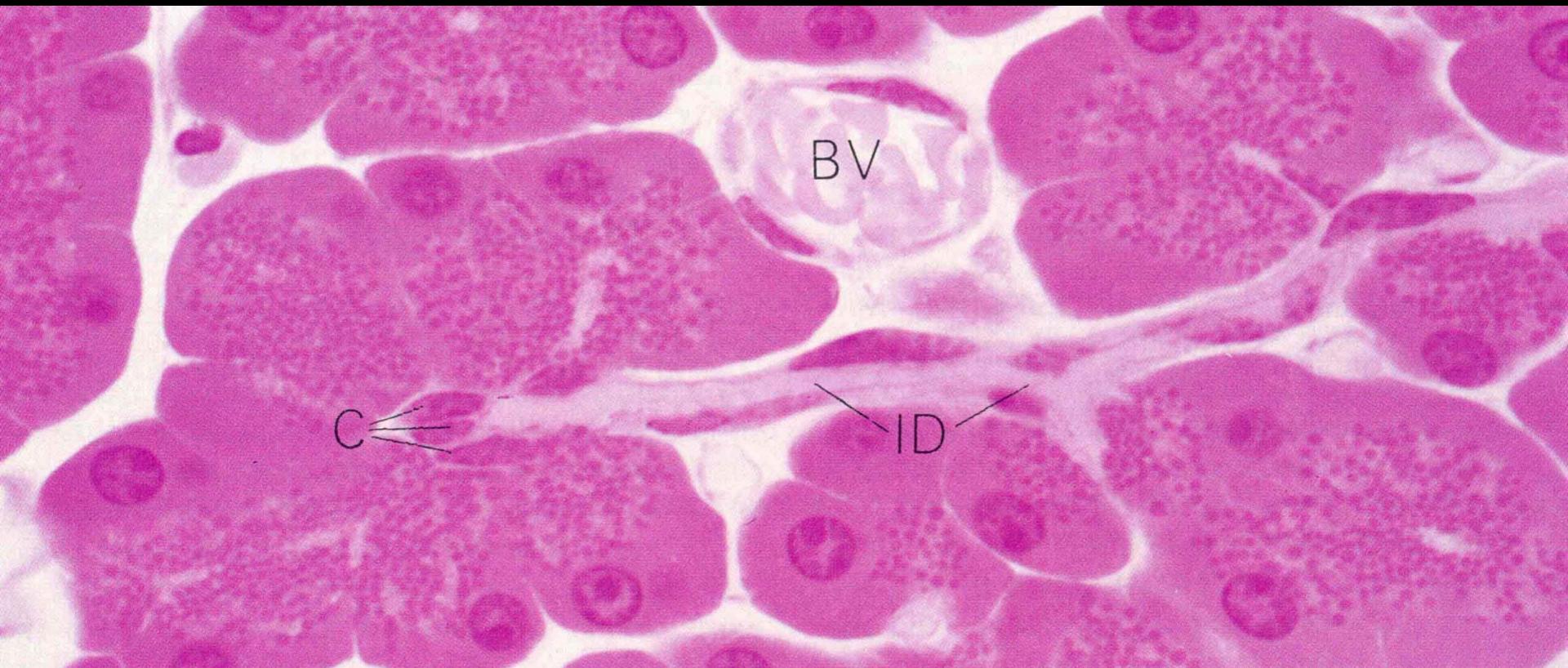
centroacinar cell



Ductal system



intercalated duct



This micrograph shows a tissue sample with several clusters of epithelial cells, known as lobules. Within these lobules, there are distinct tubular structures. A single tube within a lobule is labeled 'intralobular duct'. Another tube, which connects different lobules, is labeled 'interlobular duct'.

intralobular duct

interlobular duct

A light micrograph of breast tissue. It features several clusters of small, rounded, pinkish-purple structures representing lobules. Interspersed among them are larger, more irregularly shaped, pale pink areas representing interlobular ducts. The overall pattern is somewhat glandular and organized.

larger interlobular duct

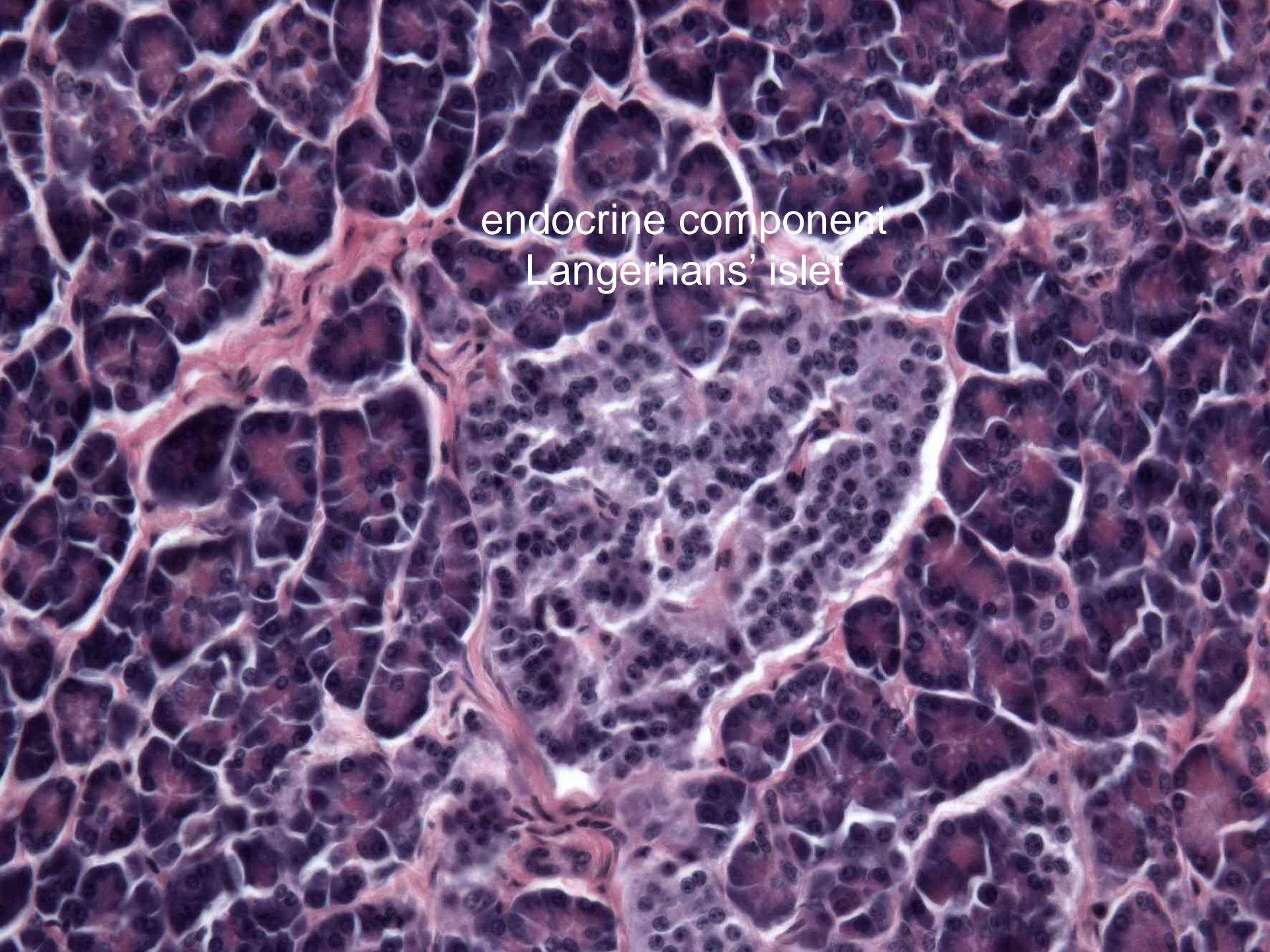
Exocrine pancreatic secretions

- water, ions (bicarbonate)
- trypsinogen
- chymotrypsinogen
- carboxypeptidase
- ribonuclease
- deoxyribonuclease
- triacylglycerollipase
- phospholipase A2
- elastase
- amylase

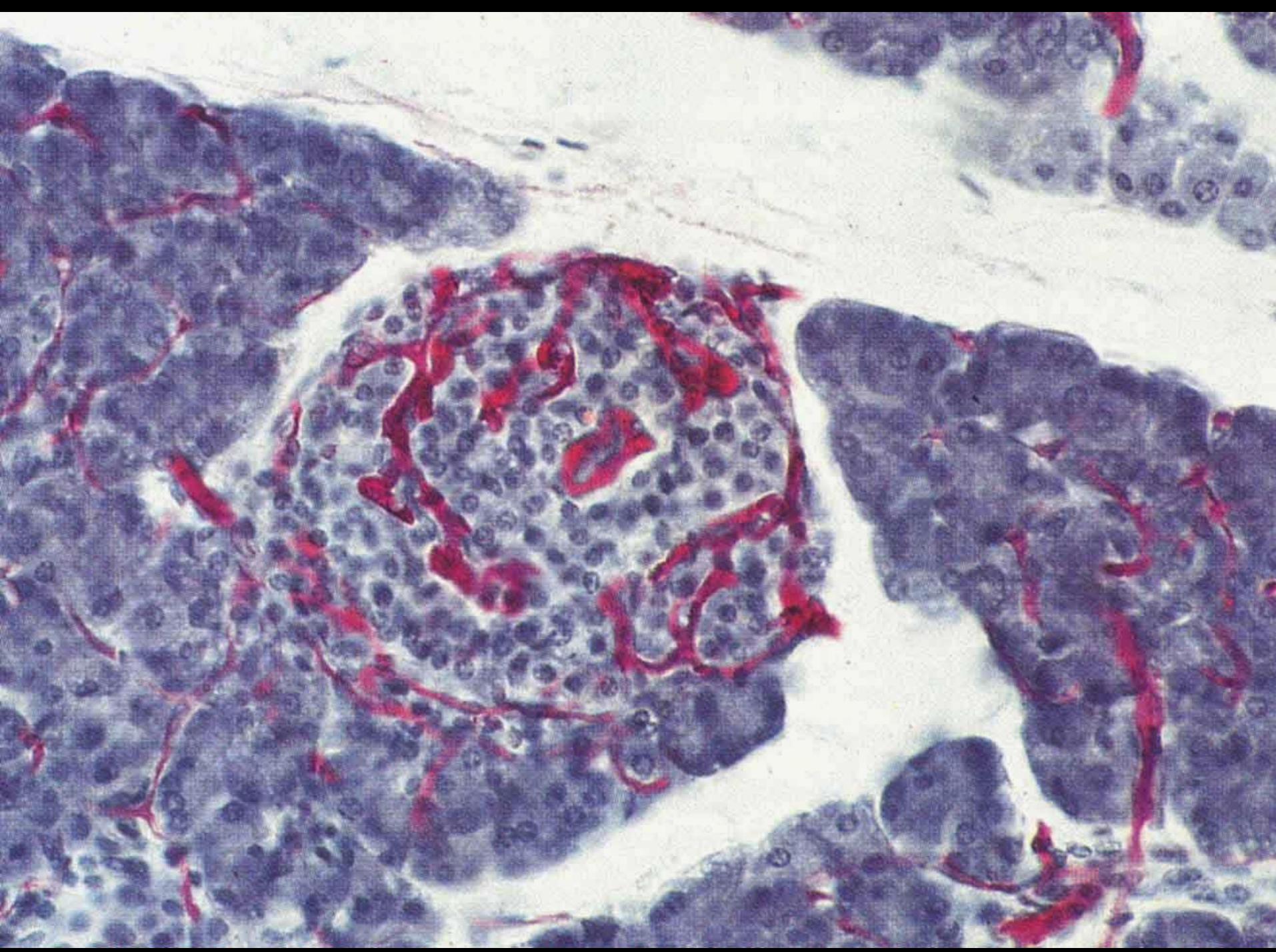
Secretion control:

secretin (S-cells) ▲ water, ▲ bicarbonate, ▼ enzymes

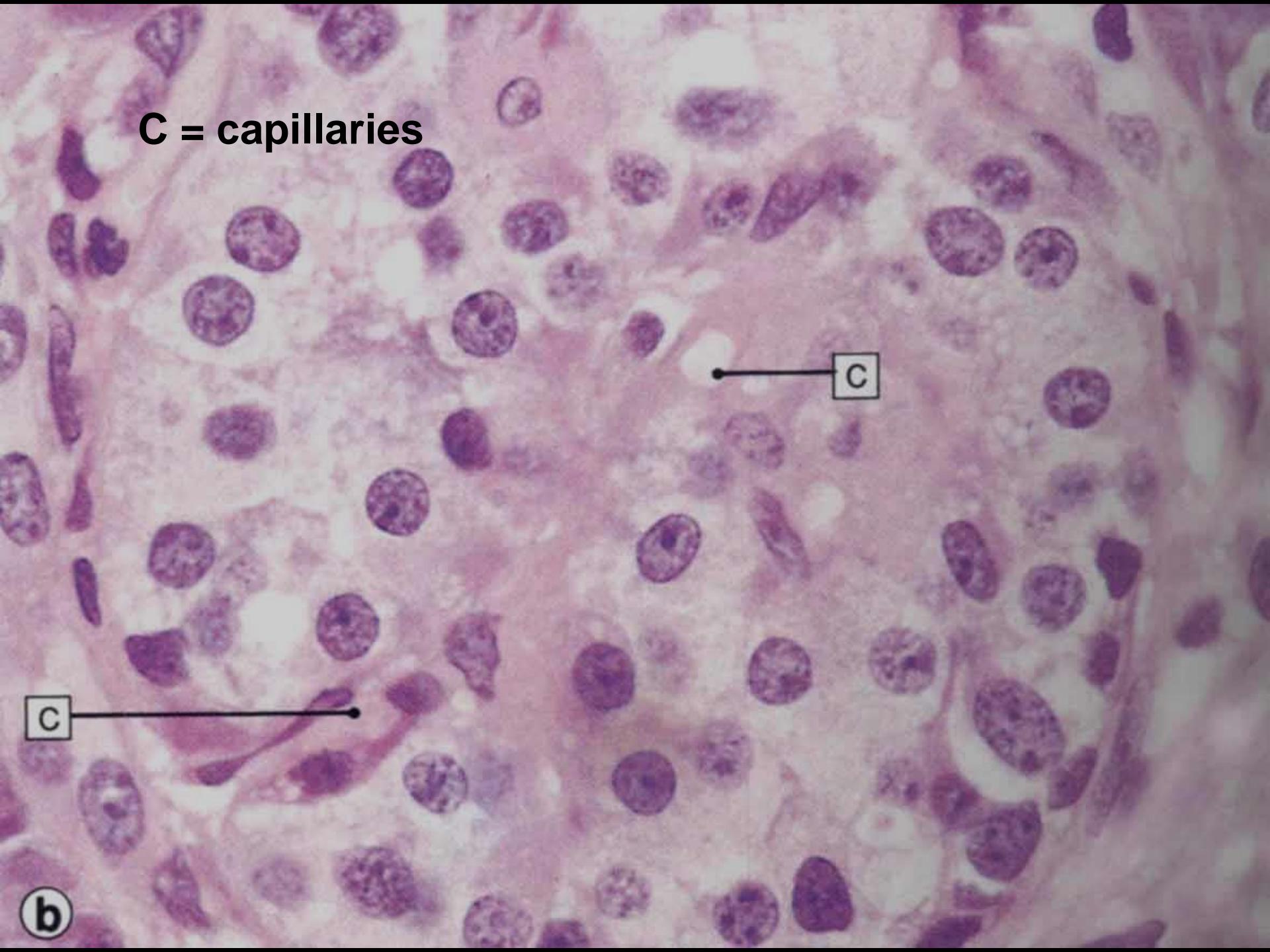
cholecystokinin (I-cells) ▲ enzymes, ▼ water

A high-magnification light micrograph of a tissue section. The image shows a dense arrangement of cells with dark, granular nuclei. A prominent feature is a cluster of cells with very small, uniform nuclei, characteristic of a Langerhans' islet. The surrounding cells have larger, more irregularly shaped nuclei. The overall color palette is dominated by shades of purple and pink.

