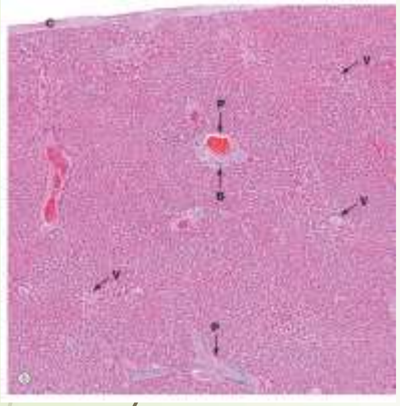
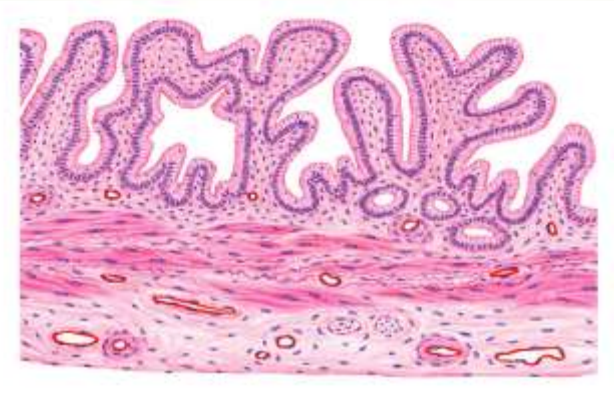
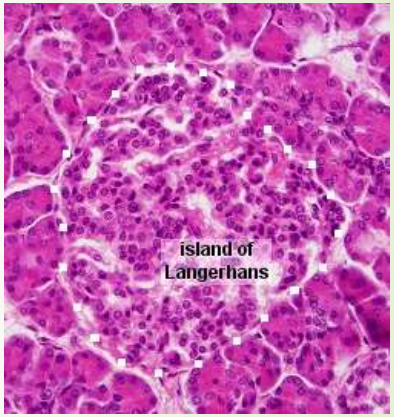
HISTOLOGI SISTEM ENTEROHEPATIK







dr. Ulfah Dian Indrayani, M.Sc
Bagian Histologi
Fakultas Kedokteran UNISSULA

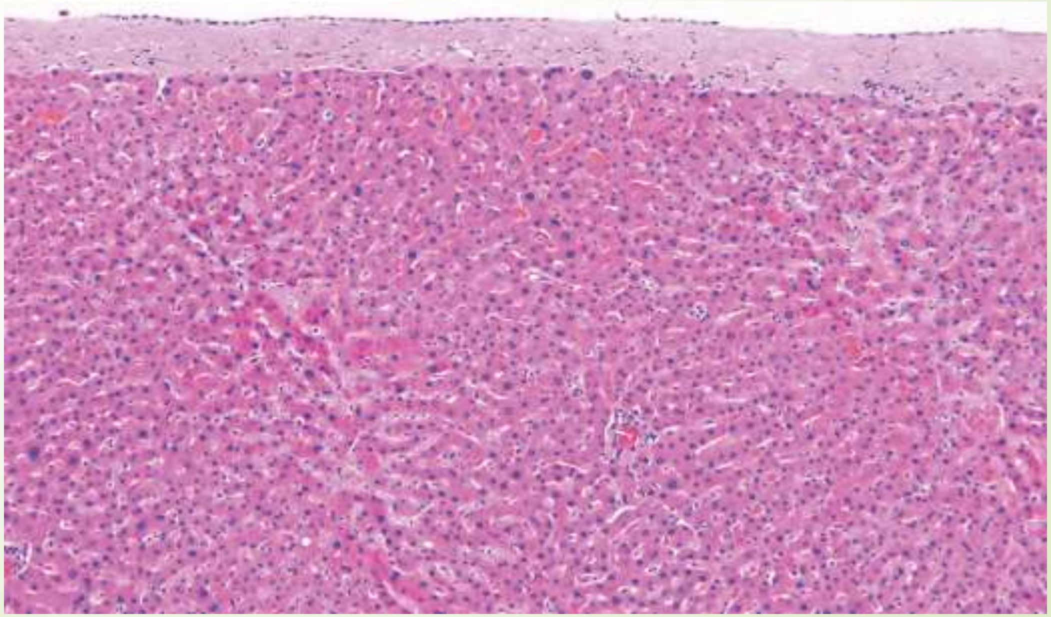
- Hepar
- Vesica fellea
- Exocrine Pancreas

Learning objective: Hepar

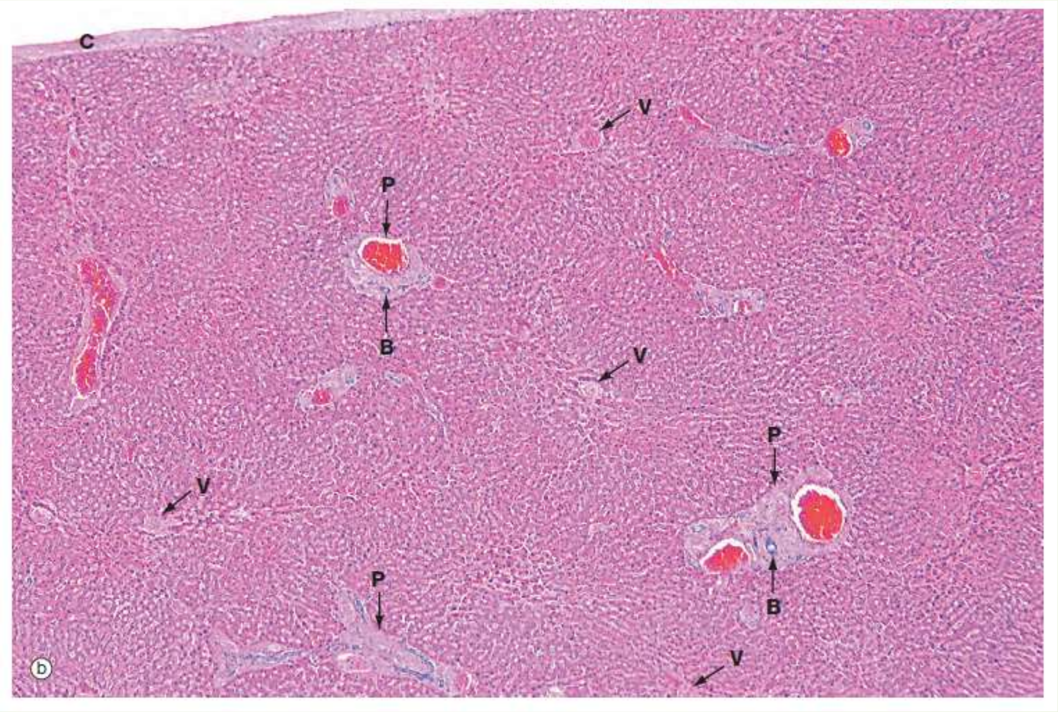
1. Overview of the hepar
2. Histology of arrangement of hepatic parenchyma
3. General organization of hepatic lobule
4. Structure and function of liver acinus
5. Histology of portal triads and central veins
6. Ultrastructure and function of hepatocytes
7. Ultrastructure of hepatic sinusoids
8. Ultrastructure of Space of Disse
9. Ultrastructure and function of bile canaliculi