endocrine component
Langerhans' islet



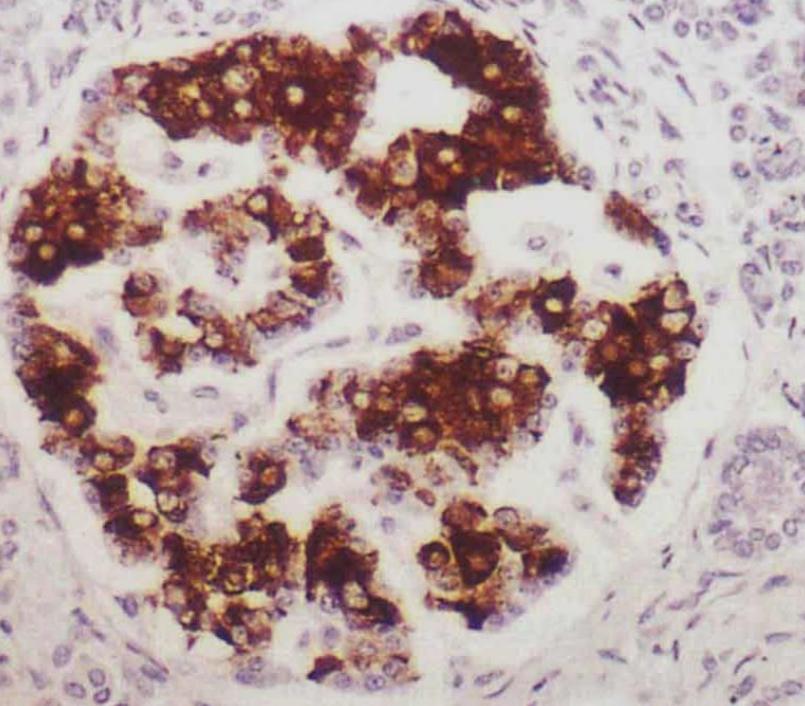
C = capillaries



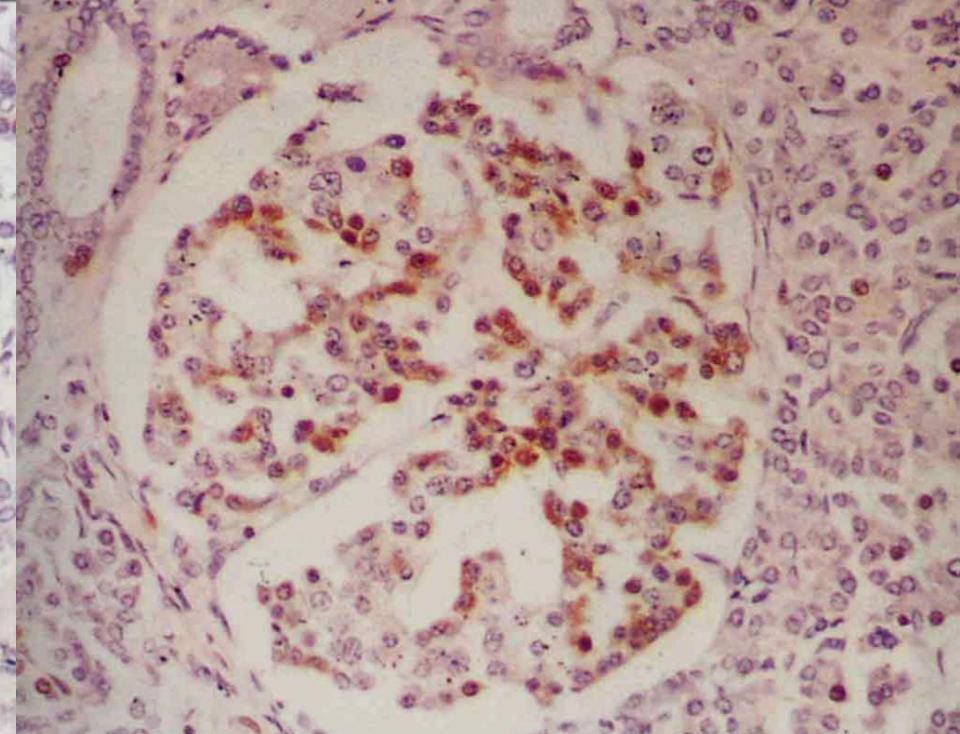
C

C

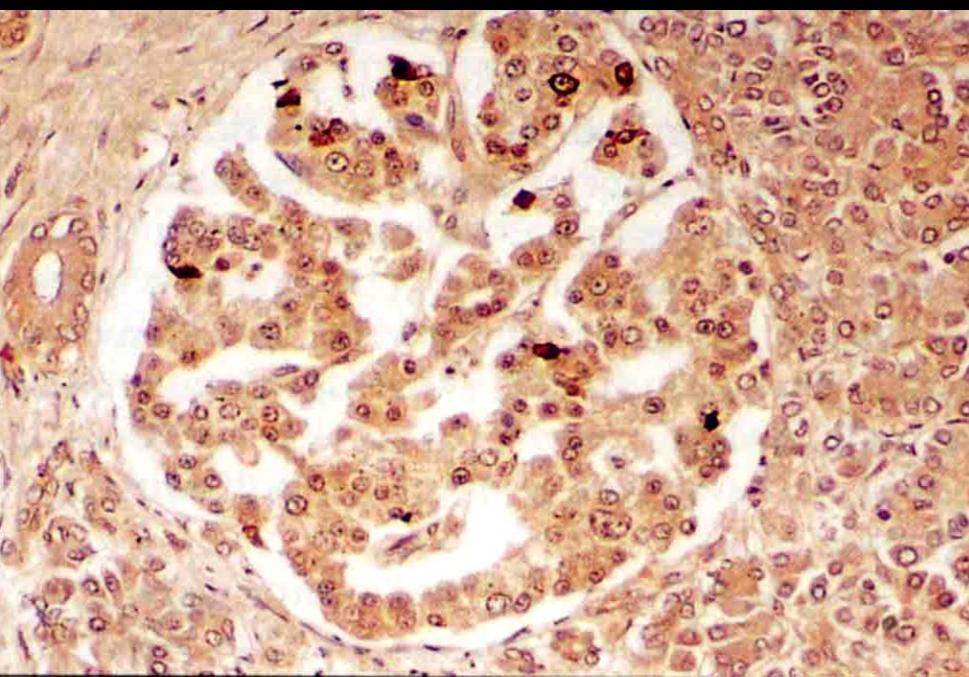
b



B cells
approx. 70 %
centrum, clusters



A cells
to 20 %
periphery,
sheets



D cells
to 5 %
scattered

Langerhans' islets

cell	granule structure	hormone
------	-------------------	---------

A



glucagon

B



insulin

D



somatostatin

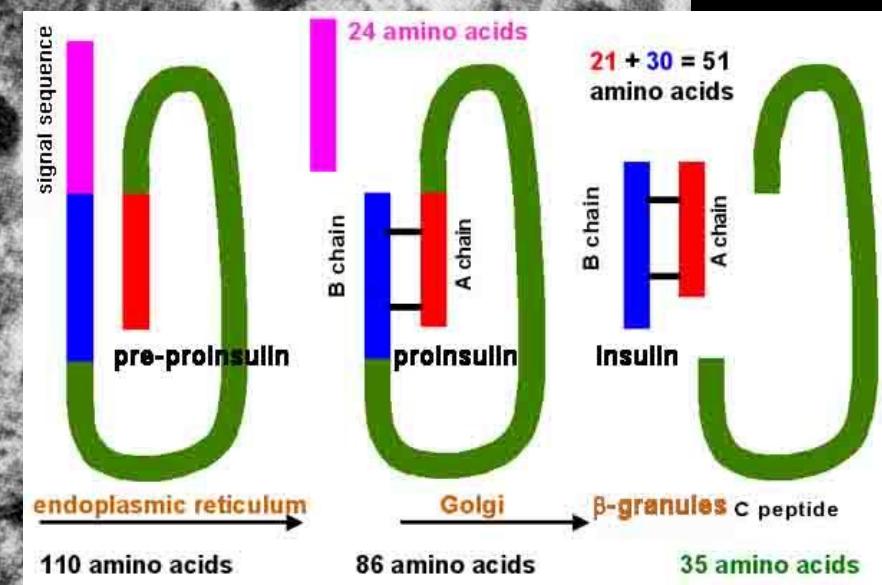
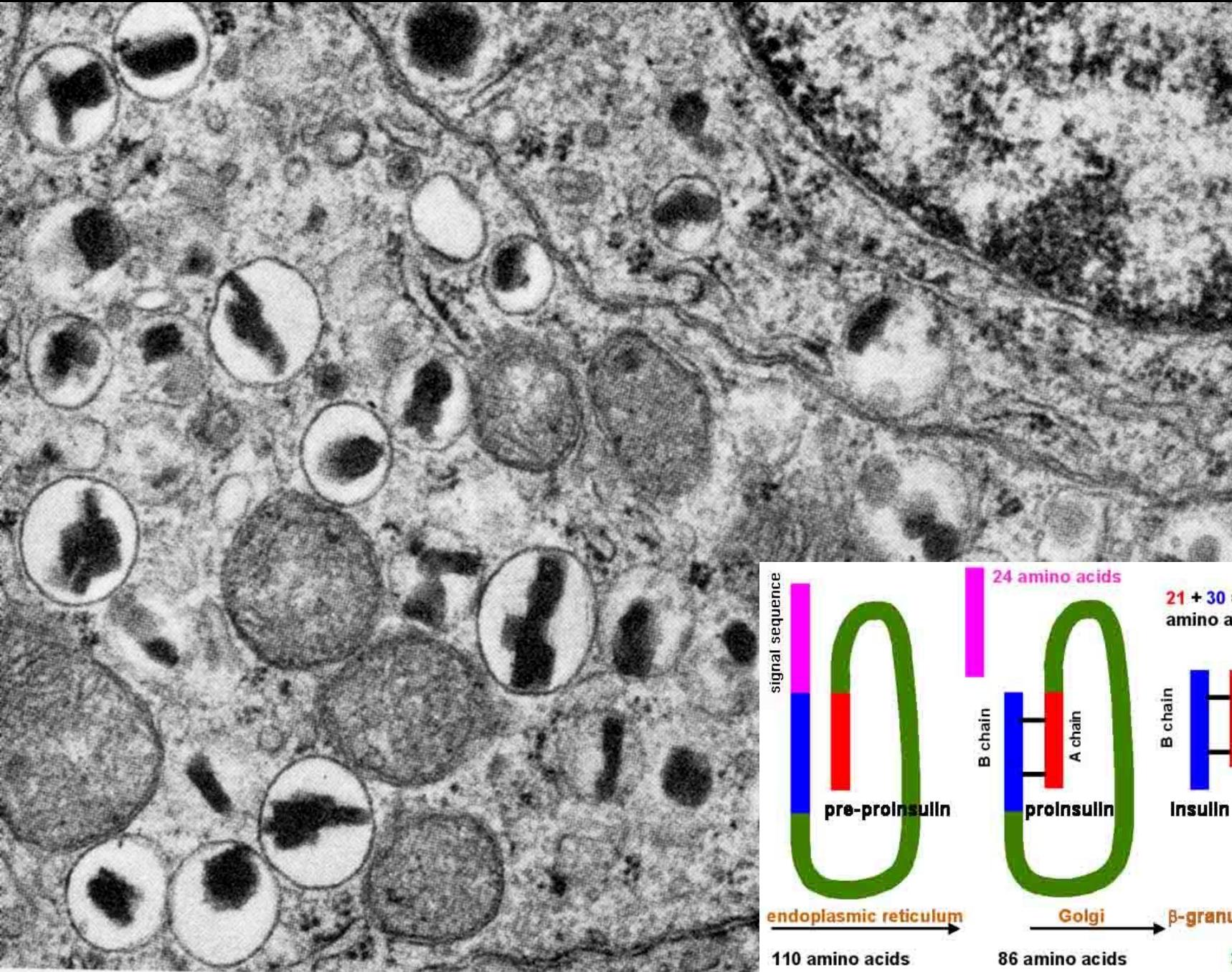
F



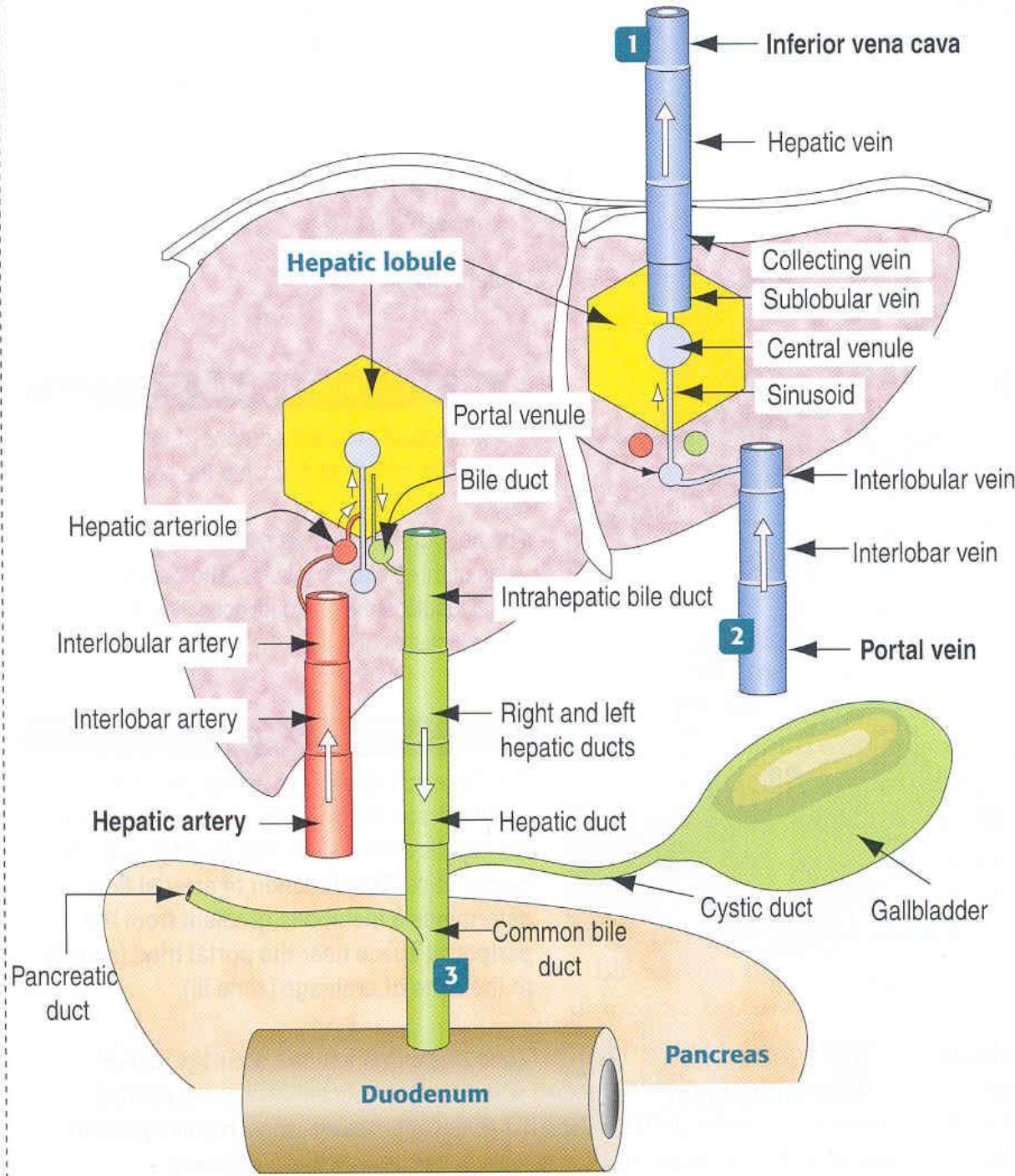
pancreatic
polypeptide

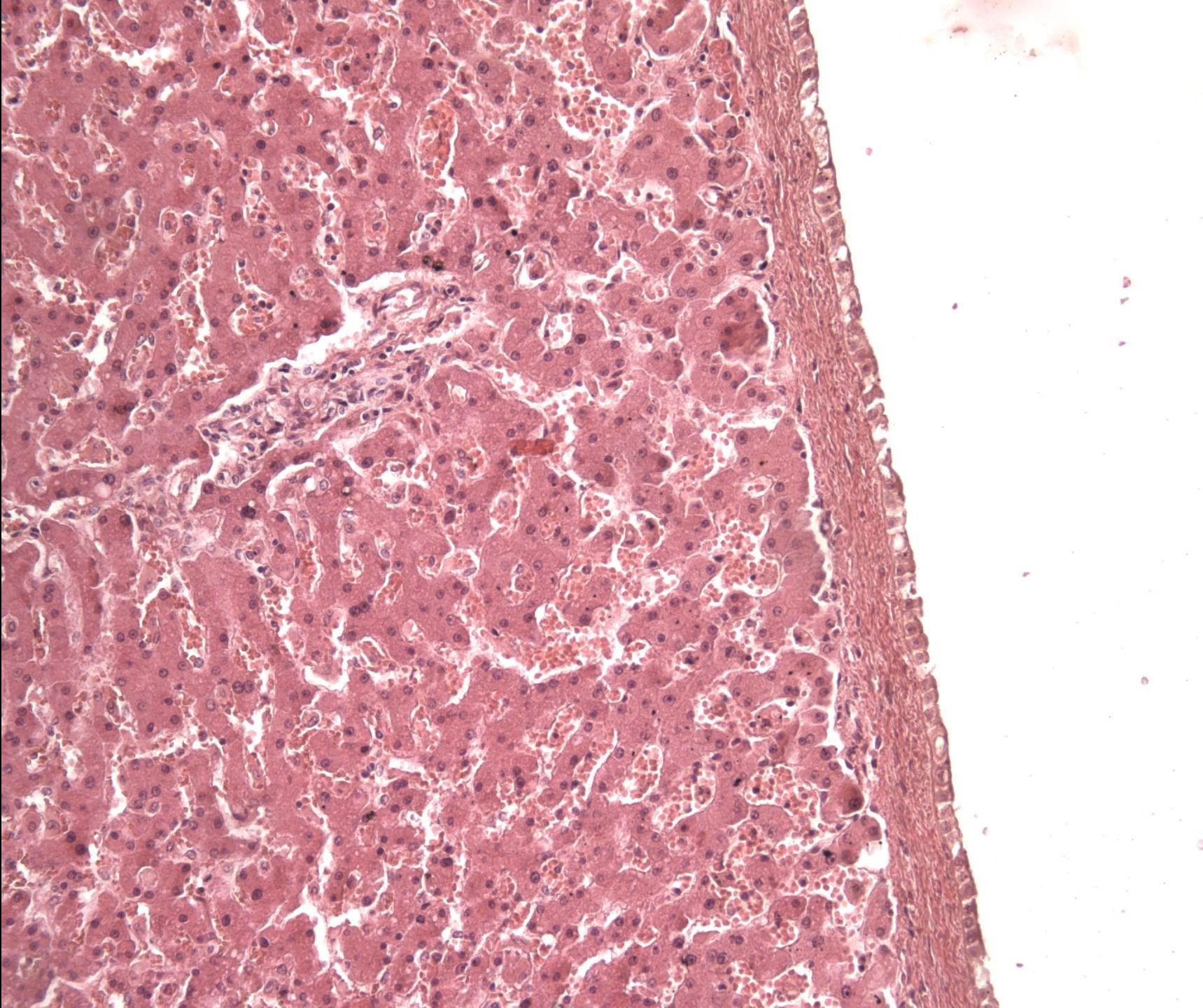
E (ghrelin), EC (substance P), D₁ (VIP)

B cell



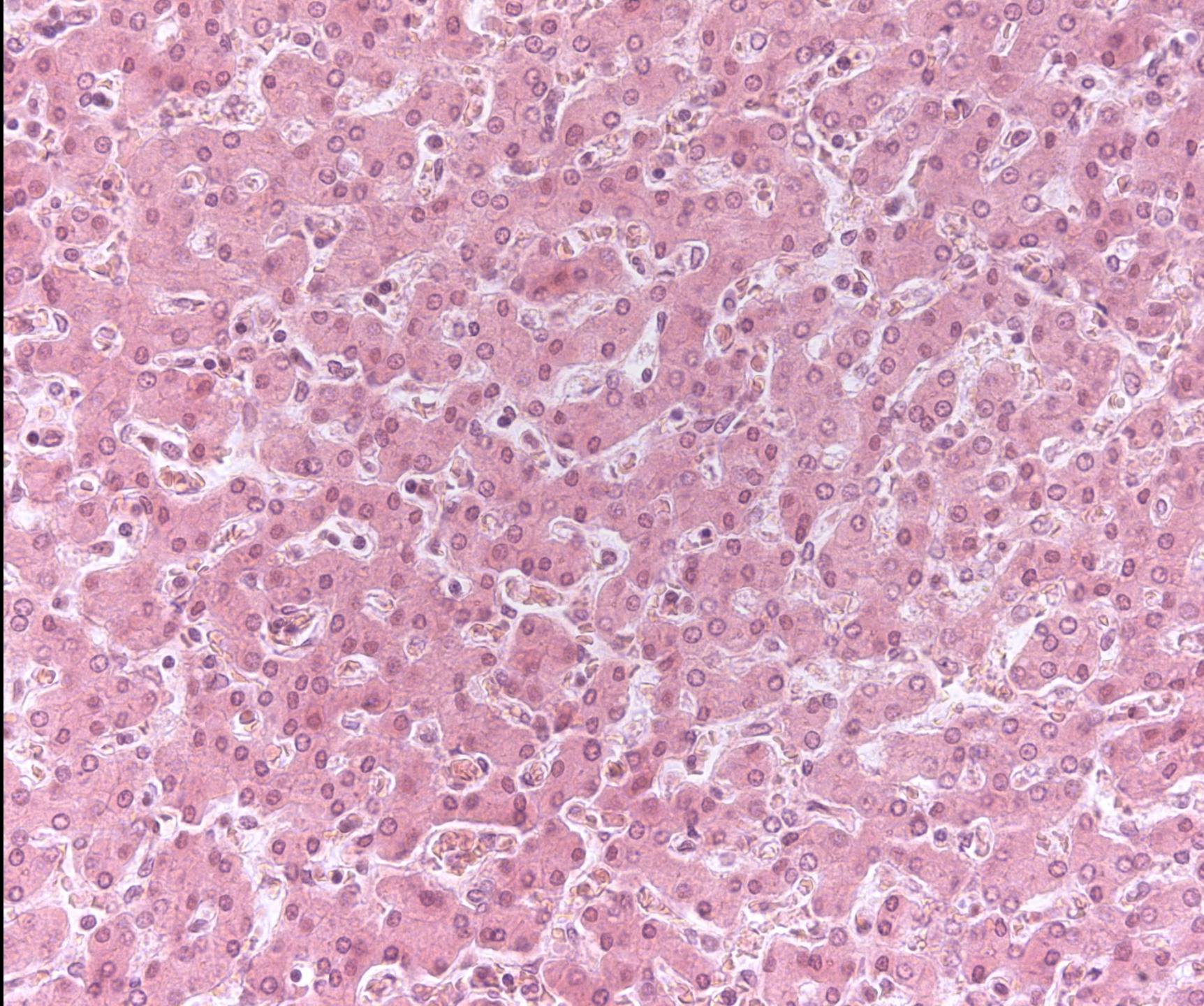
Liver (iecur, hepar)