Overview of the hepar

- the largest gland in the human body
- surrounded by a collagen-elastic fiber–containing capsule (of Glisson) and is lined by the peritoneum
- On the visceral surface is porta hepatis (gateway for hepatic ducts, portal vein, hepatic artery, lymphatics and nerves)
- Blood is supplied to the liver by two blood vessels (Portal veins, Hepatic artery)



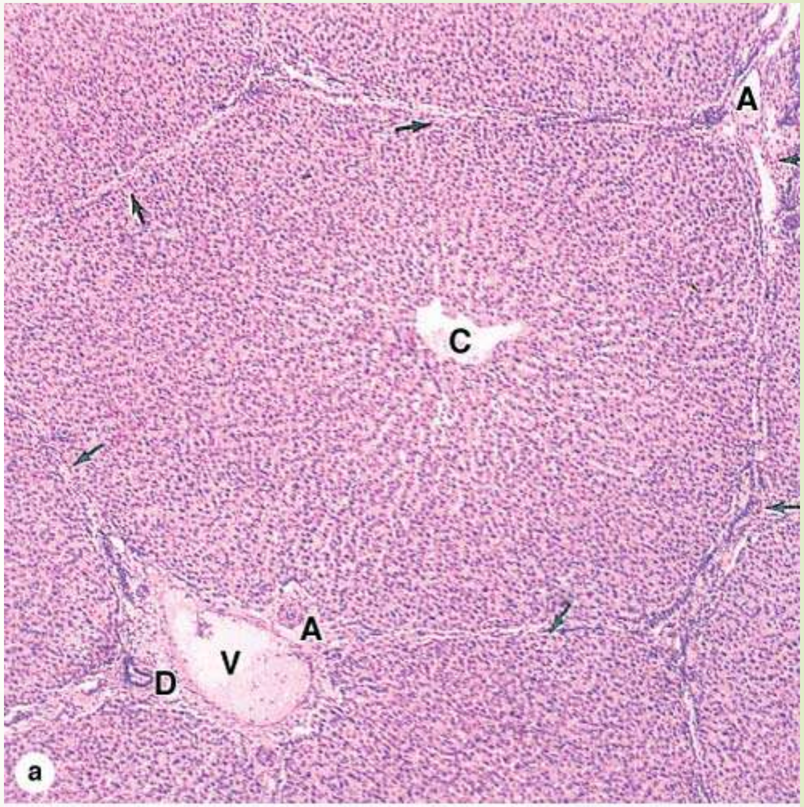
Histology of arrangement of hepatic parenchyma



- 80% of liver tissue is **parenchyma** and 20% is **stroma parenchyma** consisting of hepatocytes
- The liver parenchyma is organized as thousands of small (~0.7 × 2 mm) hepatic lobules

Hepatic lobule

- Hepatic lobuleles are polygonal/hexagonal units showing plates of hepatocytes radiating from a central venule