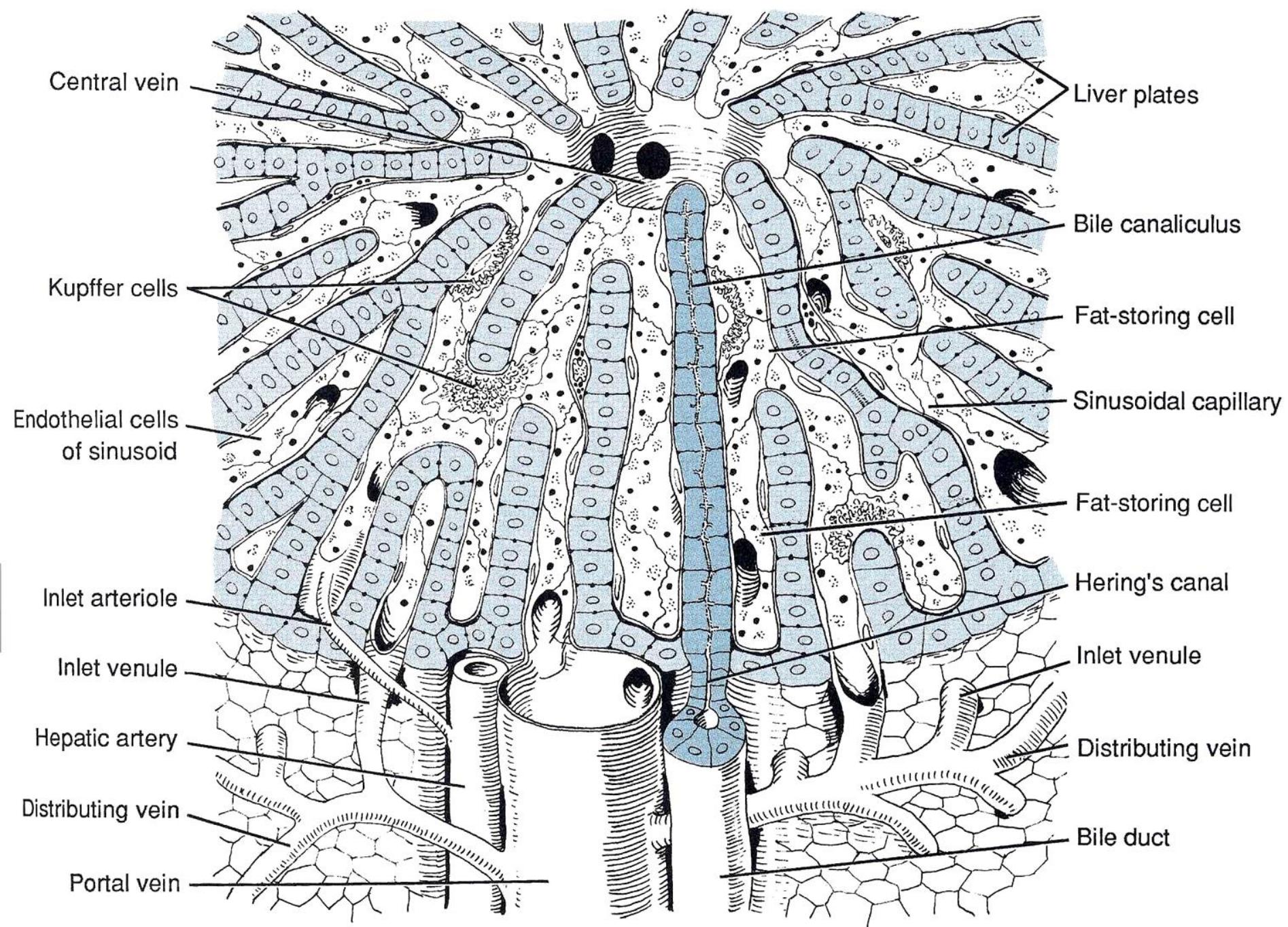




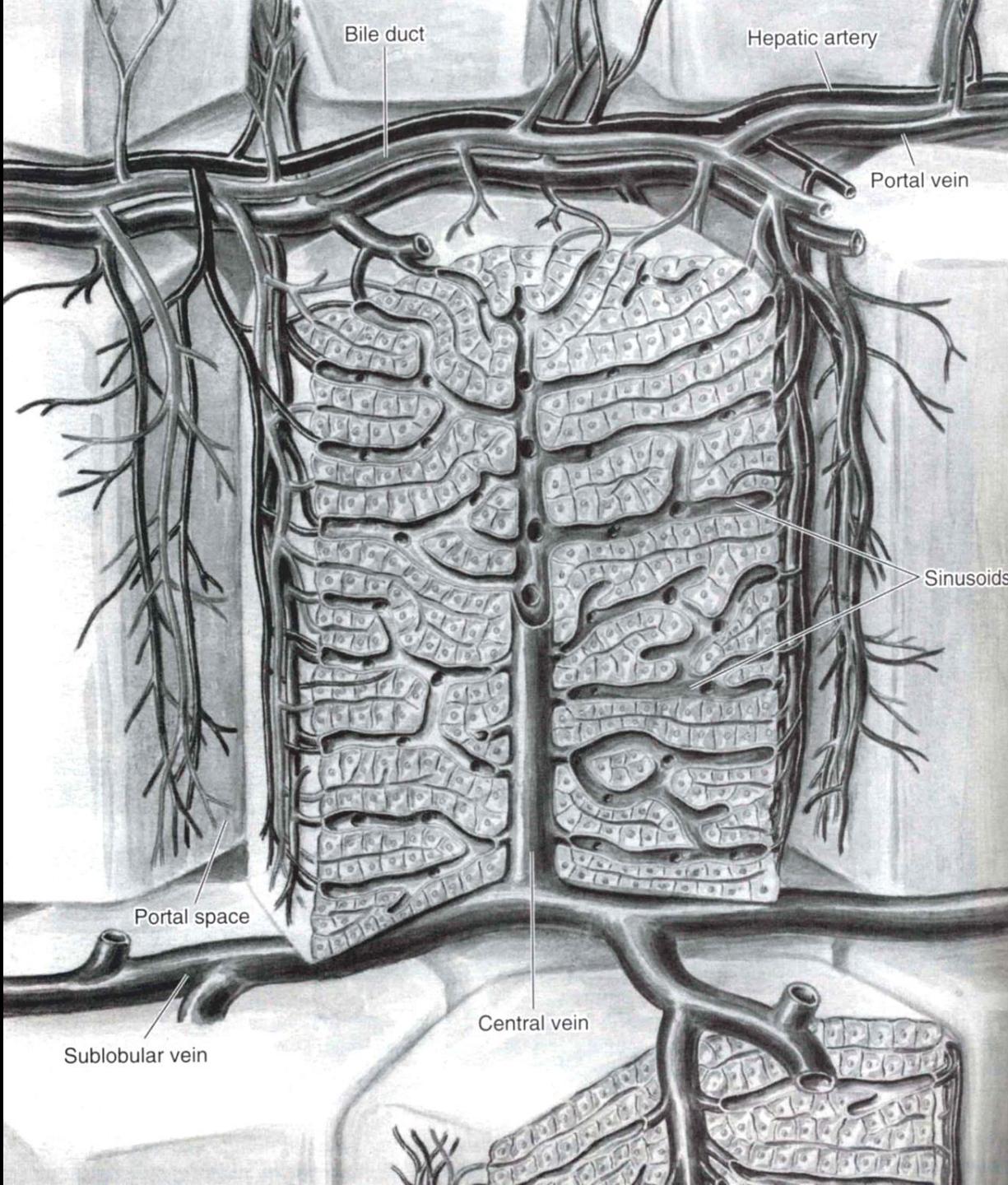
Trabecular epithelium







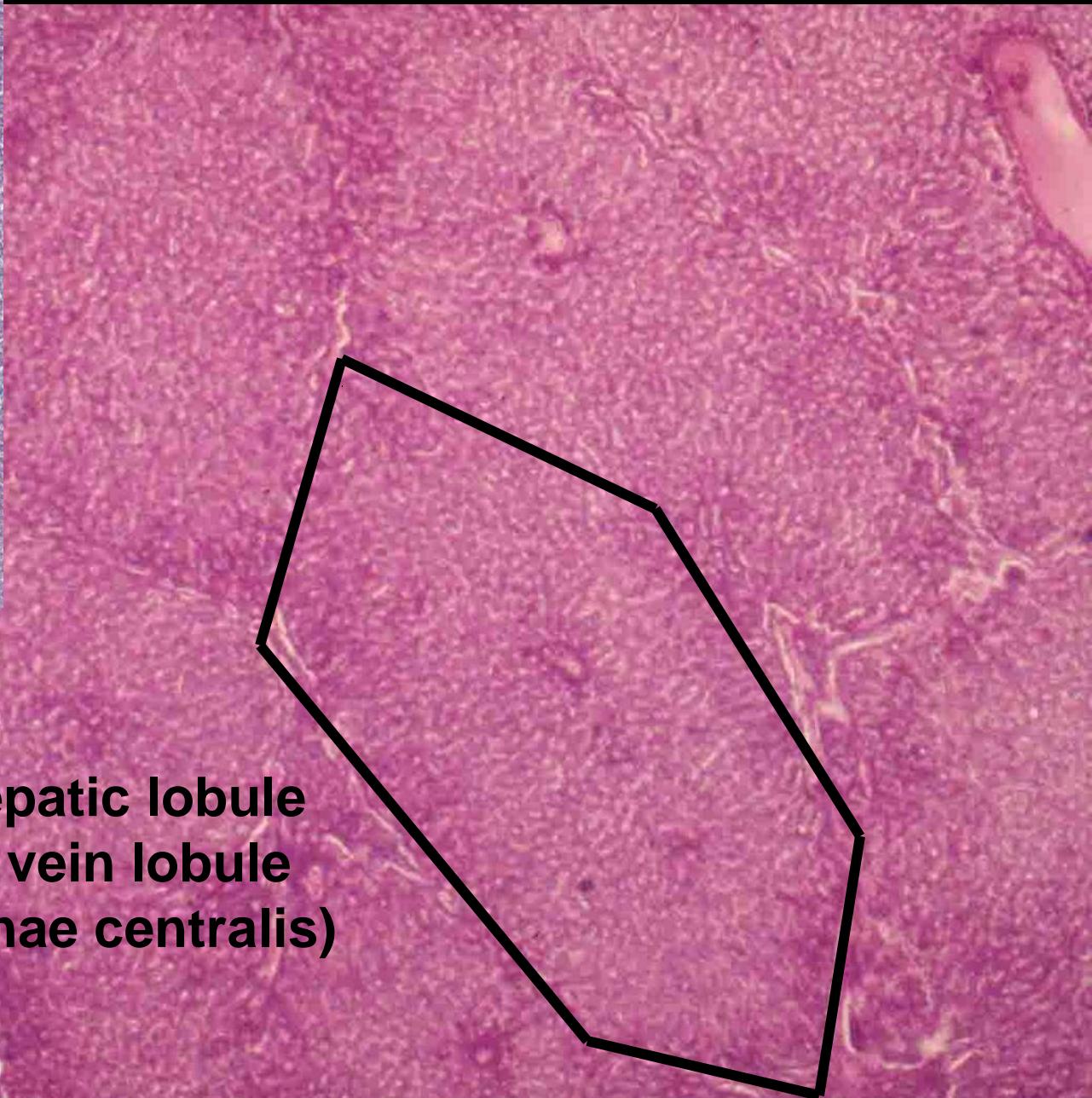
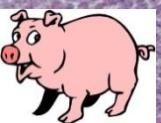
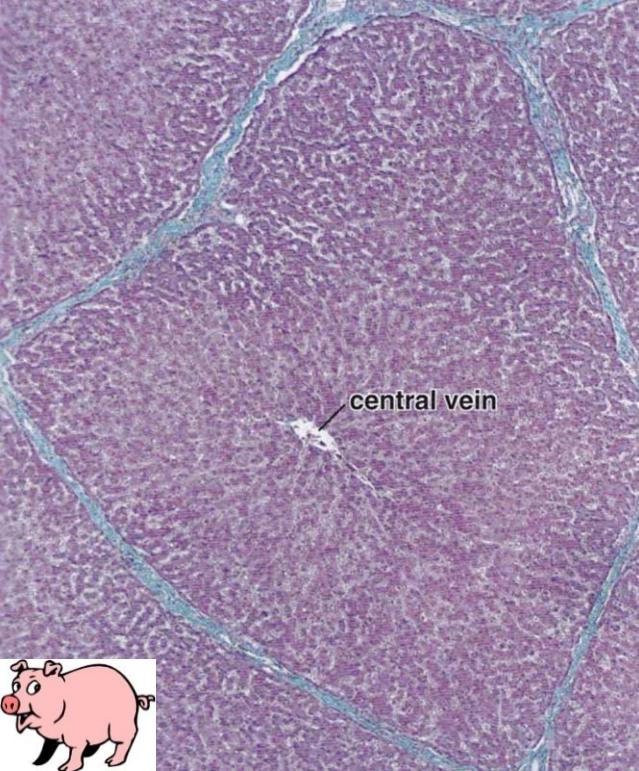
Blood supply



A light micrograph of liver tissue. A prominent, roughly triangular area in the center-right is labeled "portal or portobiliary space" in red text. This space contains several small, dark, irregular clusters of cells and some thin-walled vessels. The surrounding tissue consists of numerous smaller, rounded cells with pale, granular cytoplasm, typical of hepatocytes.

portal or portobiliary space

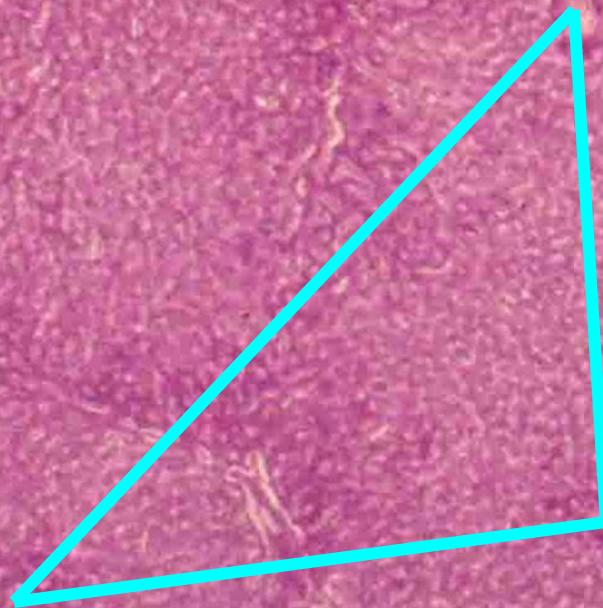




**classic hepatic lobule
or central vein lobule
(lobulus venae centralis)**

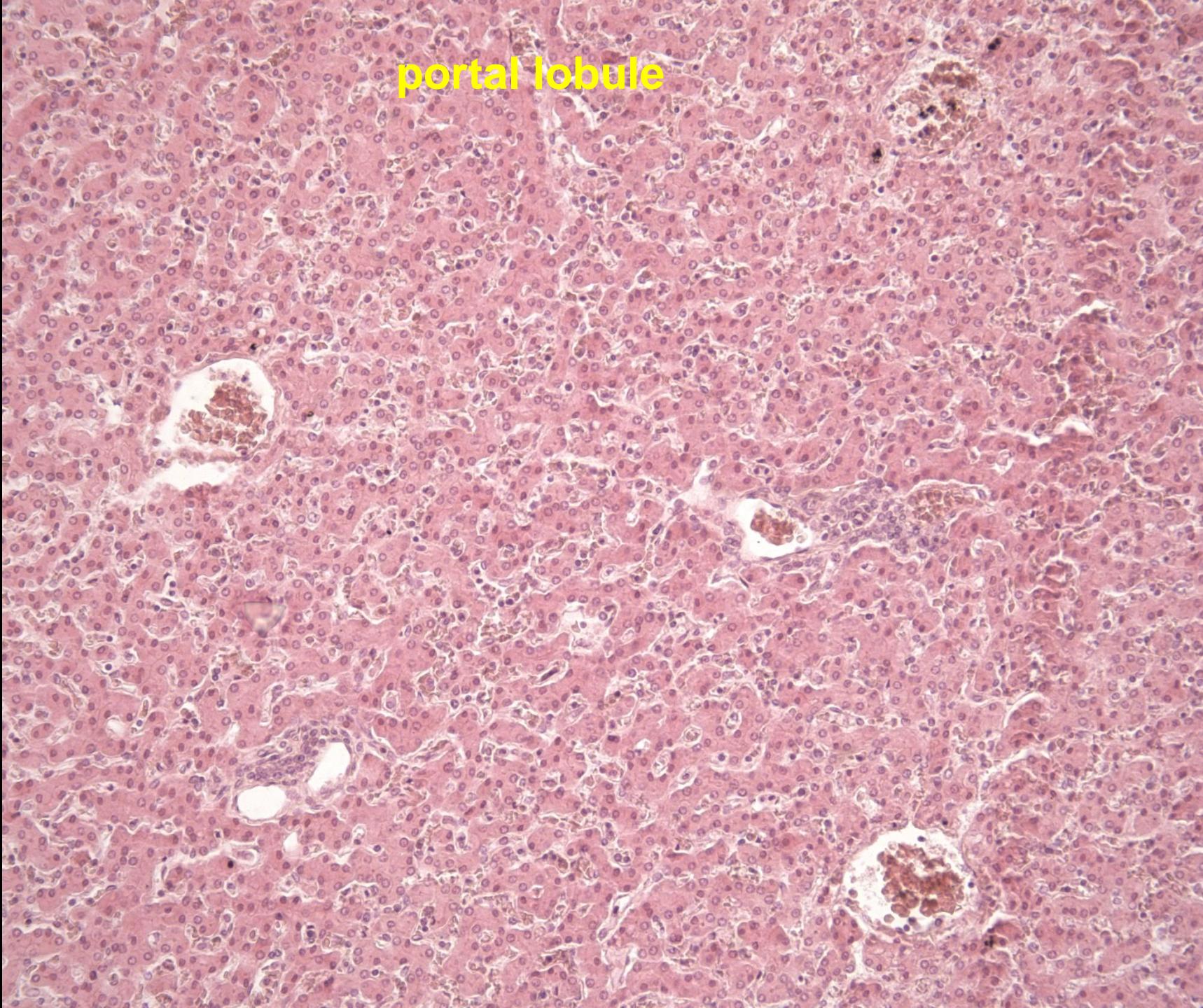


A light micrograph showing a hepatic lobule of liver tissue. The lobule is roughly circular and densely packed with hepatocytes, which appear as small, pinkish-purple dots. A prominent feature is a central, dark brown, circular area representing the central vein. Radiating from the central vein are several darker, irregularly shaped areas representing the hepatic sinusoids. The overall structure is organized into a lobular pattern.
hepatic lobule

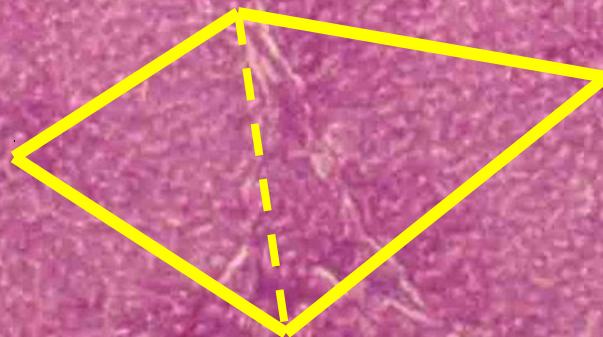


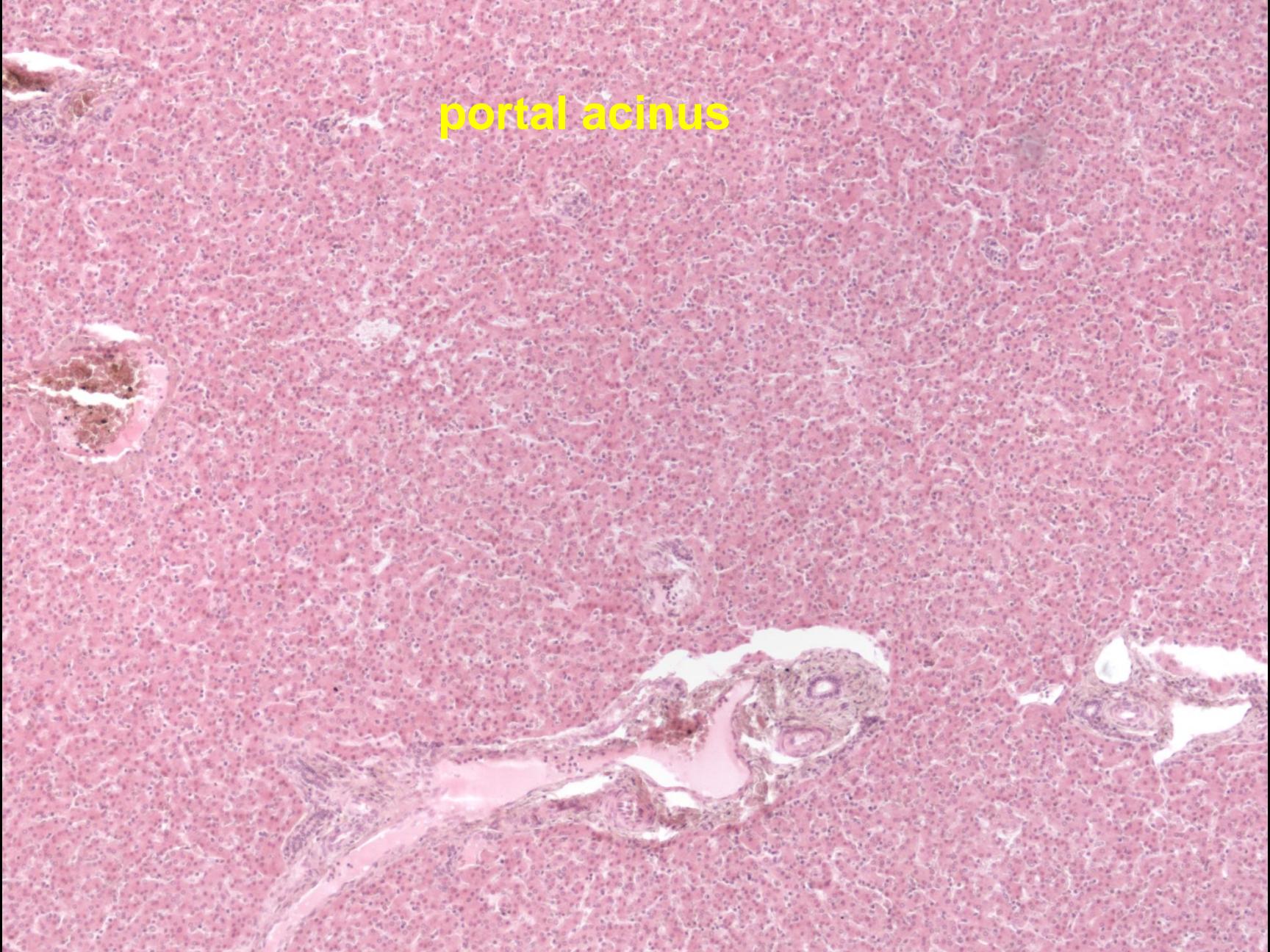
portal lobule
(lobulus venae interlobularis)

portal lobule



portal acinus
(acinus venae circumlobularis)



A light micrograph of liver tissue. The image shows several portal tracts, which are clusters of connective tissue containing blood vessels and bile ducts. These tracts are surrounded by hepatocyte cords, which are groups of liver cells arranged in a roughly circular pattern. The overall tissue has a pinkish hue, characteristic of hematoxylin staining.

portal acinus

a CLASSIC HEPATIC LOBULE

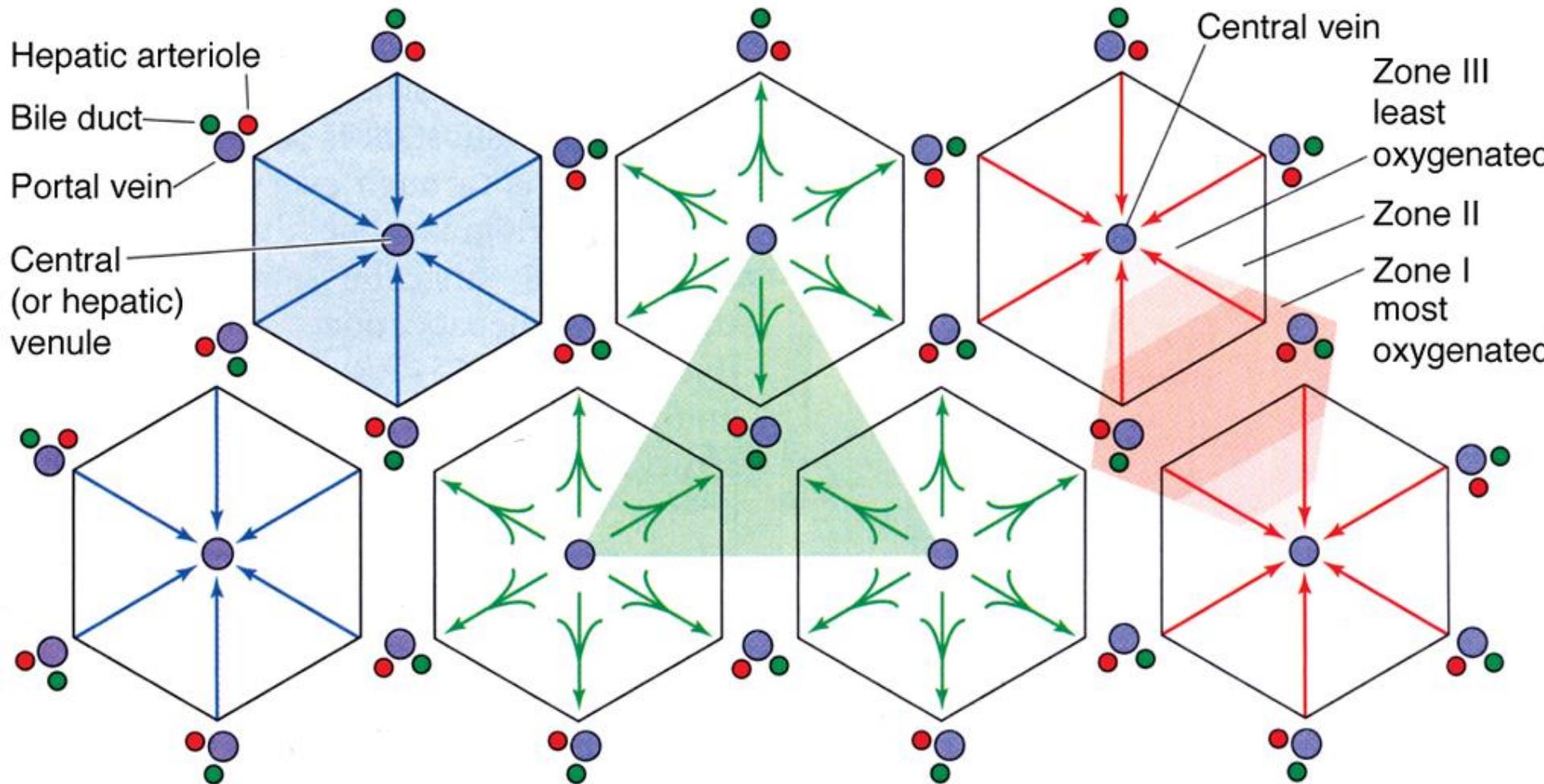
Drains blood from the portal vein and the hepatic artery to the hepatic or the central vein

b PORTAL LOBULE

Drains bile from hepatocytes to the bile duct

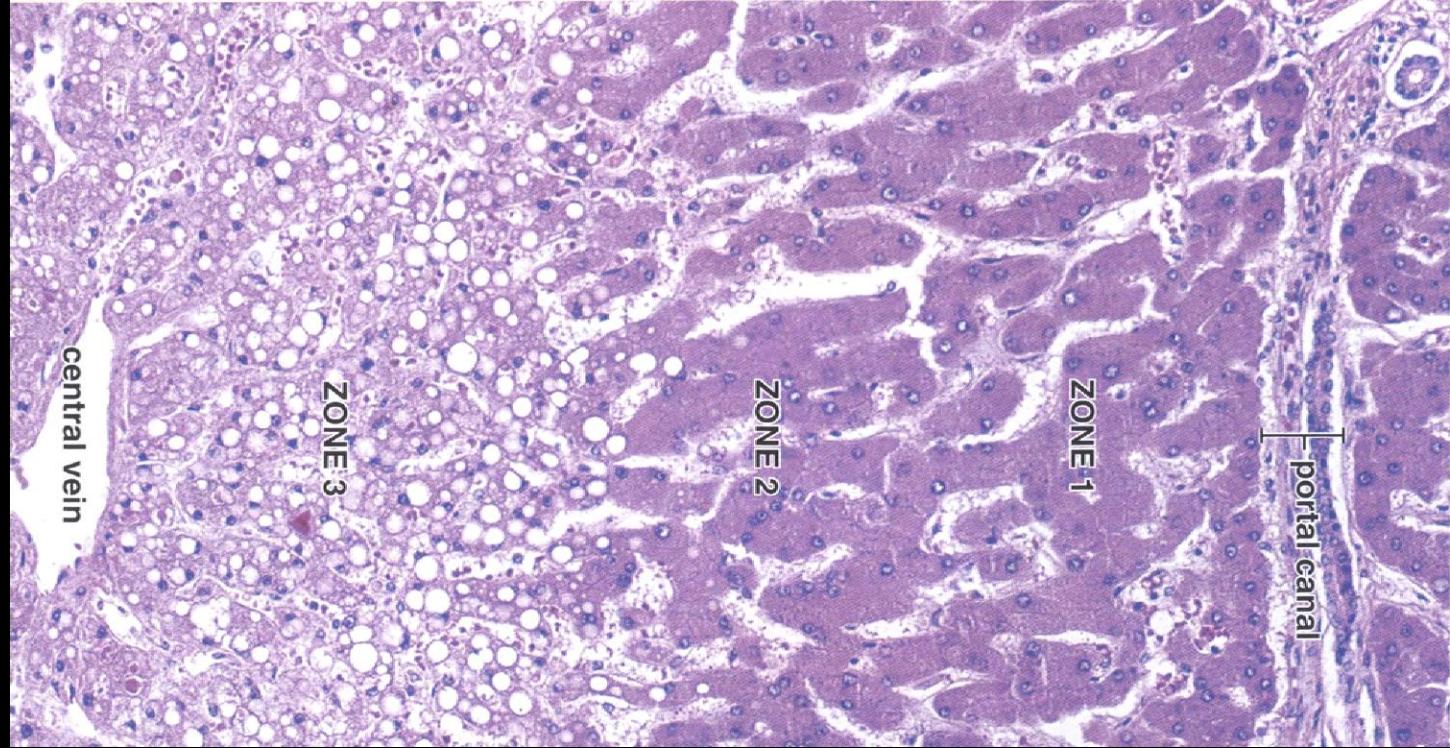
c PORTAL ACINUS

Supplies oxygenated blood to hepatocytes



hypoxic damage to classic hepatic lobule

Pawlina, W.: Histology. A Text and Atlas, Wolters Kluwer 2016.

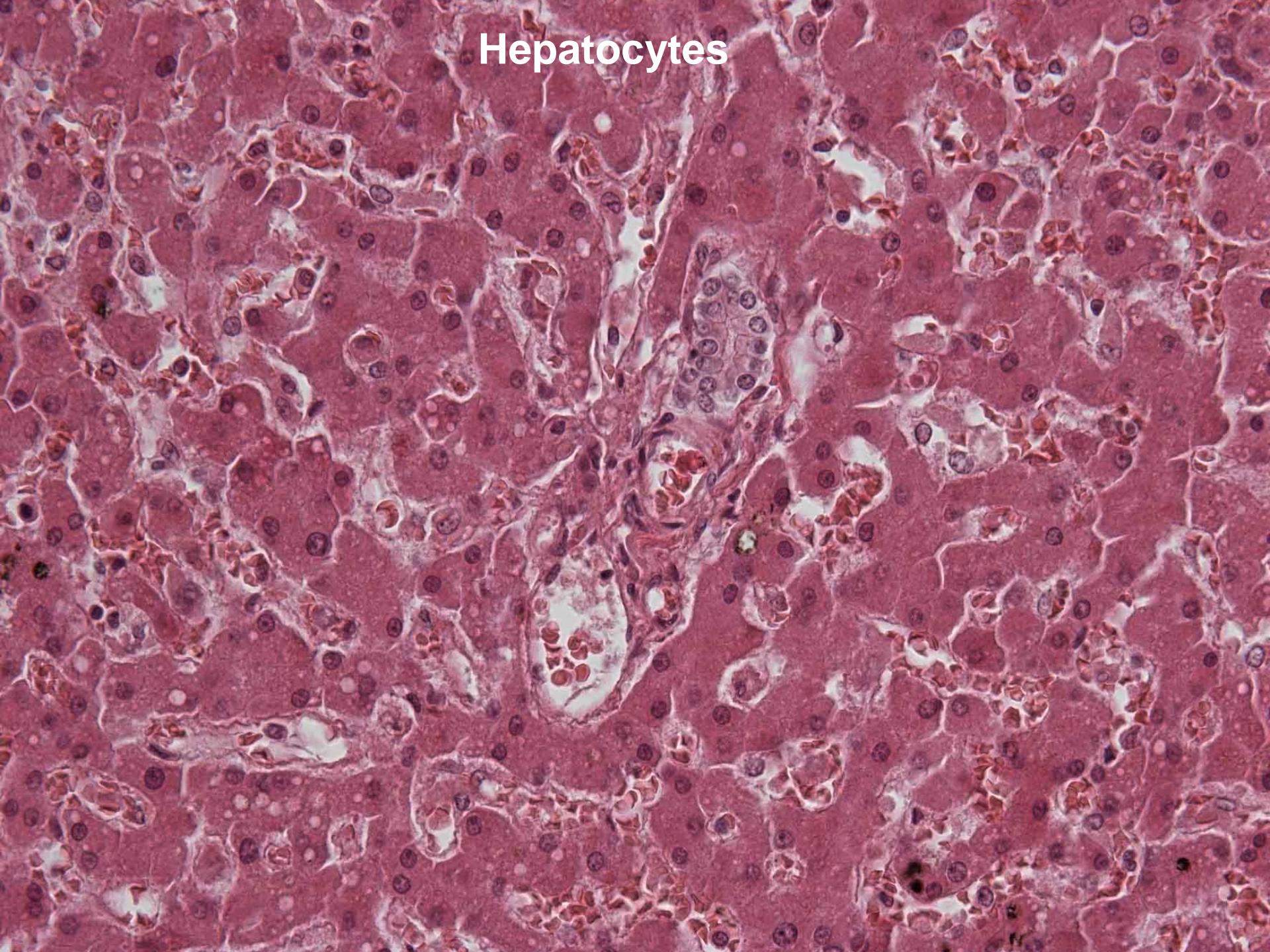


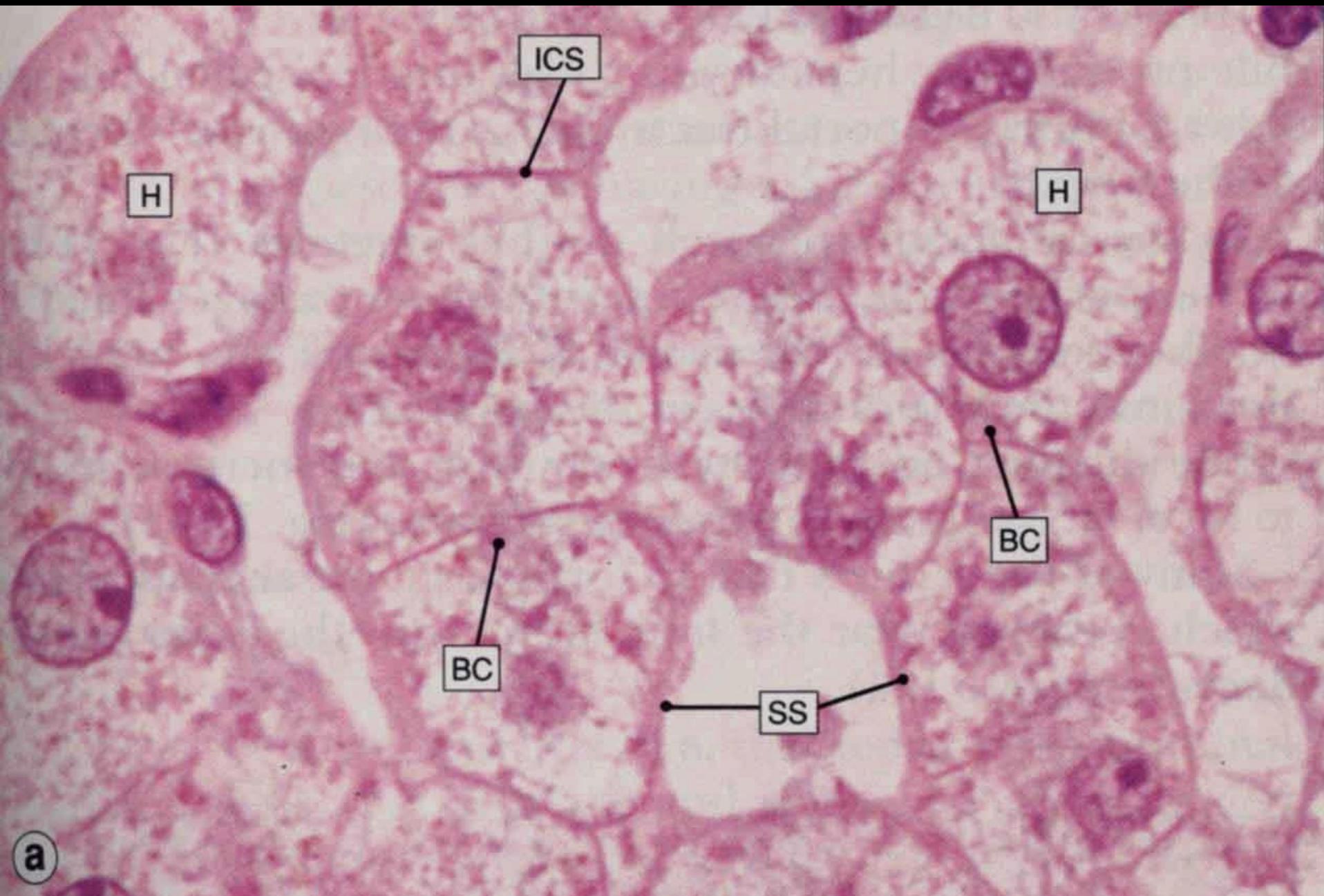
Sarma, V., Janmeda, P.: Protective assessment of Euphorbia neriiifolia and its isolated flavonoid against N-nitrosodiethylamine-induced hepatic carcinogenesis in male mice: A histopathological analysis. Toxicology International 21 (1), 2014: 37-43.