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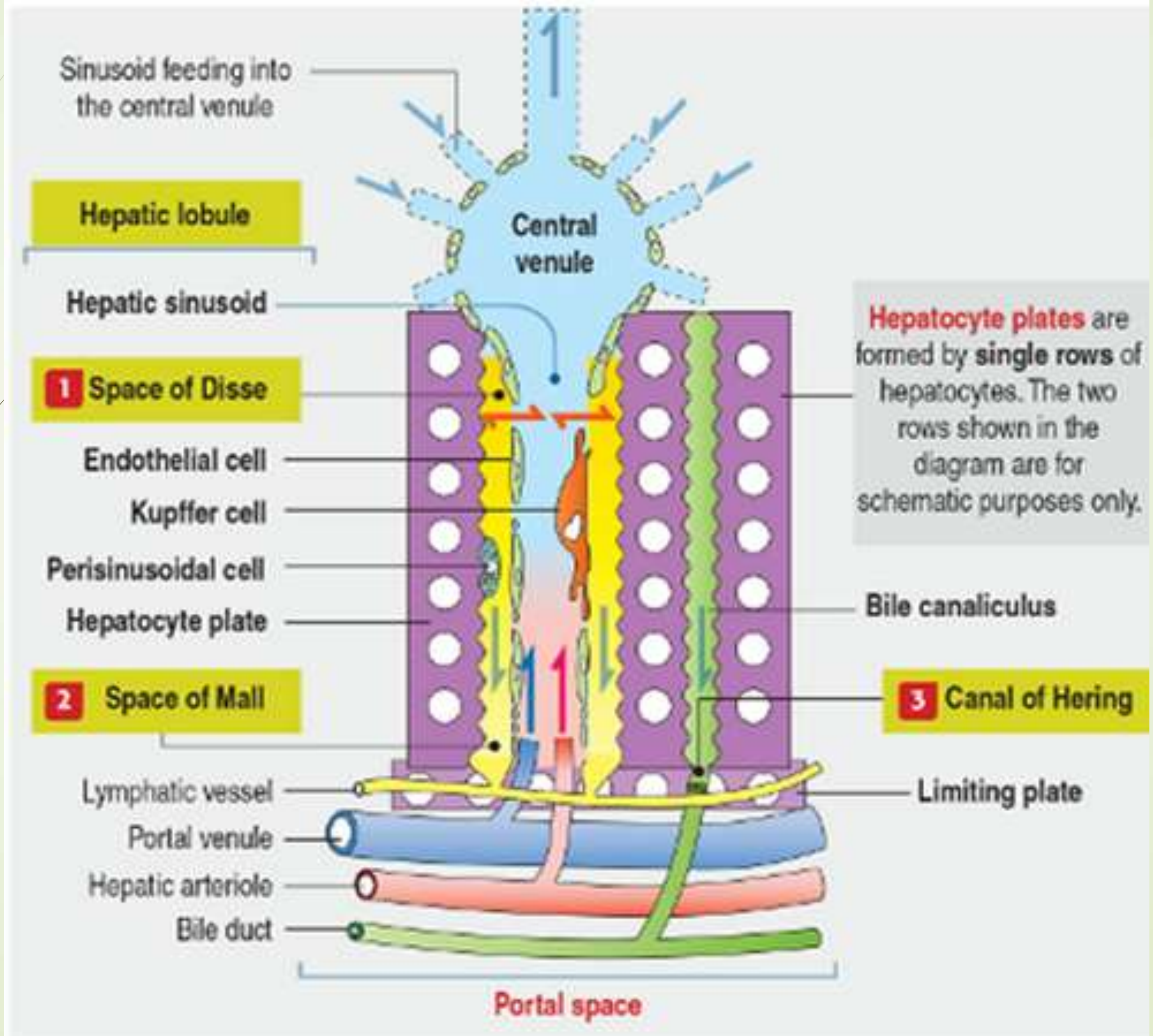
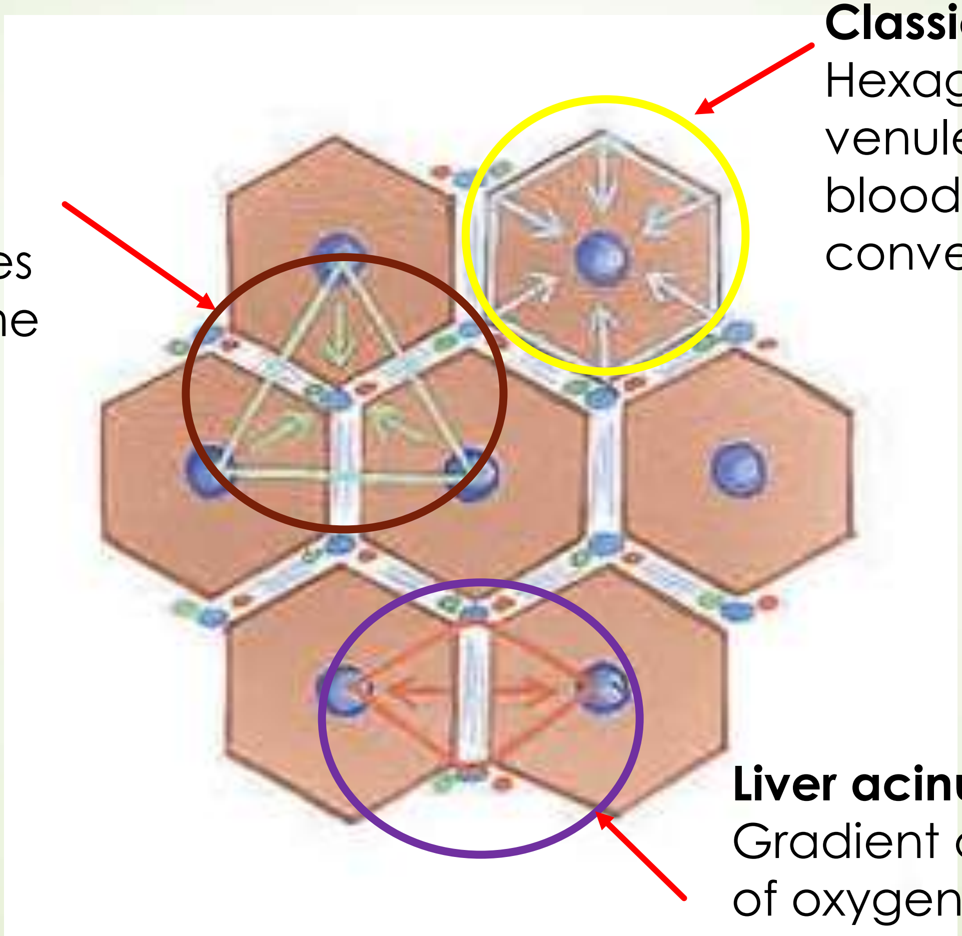
General organization of hepatic lobule