toxic damage to classic hepatic lobule

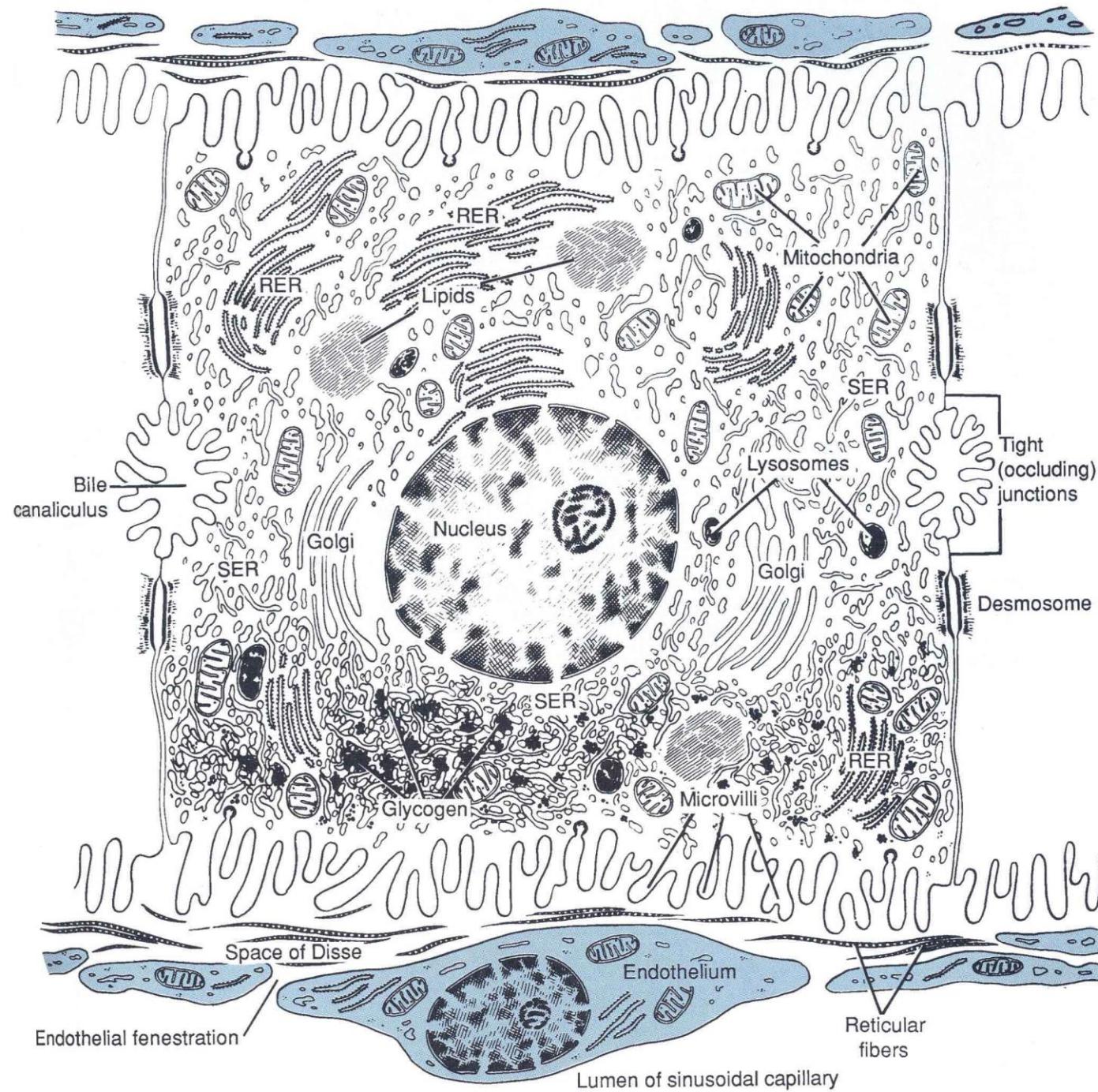


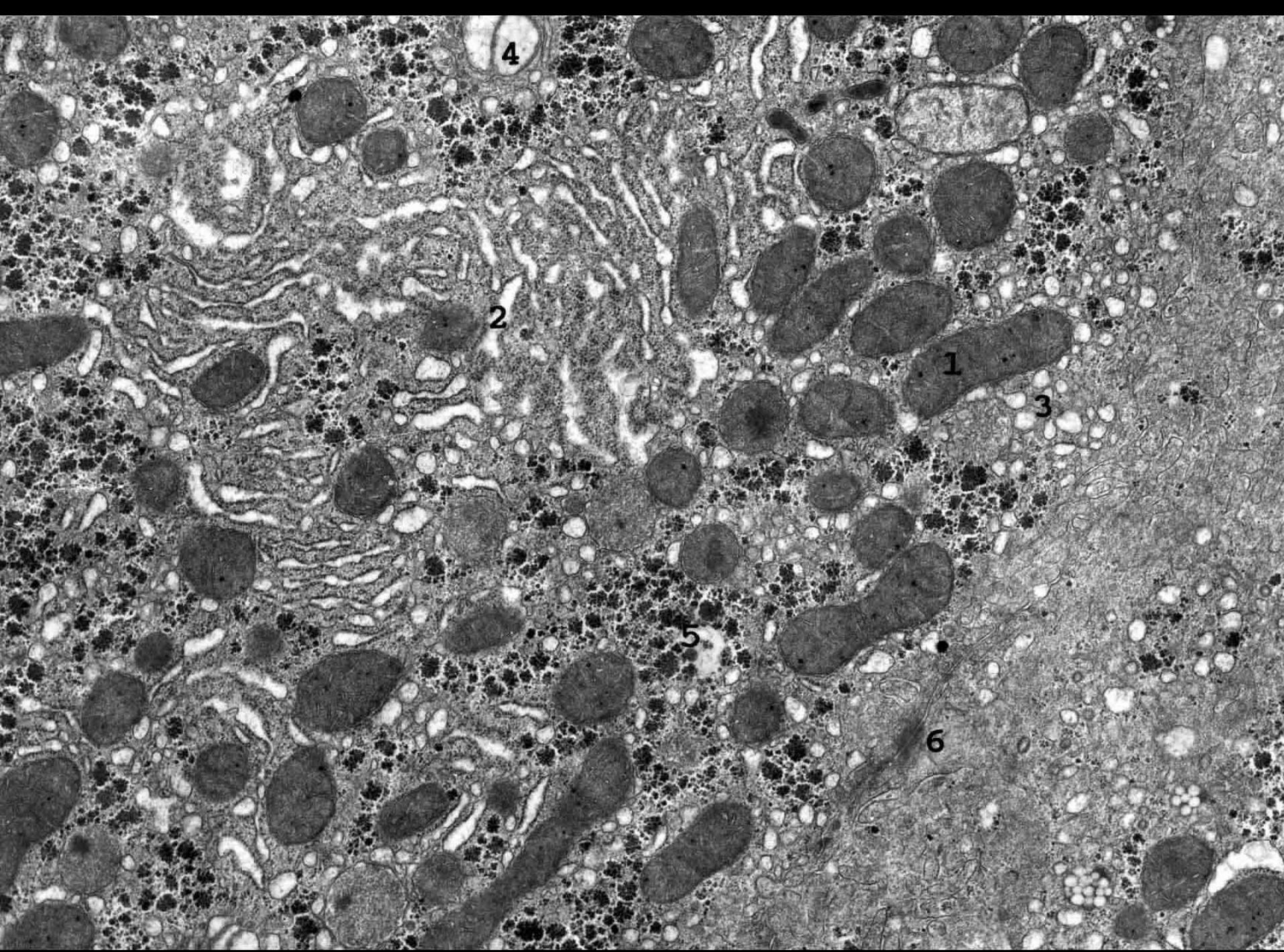
Hepatocytes

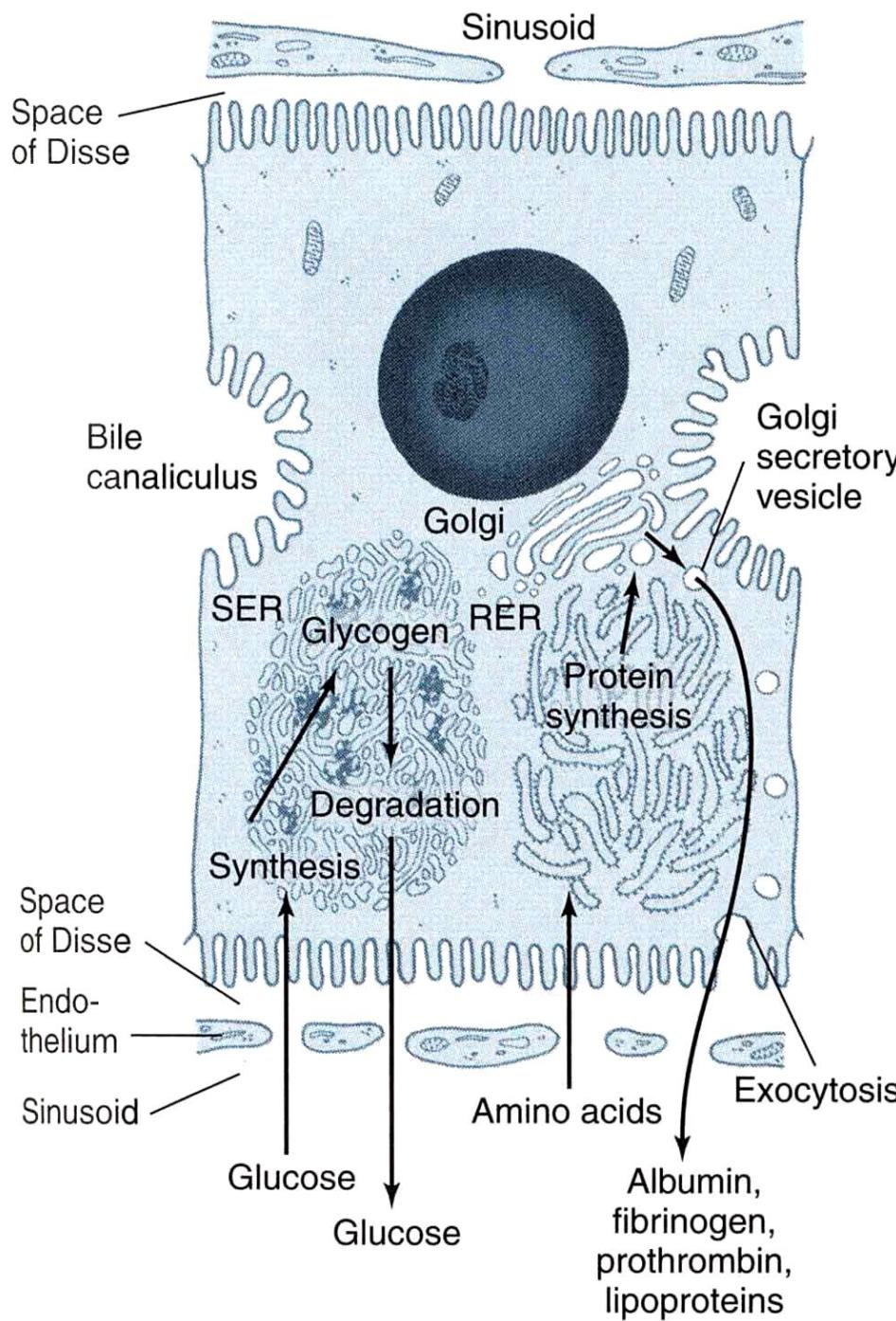




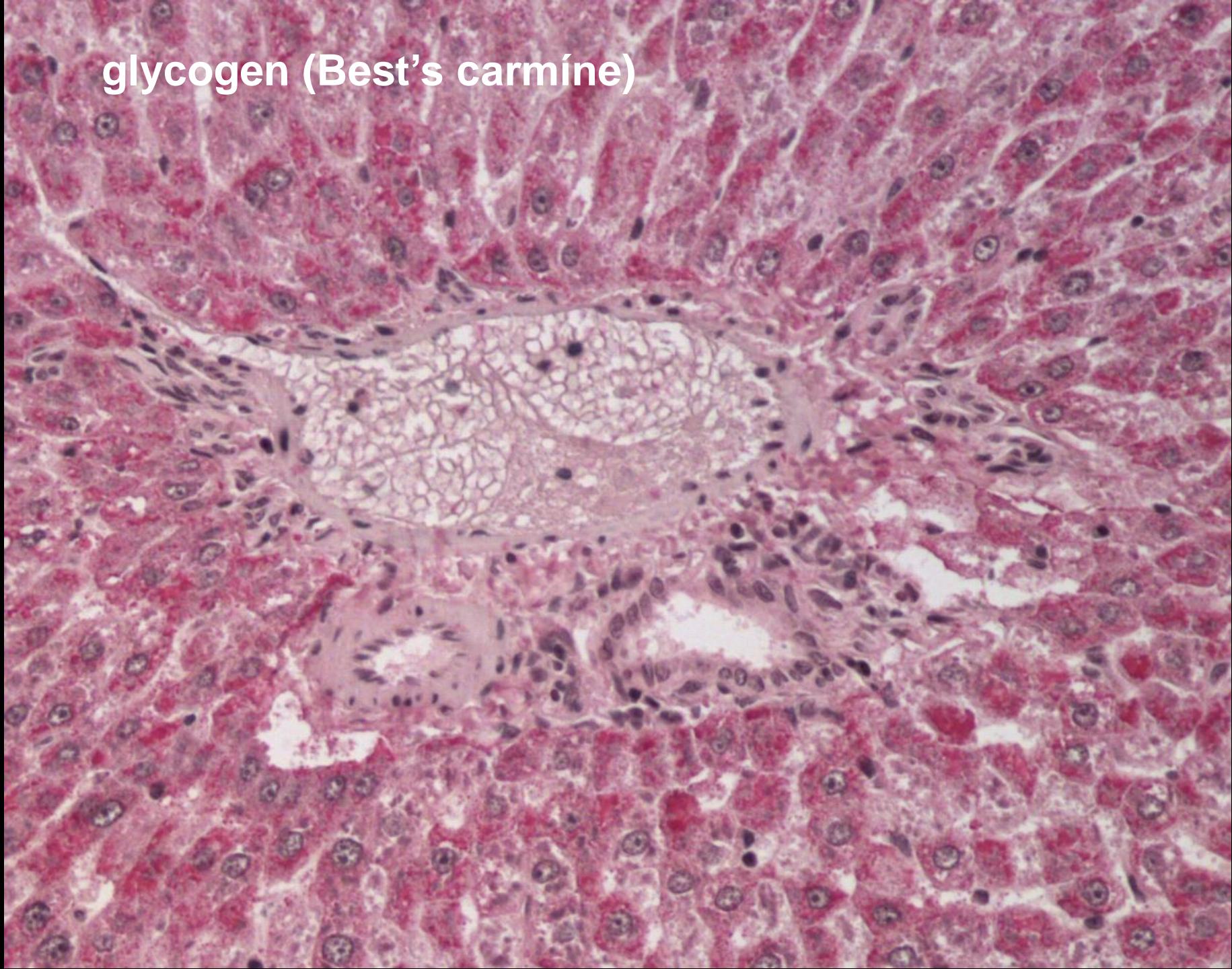
a



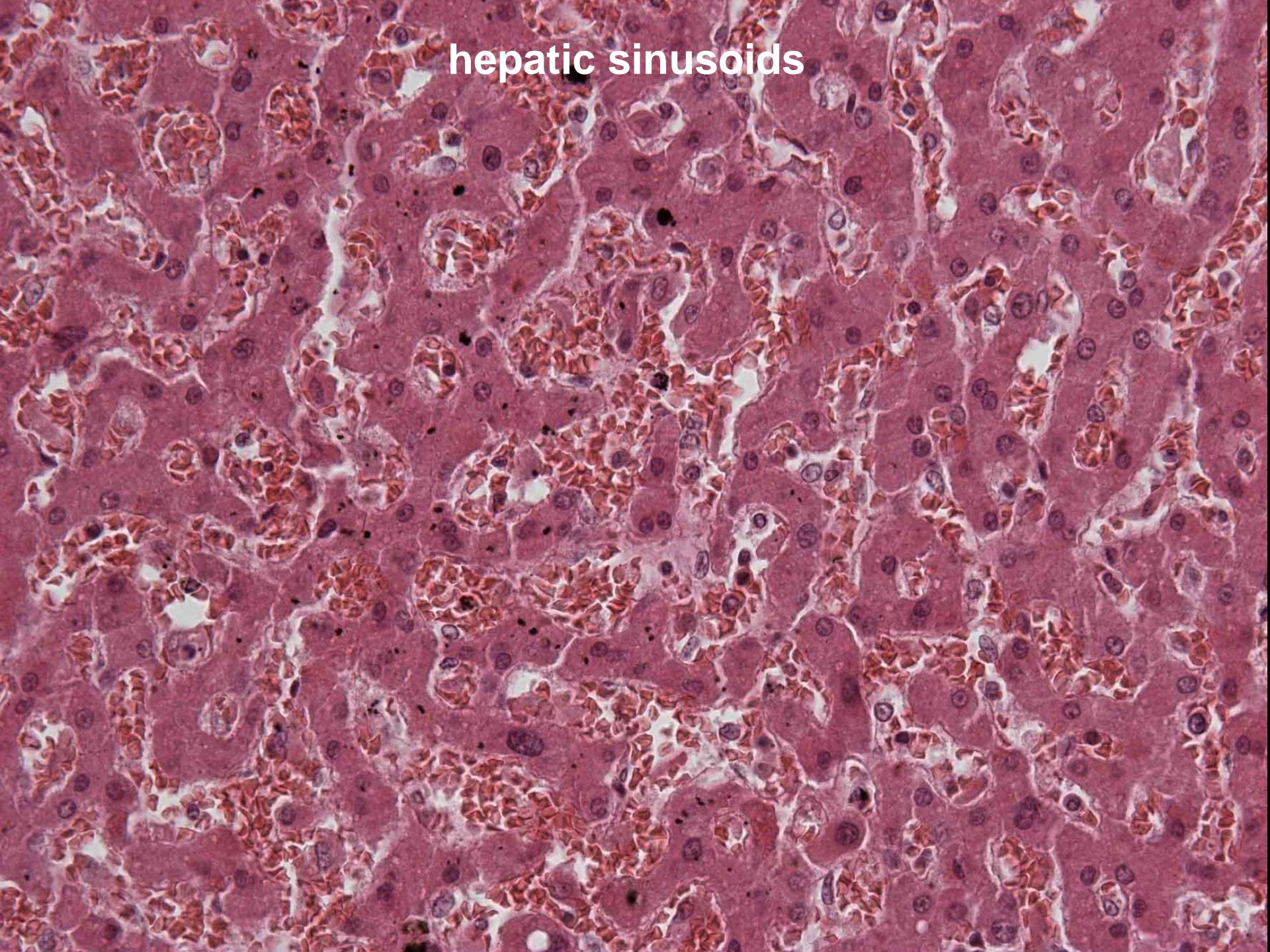


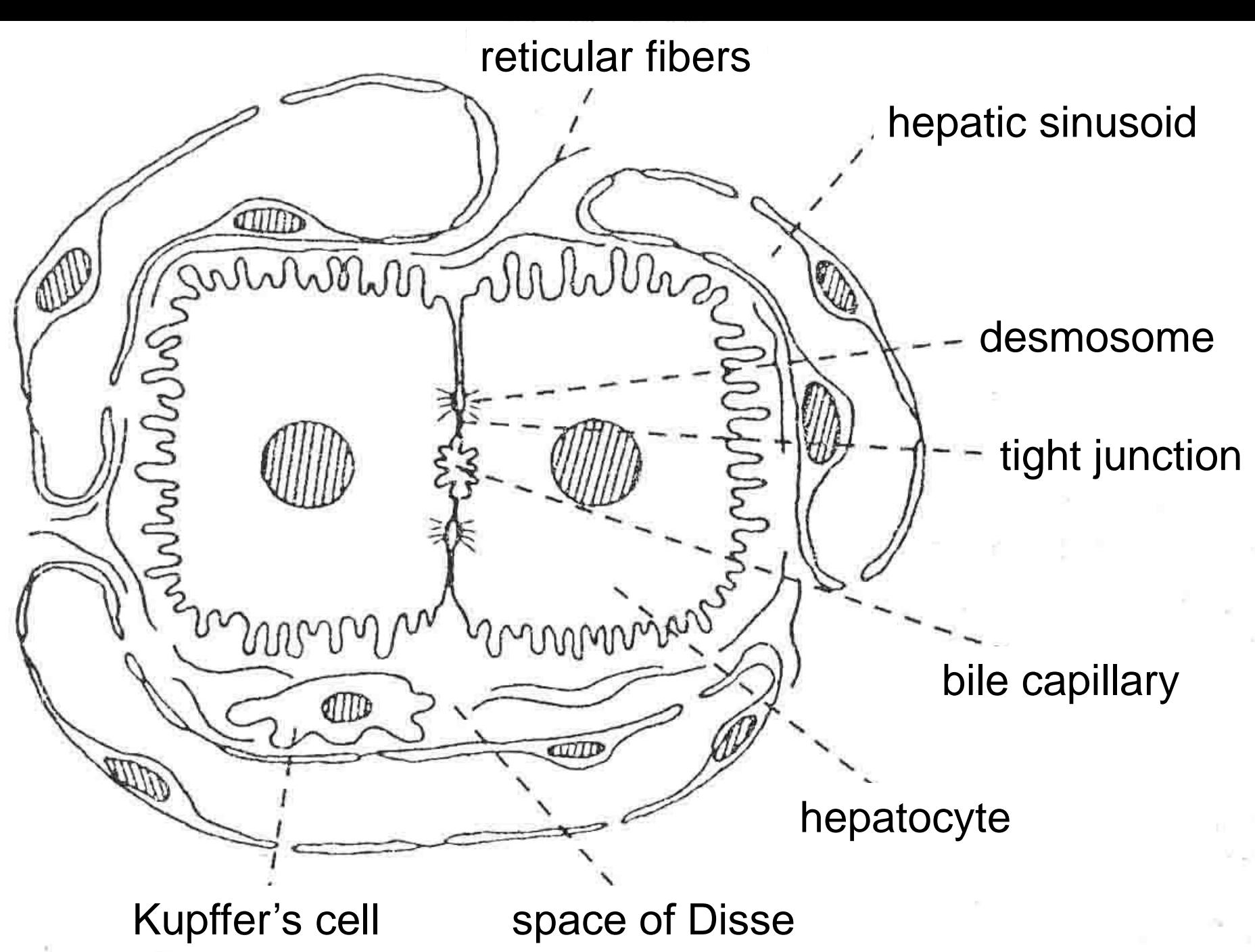