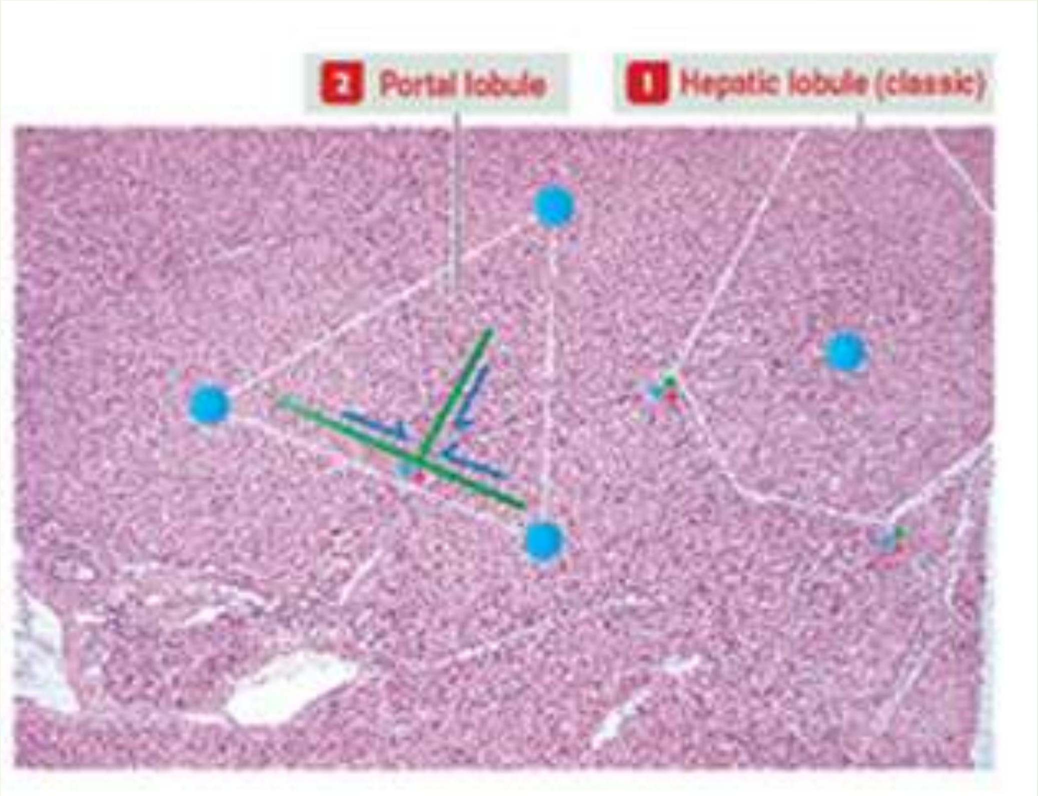
3 conceptual interpretations of the architecture of the hepatic lobule

Portal lobule:
Bile drainage pathway from adjacent lobules toward the same bile duct

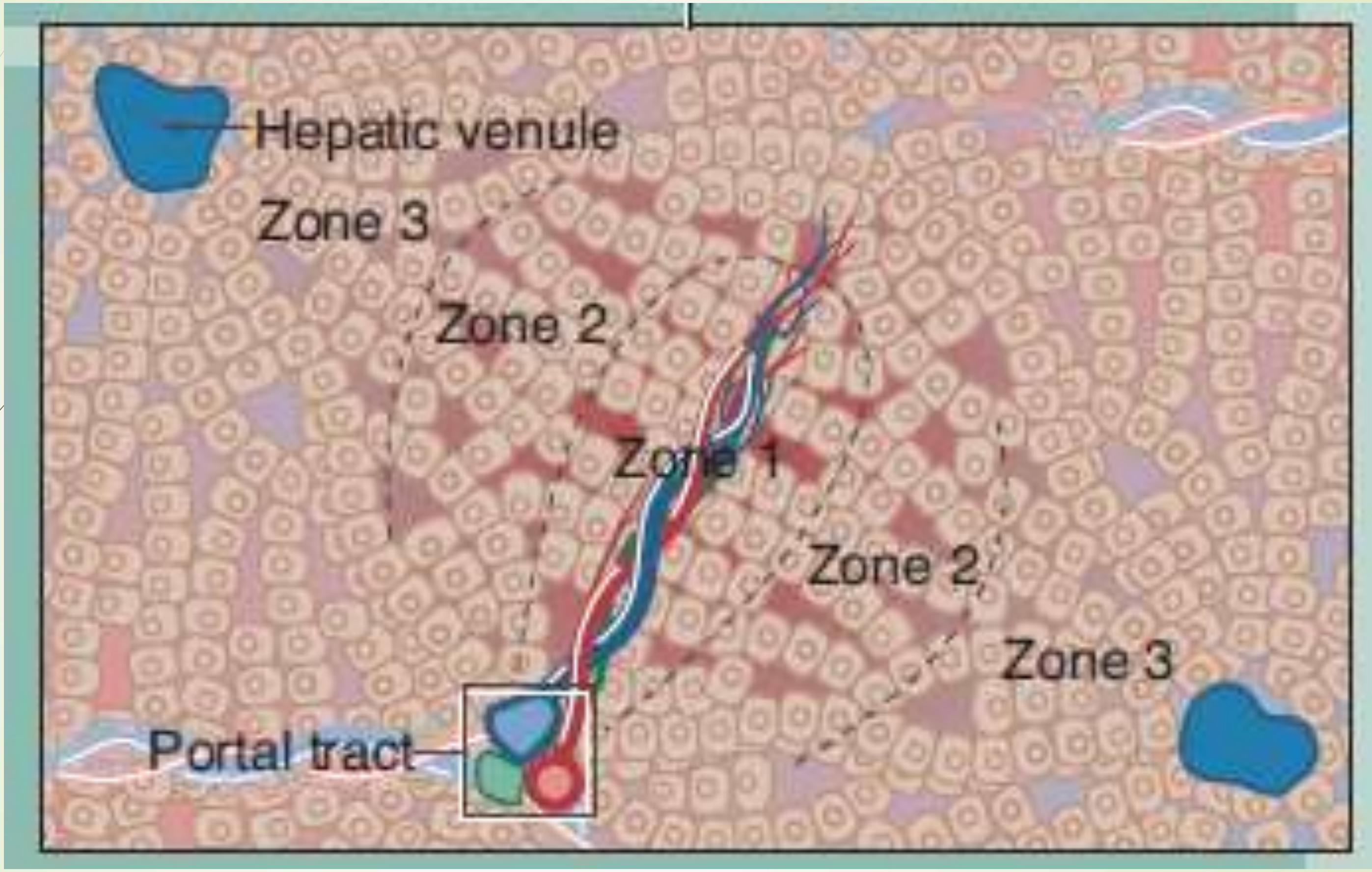


Classic lobule:
Hexagon with central venule to which blood sinusoid converge

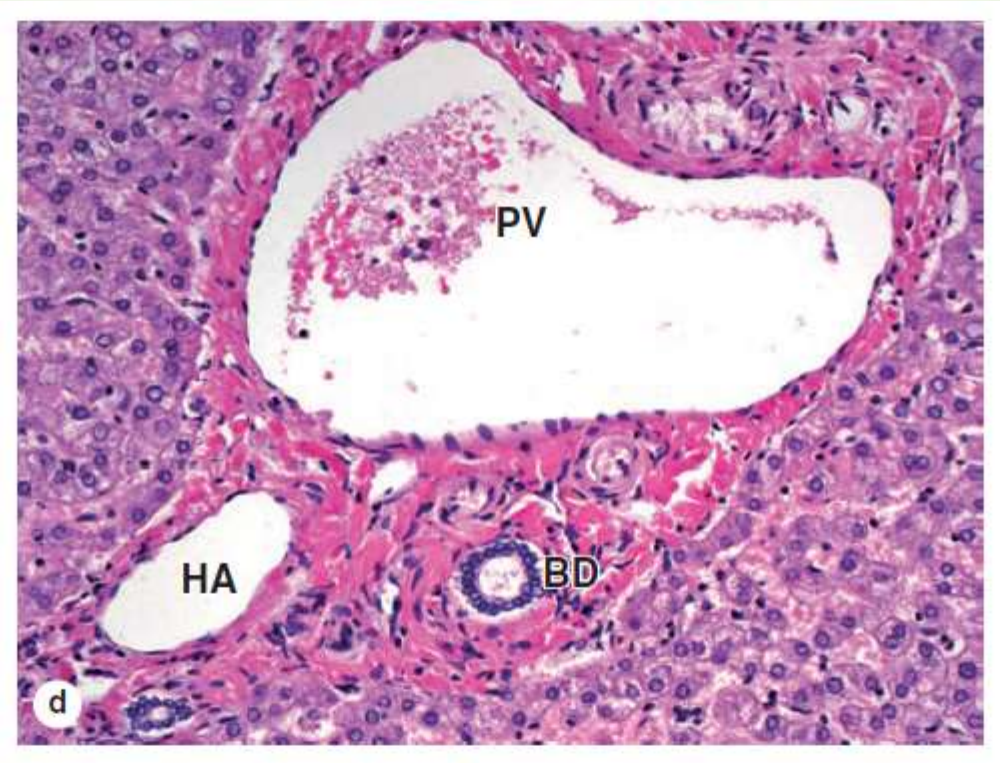
Liver acinus:
Gradient distribution of oxygen along the venous sinusoids of adjacent lobules



2 Portal lobule
1 Hepatic lobule (classic)


Hepatic venule
Zone 3
Zone 2
Zone 1
Zone 2
Zone 3
Portal tract

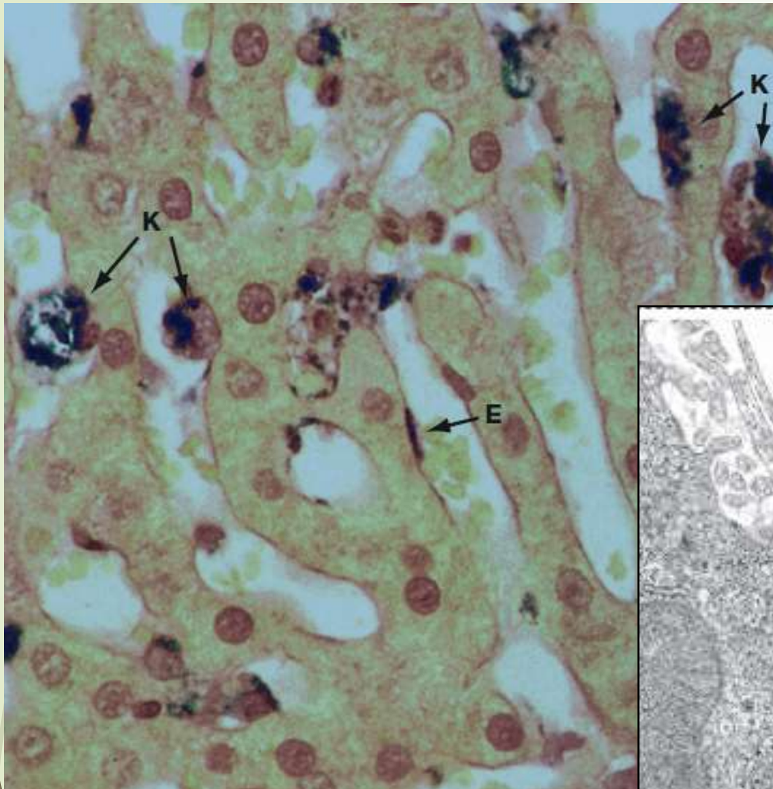
Histology of portal triads and central veins