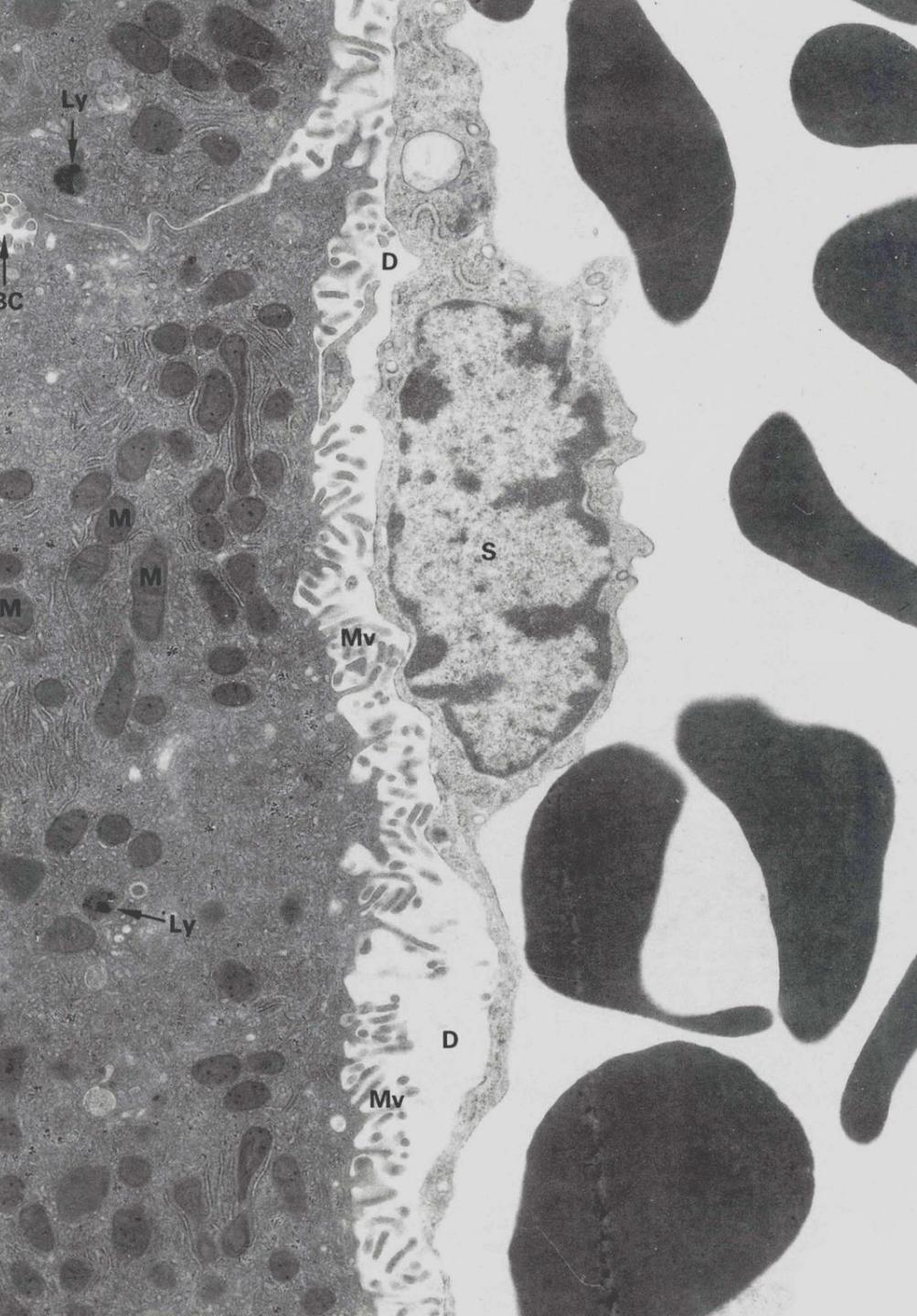
glycogen (Best's carmine)



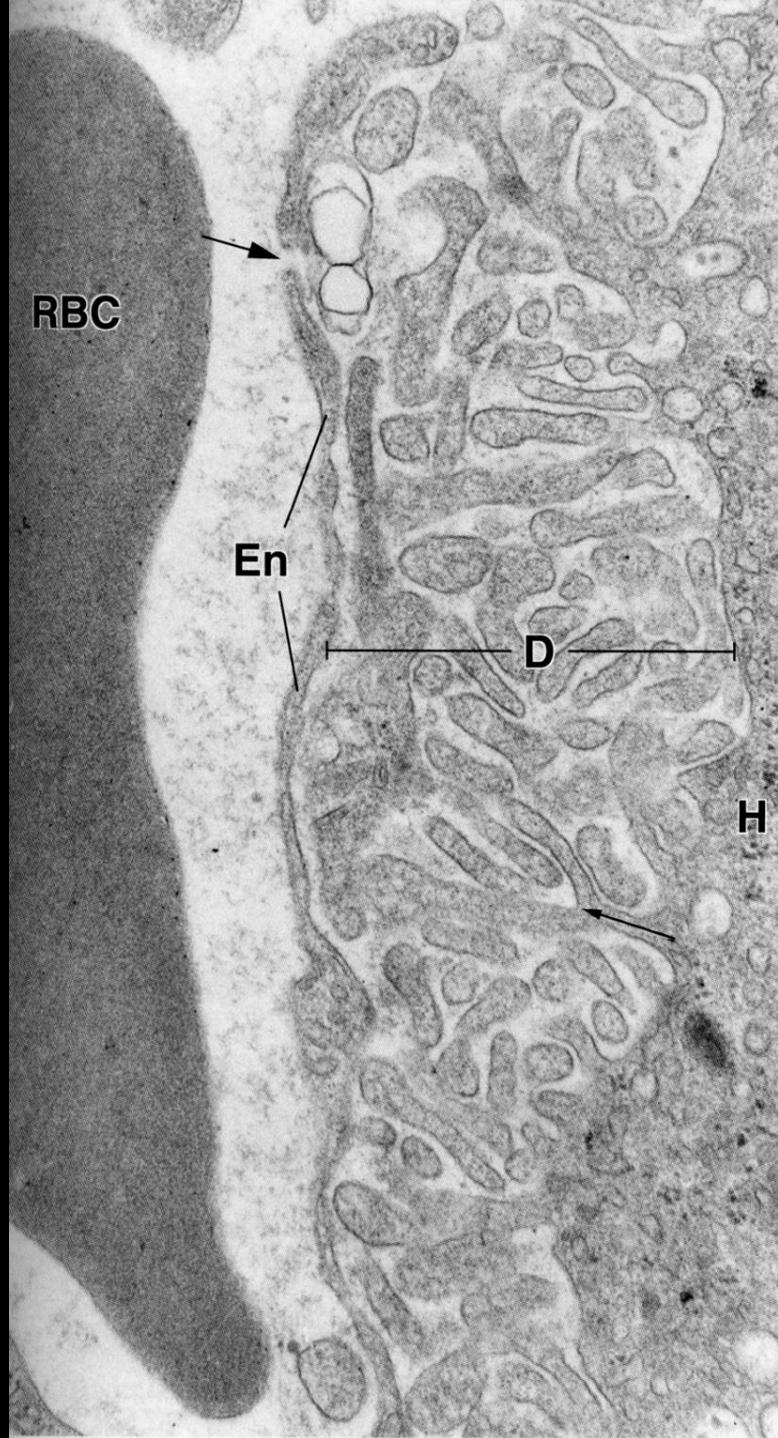
hepatic sinusoids



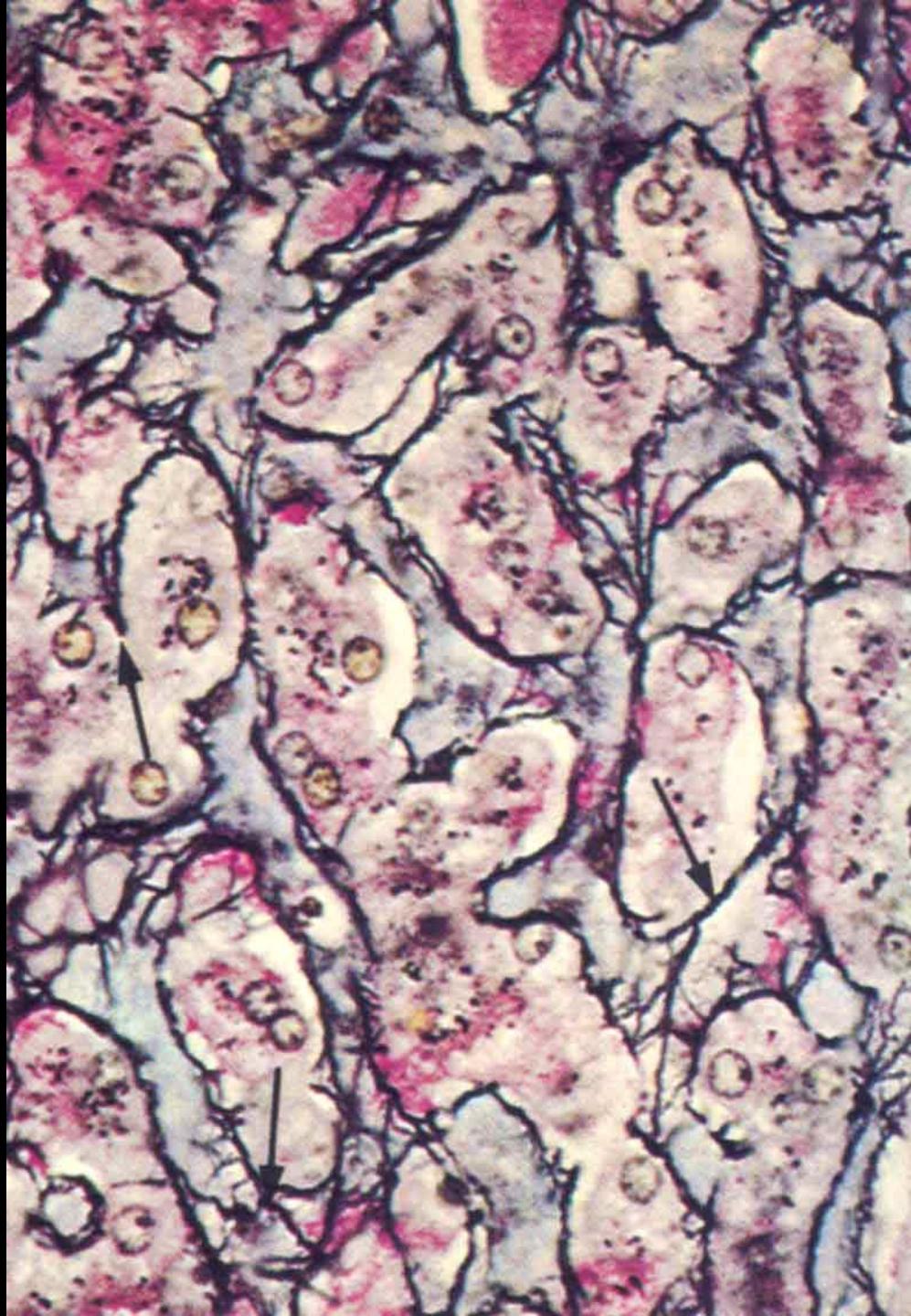




space of Disse

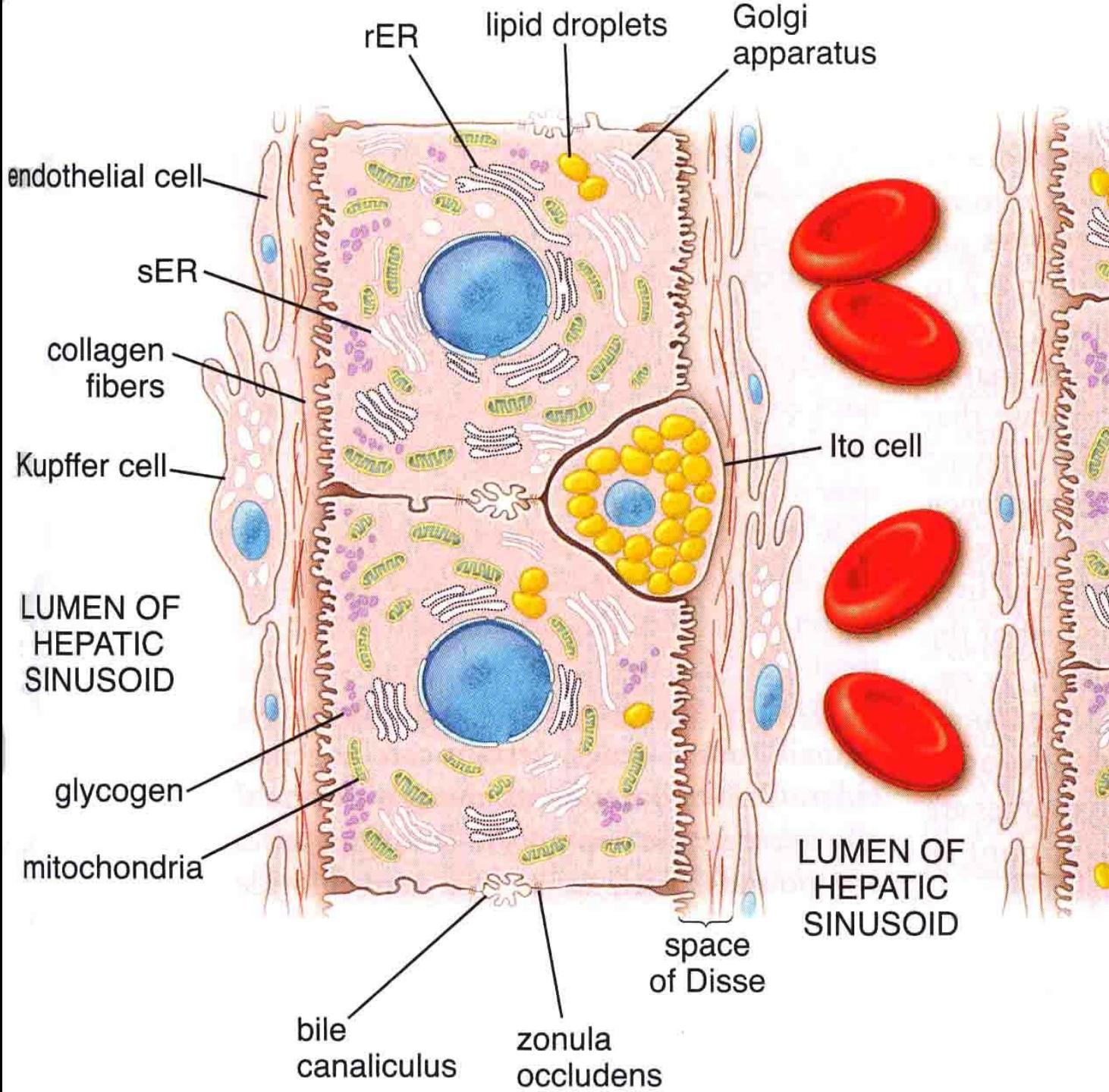


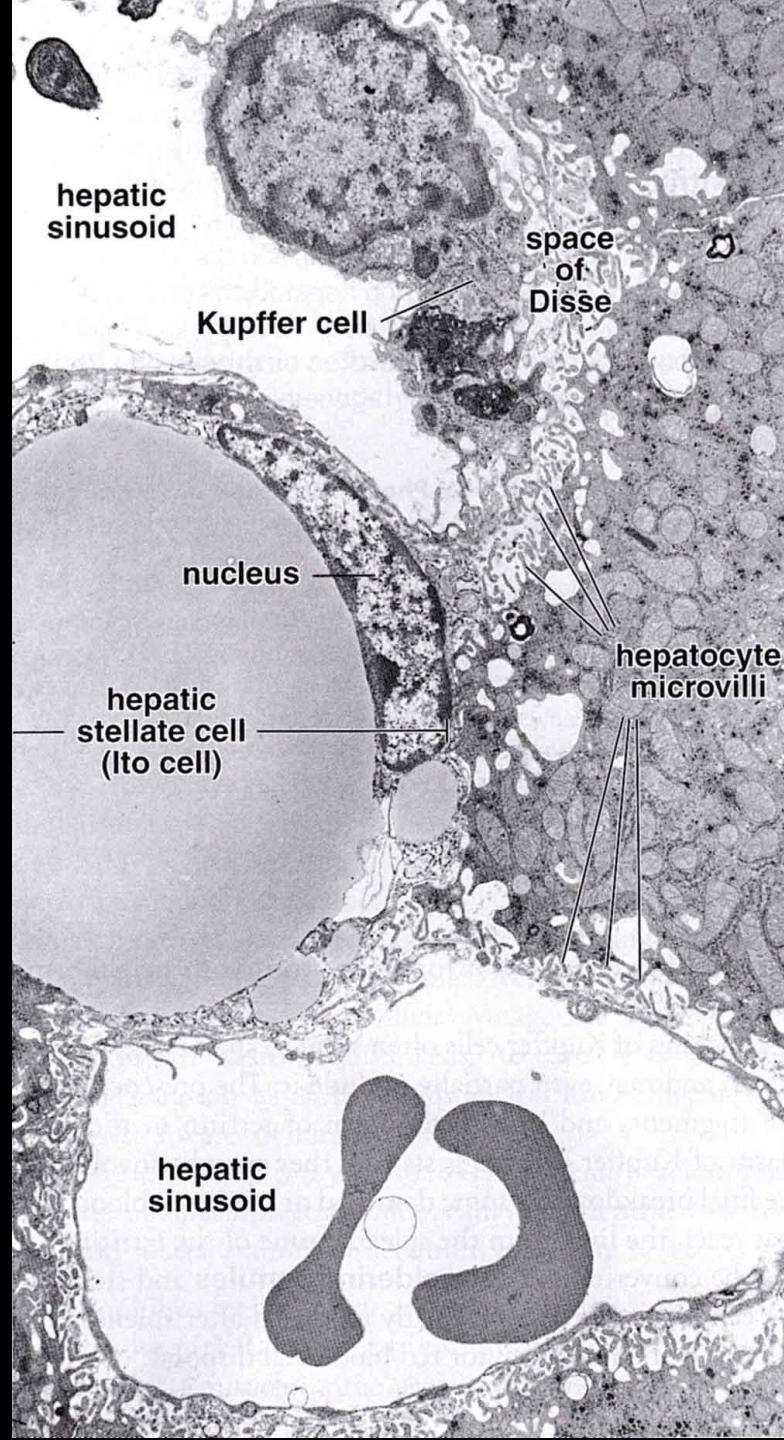
**reticular
fibers
impregnation**



Ito cells (hepatic stellate cells)

- vitamin A
- lipids
- contractile
- ECM production
- inflammatory activation





Kupffer's cells

KC

KC

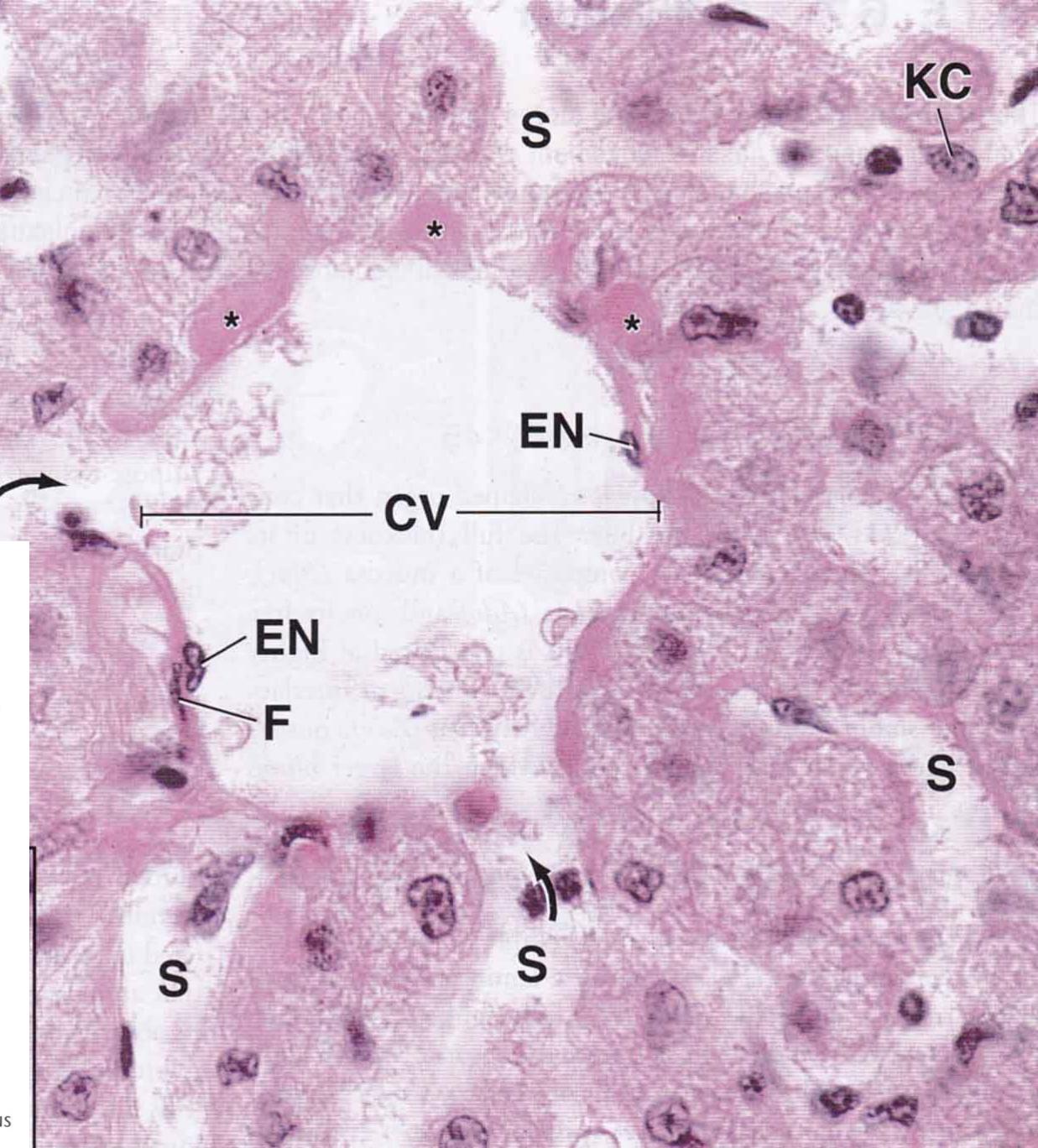
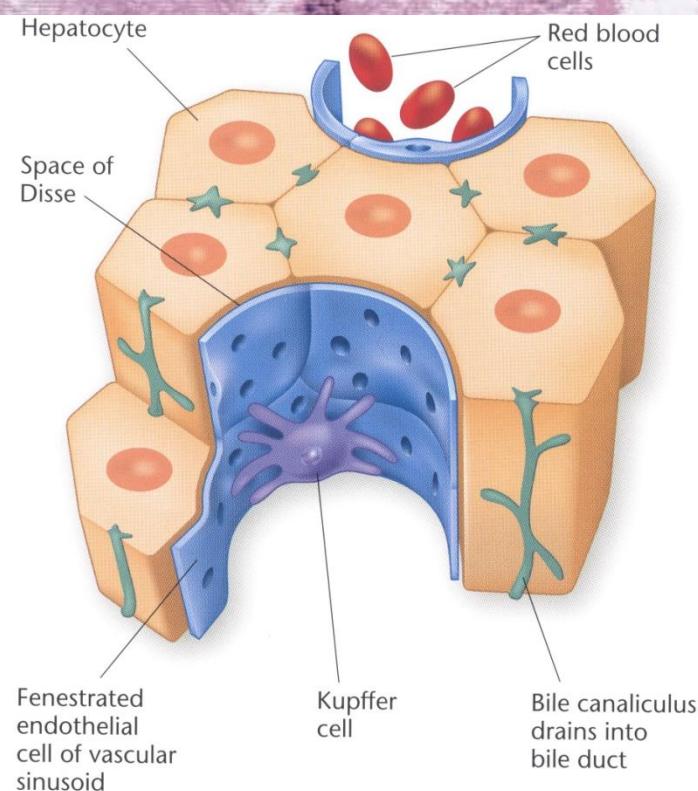
S