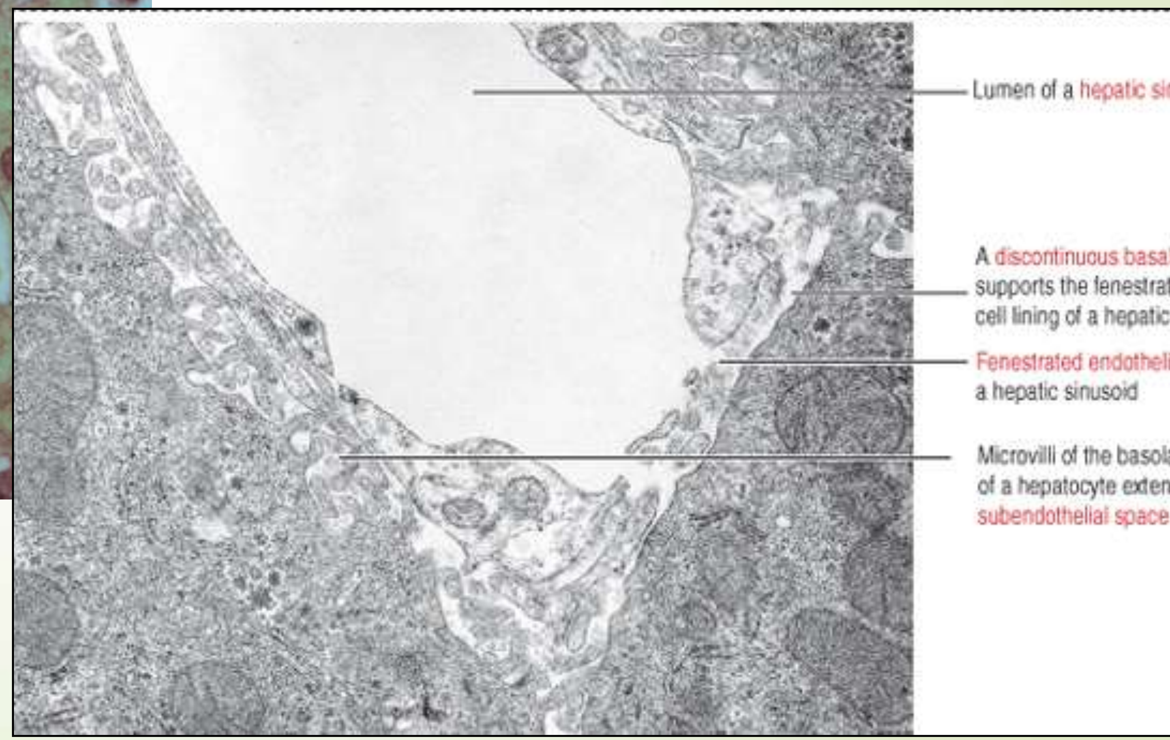
Ultrastructure and function of hepatocytes

RER	Sintesis protein plasma
SER	Sintesis glikogen Sintesis lipid Sintesis empedu Memecah glikogen→glukosa Detoksifikasi lipid soluble drug
peroksi some	Enzim oksidase & katalase → h202 → H2O+O2
lisosom	Menyimpan besi

Ultrastructure of hepatic sinusoids



Pear prusian blue

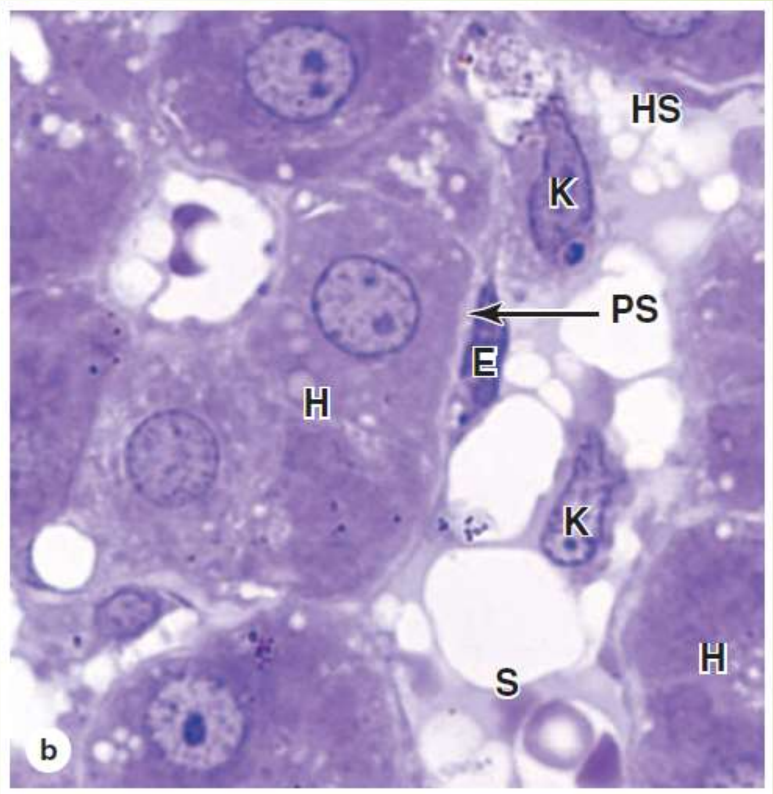


Ultrastructure of space of disse

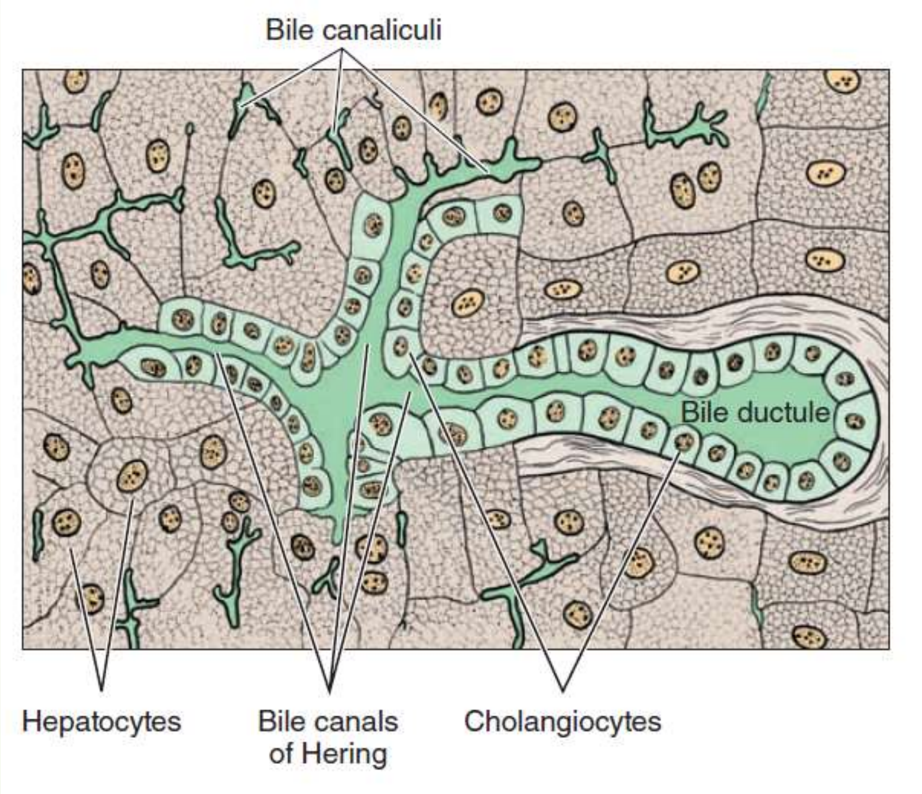
Ito cell

- Storage and release of retinoid
- Production and turnover of extracellular matrix
- The regulation of blood flow in the sinusoid