EN

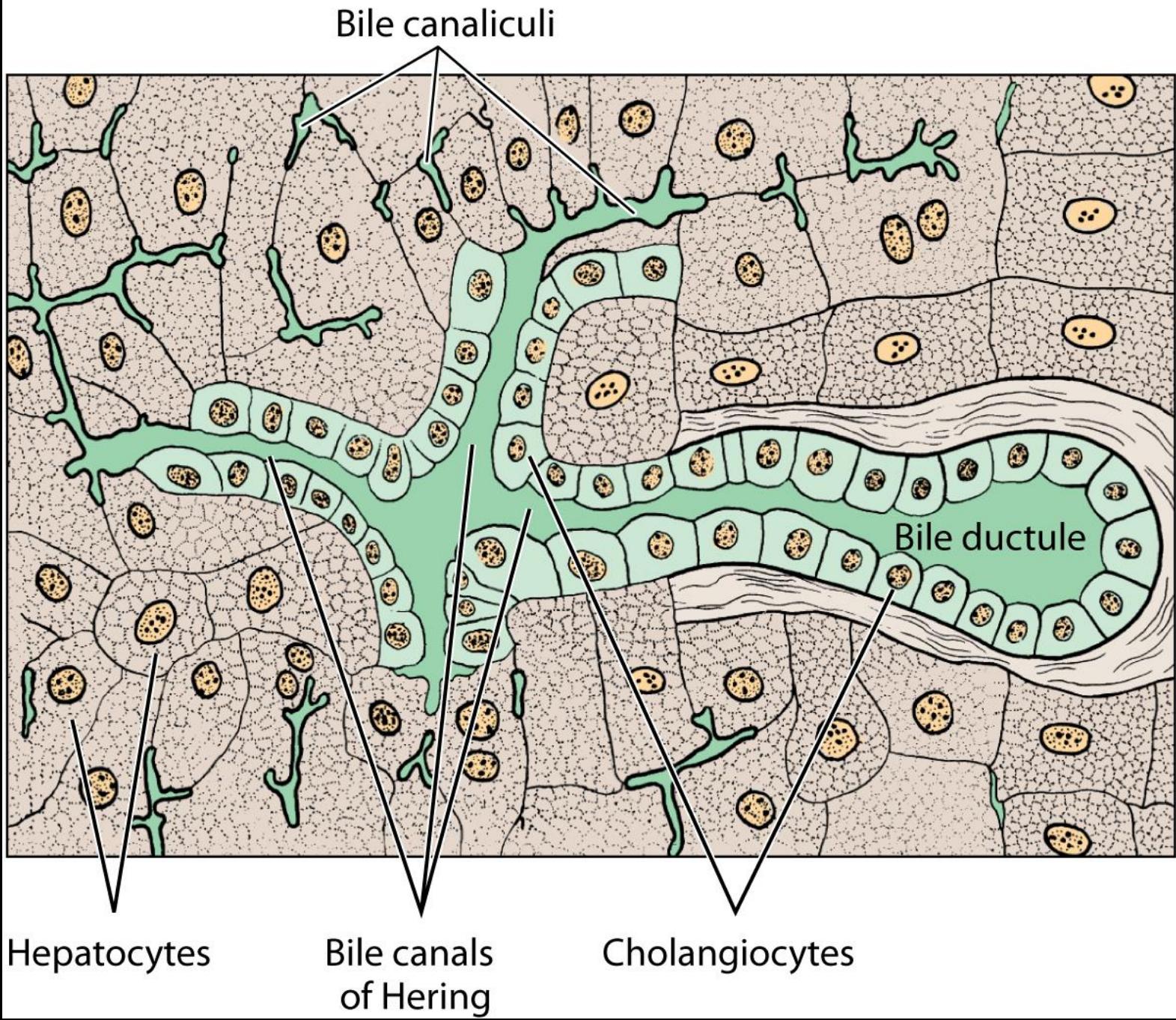
CV

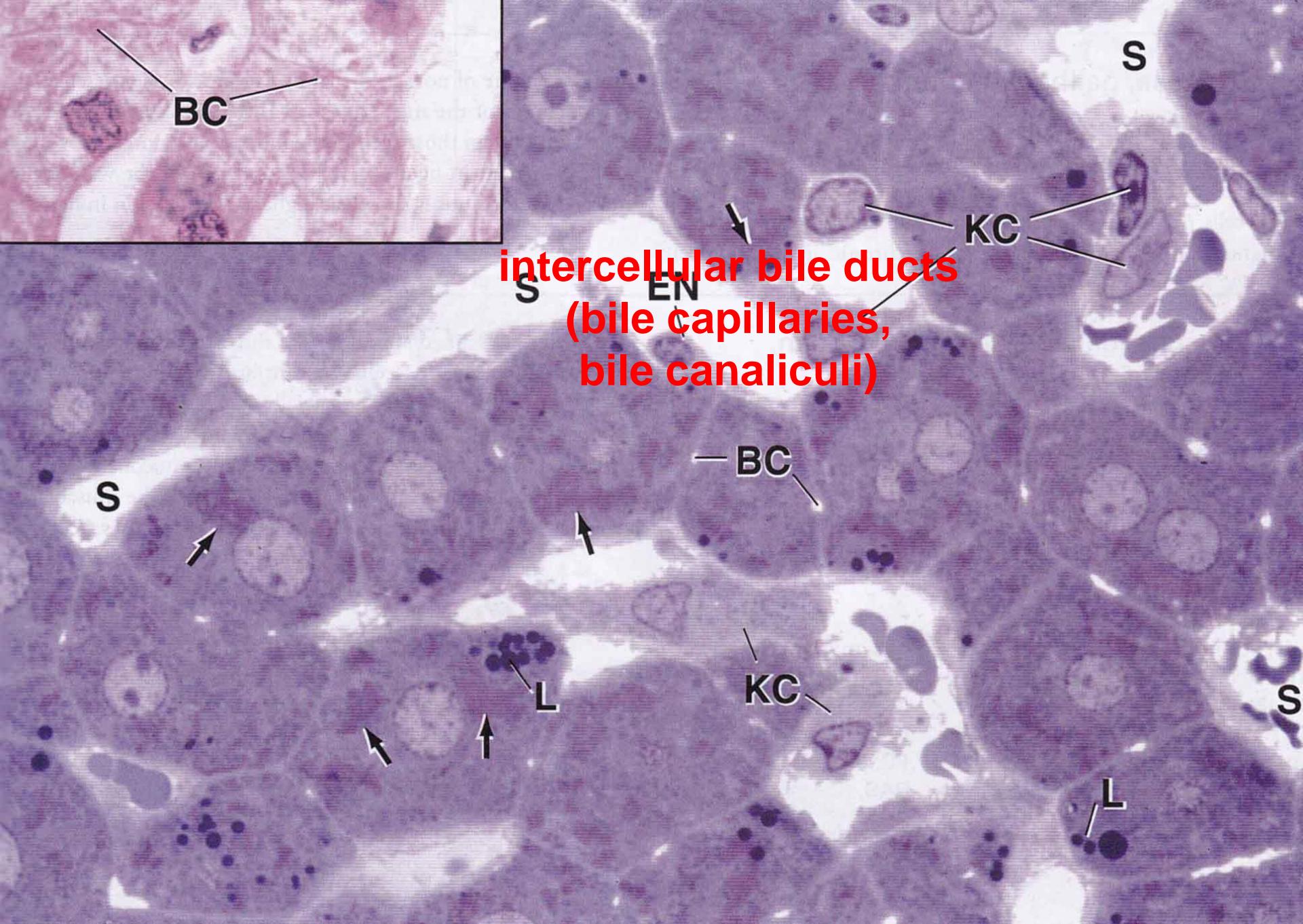
S

S

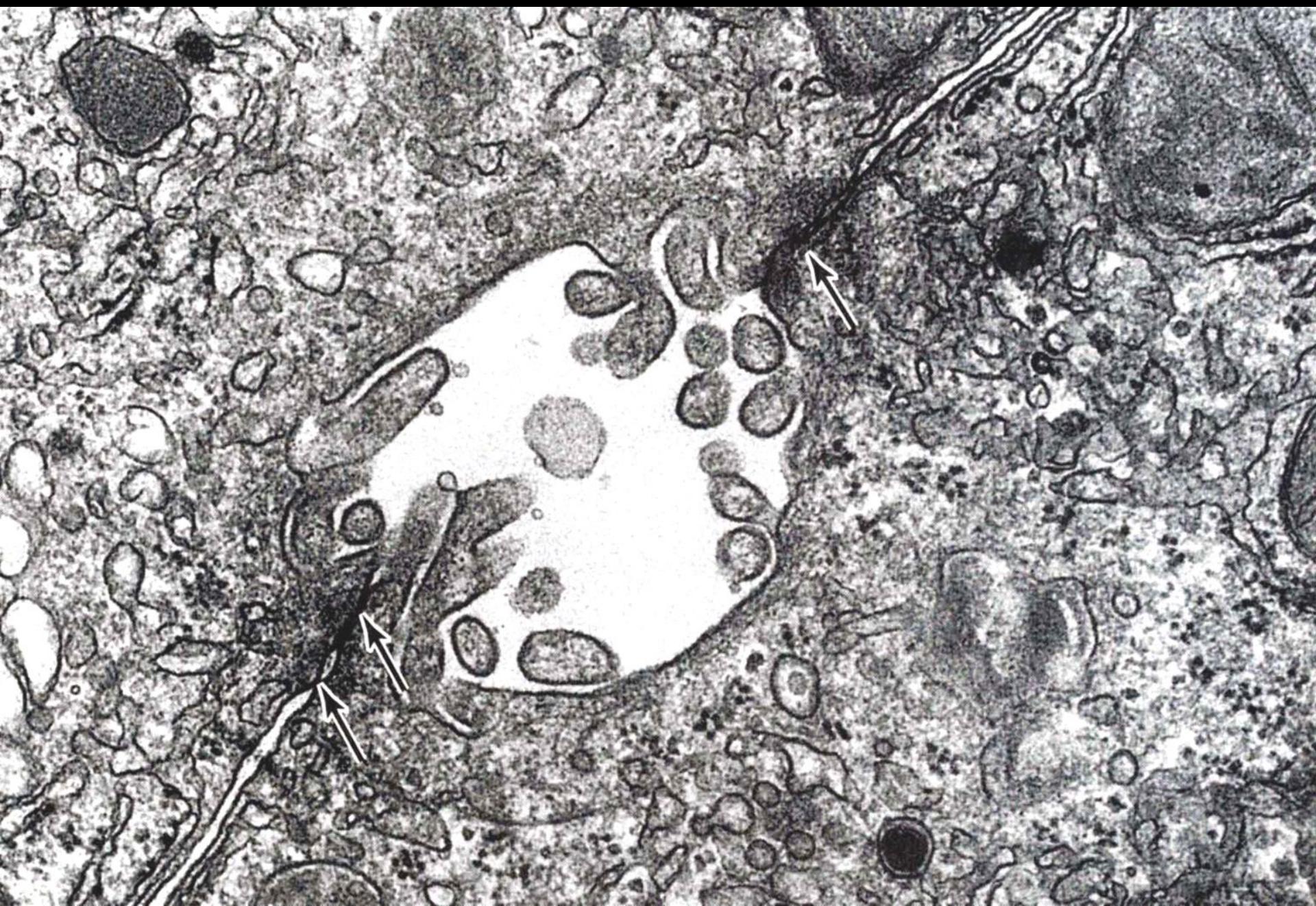


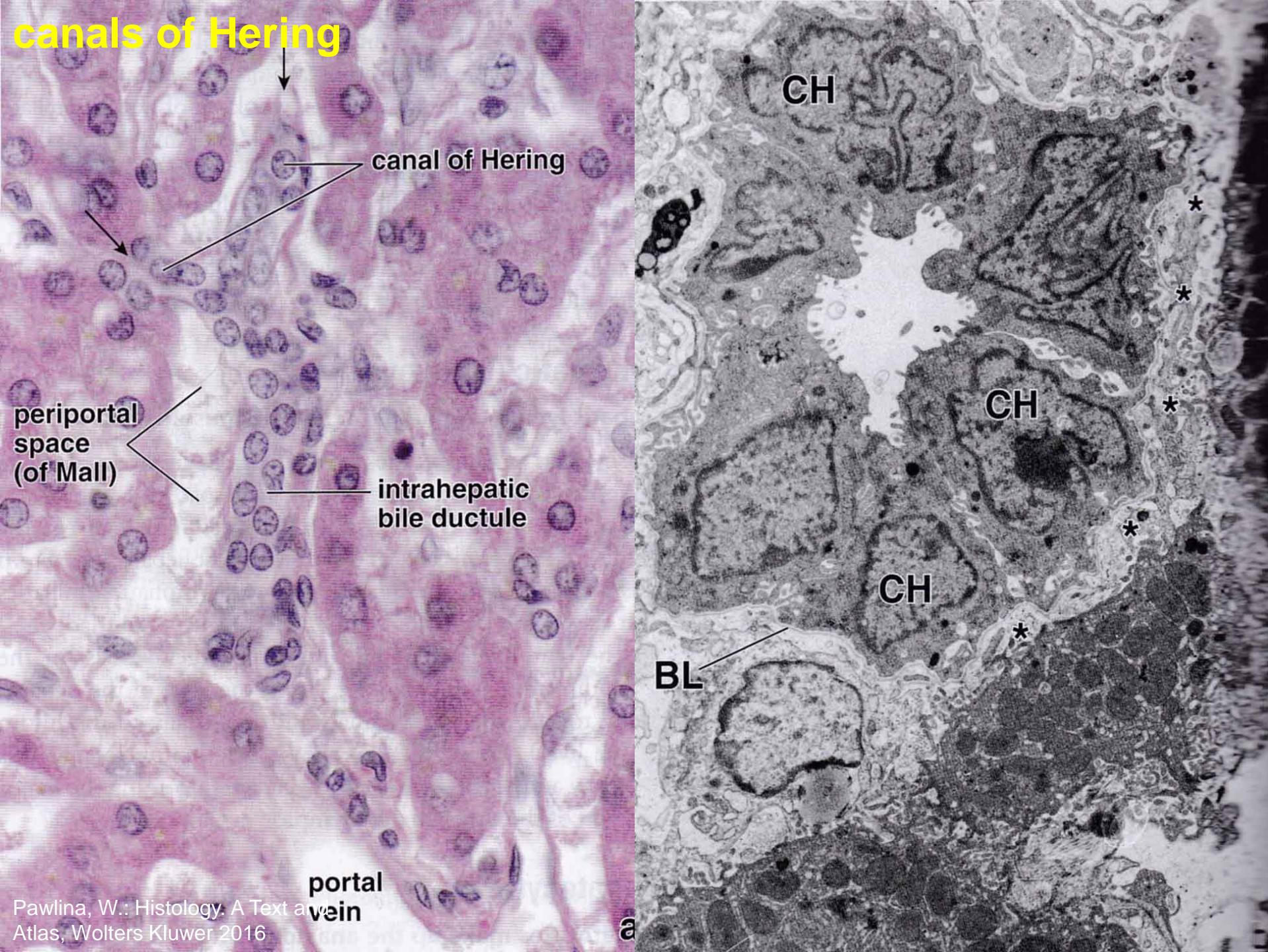
Bile ducts, Gallbladder



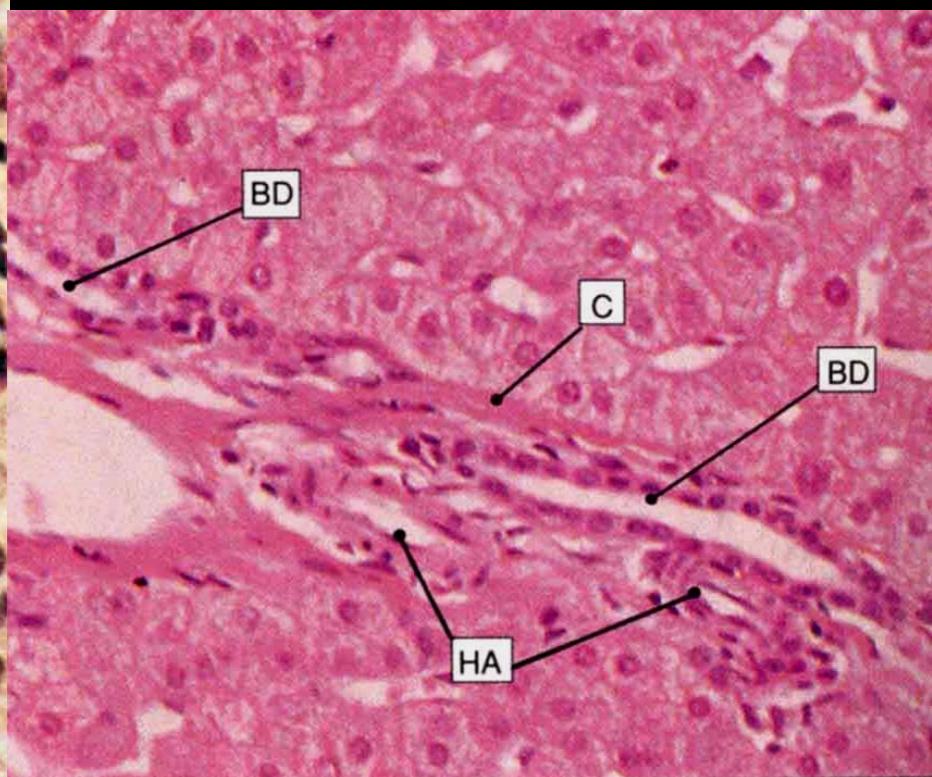
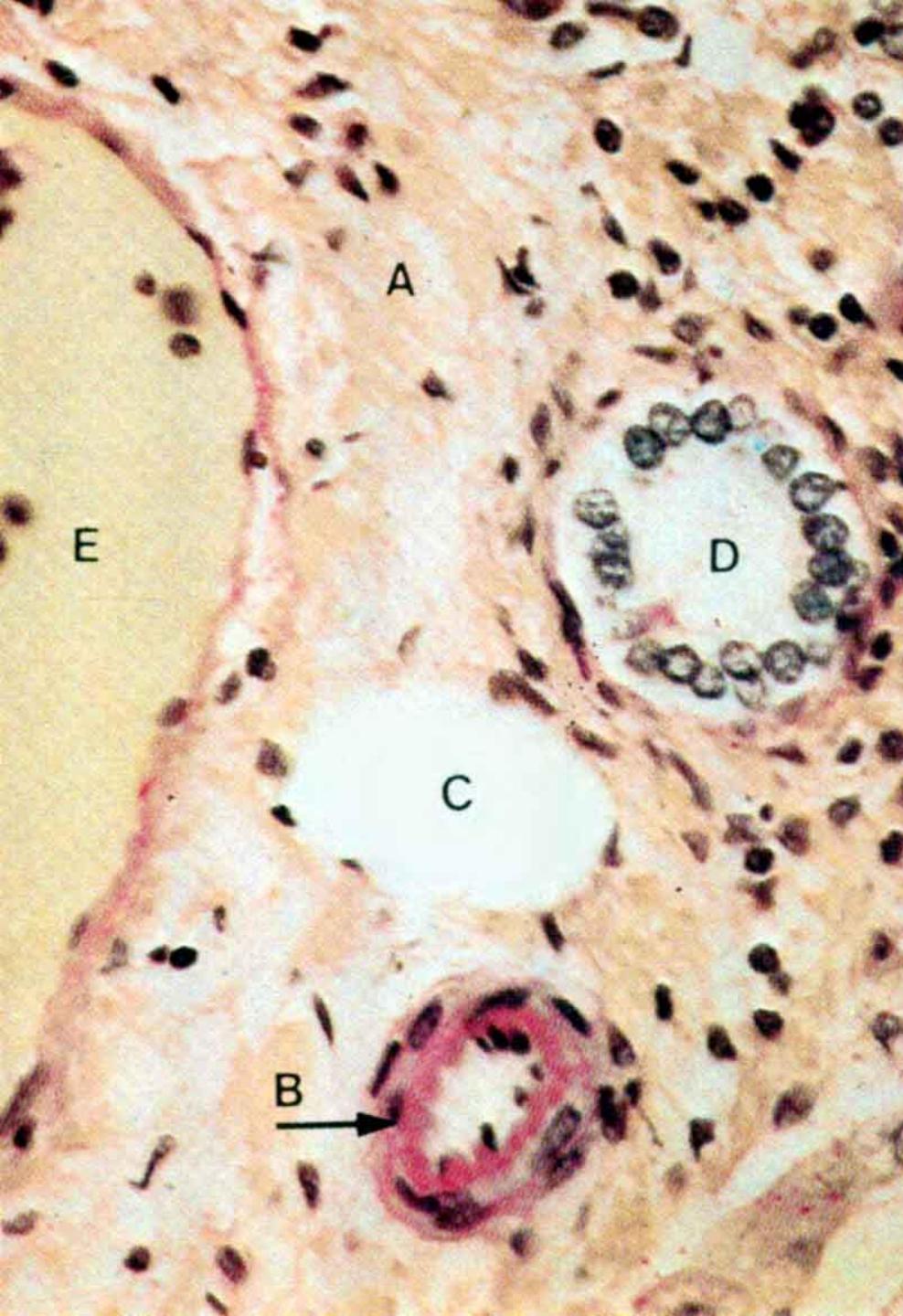


arrows = tight junctions





Interlobular bile ducts

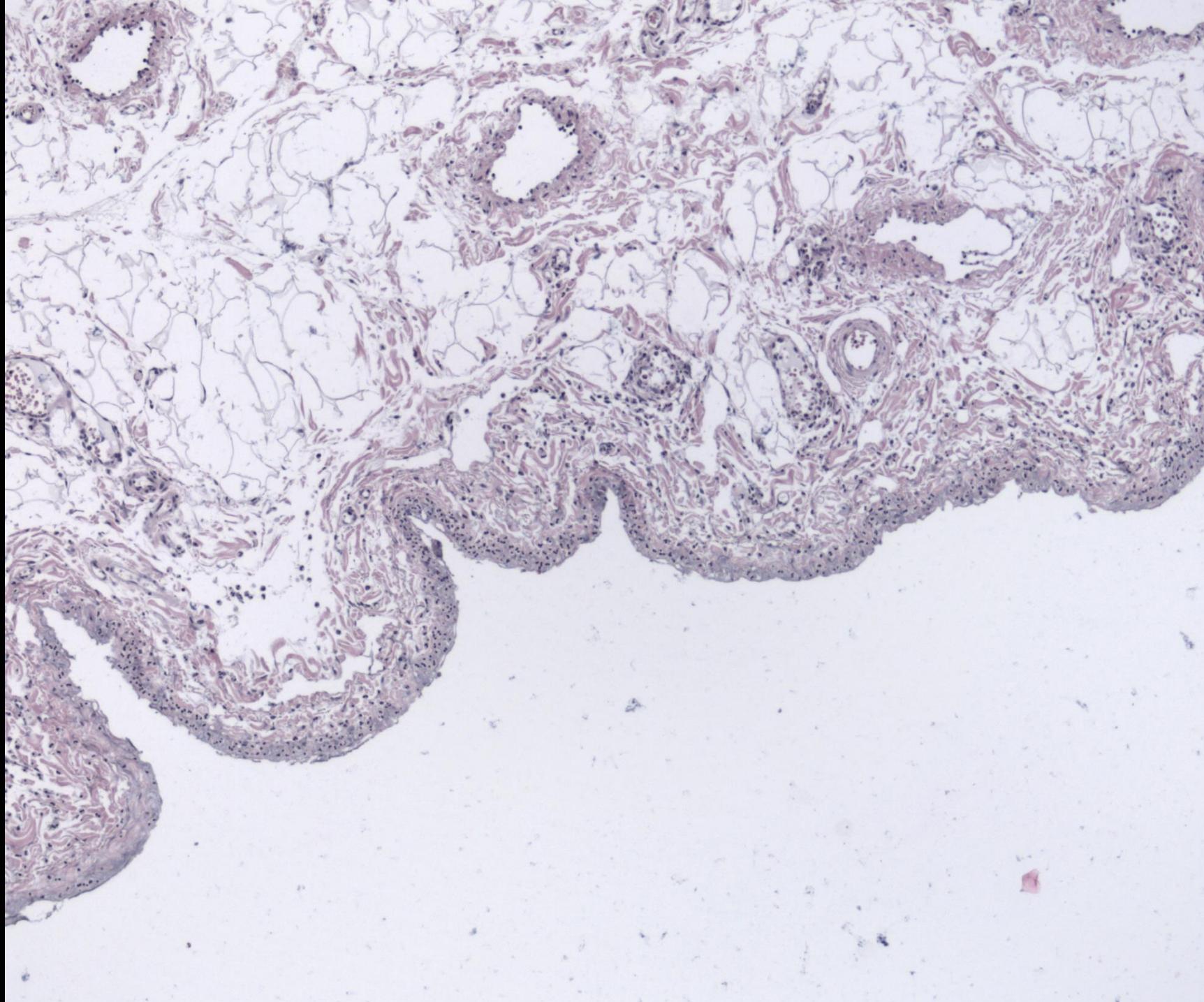


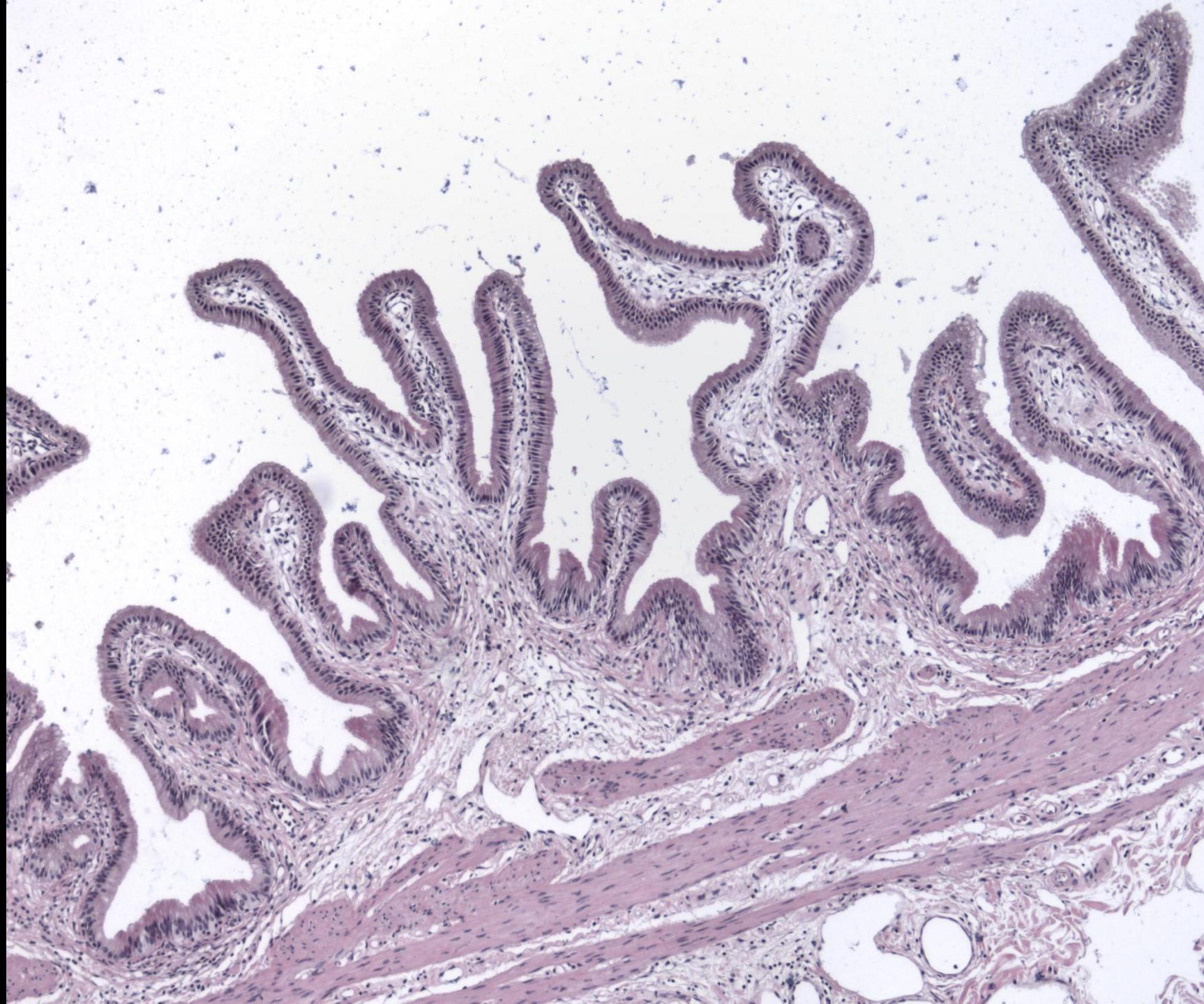
larger intrahepatic bile duct

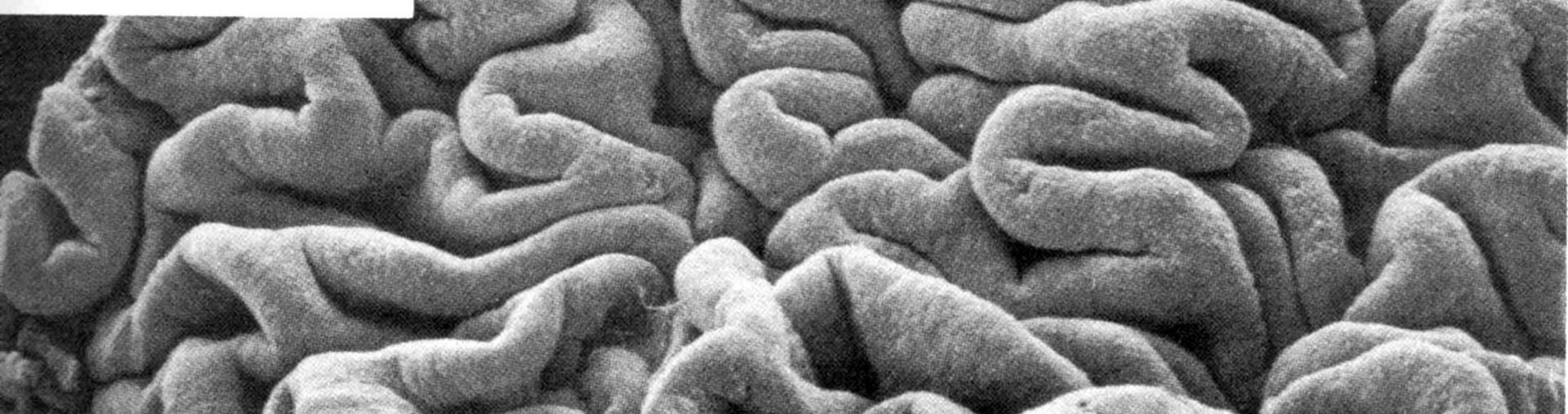
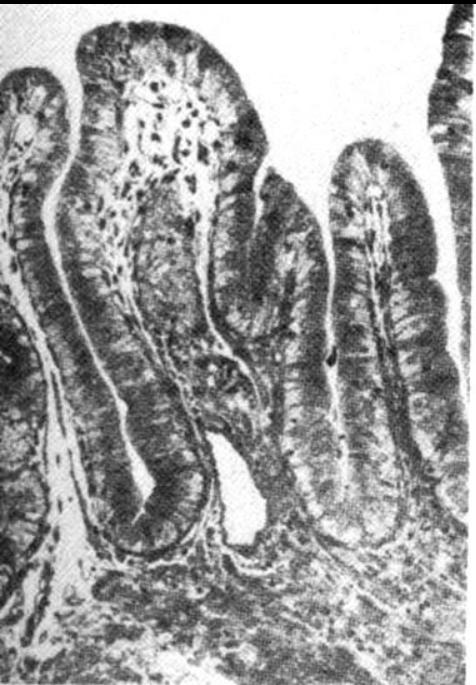


Gallbladder (*vesica felea*)











Rokitansky-Aschoff
sinuses