Remain in quiescent but can proliferate when activated by kupffer cell and hepatocytes



Ultrastructure of bile canaliculi



Liver regeneration

Ito cell, kupffer cell, endothelial cell

AKUT

- Excellent regenerative potential
  - Endothel :VEGFR2
  - Hepatocyte (HGF)

KRONIS

- Fibrogenesis → disrupt regenerative potential
- Perisinusoid→ myofibroblas→ TGF beta → fibrogenesis
- Hepatosit→ TGF beta → EMT

Hepar

Vesica fellea

Pankreas

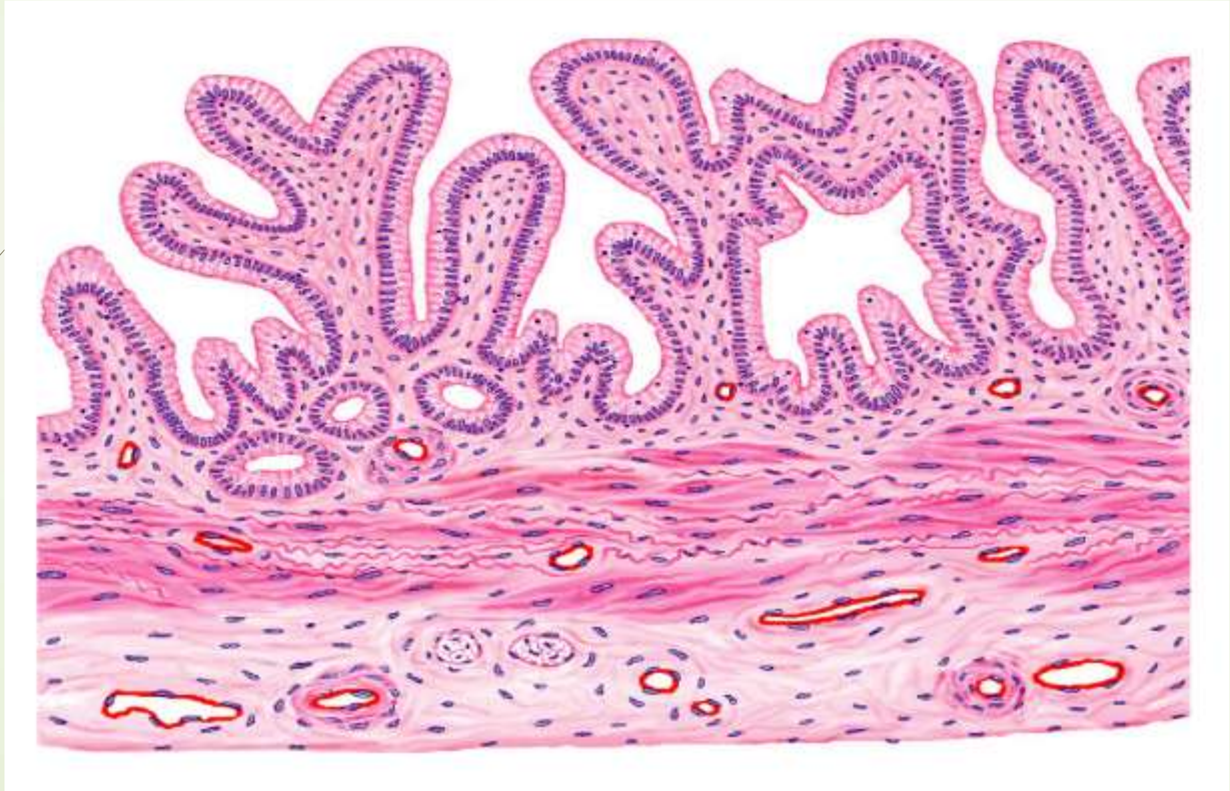
Learning objective: Gall Bladder

1. Overview of the gall bladder
2. Histology of the gall baldder wall
3. Ultrastructure and fuction of gallbladder mucosa

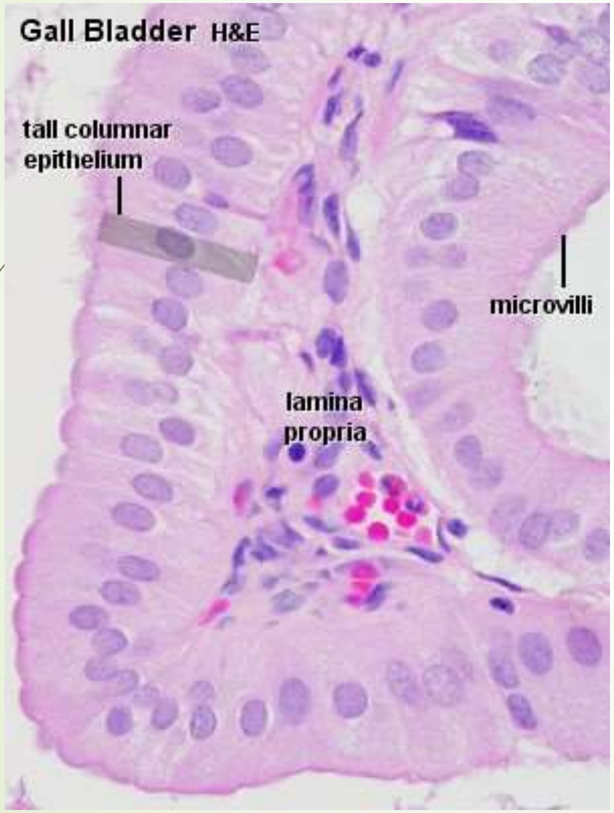
Overview of the gall bladder

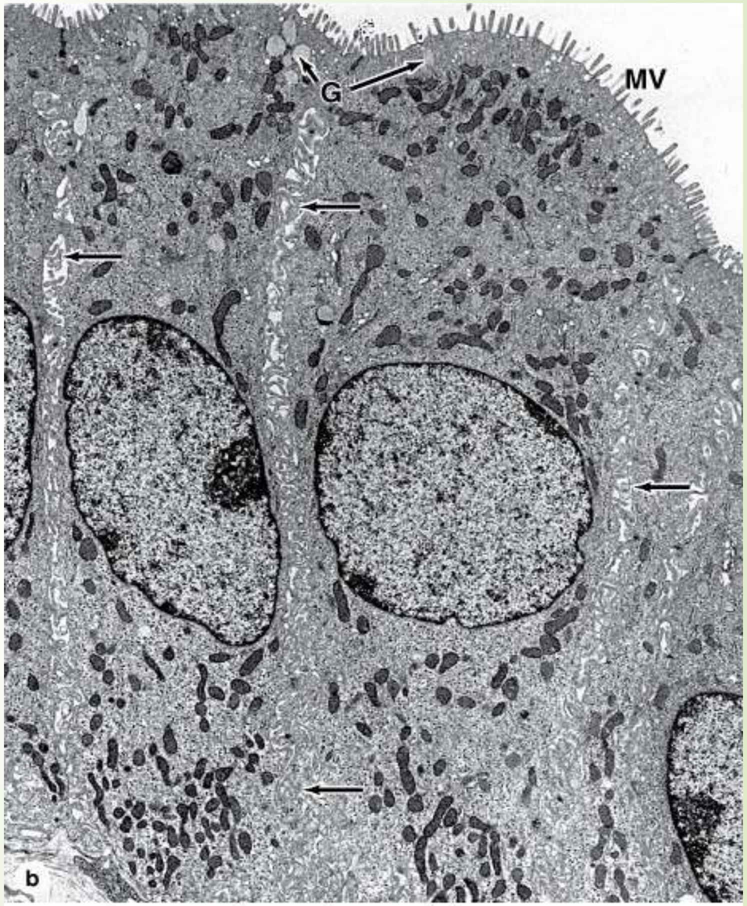
- Mayor function :
  - Concentration and storage of bile between meals
  - Release of bile by contraction of muscularis

Histology of the gall baldder wall



Ultrastructure and fuction of gallbladder mucosa





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Hepar

Vesica fellea

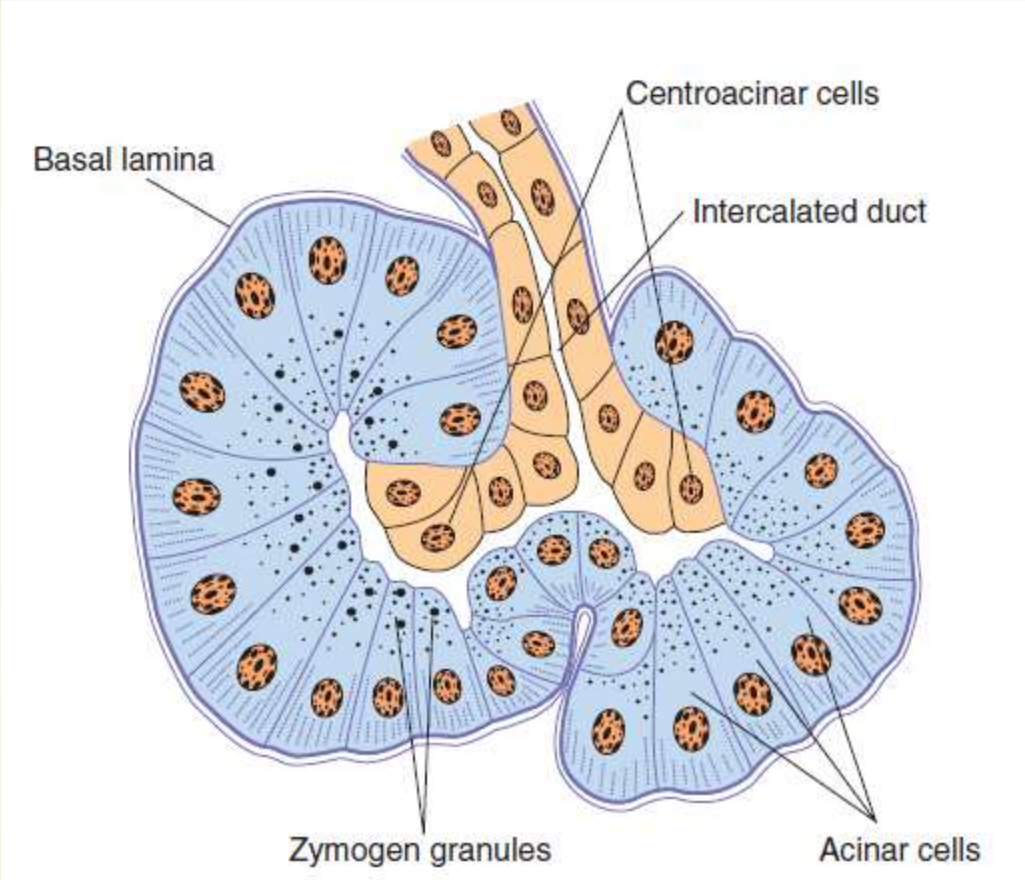
Exocrine Pancreas

Learning objective: Exocrine Pancreas

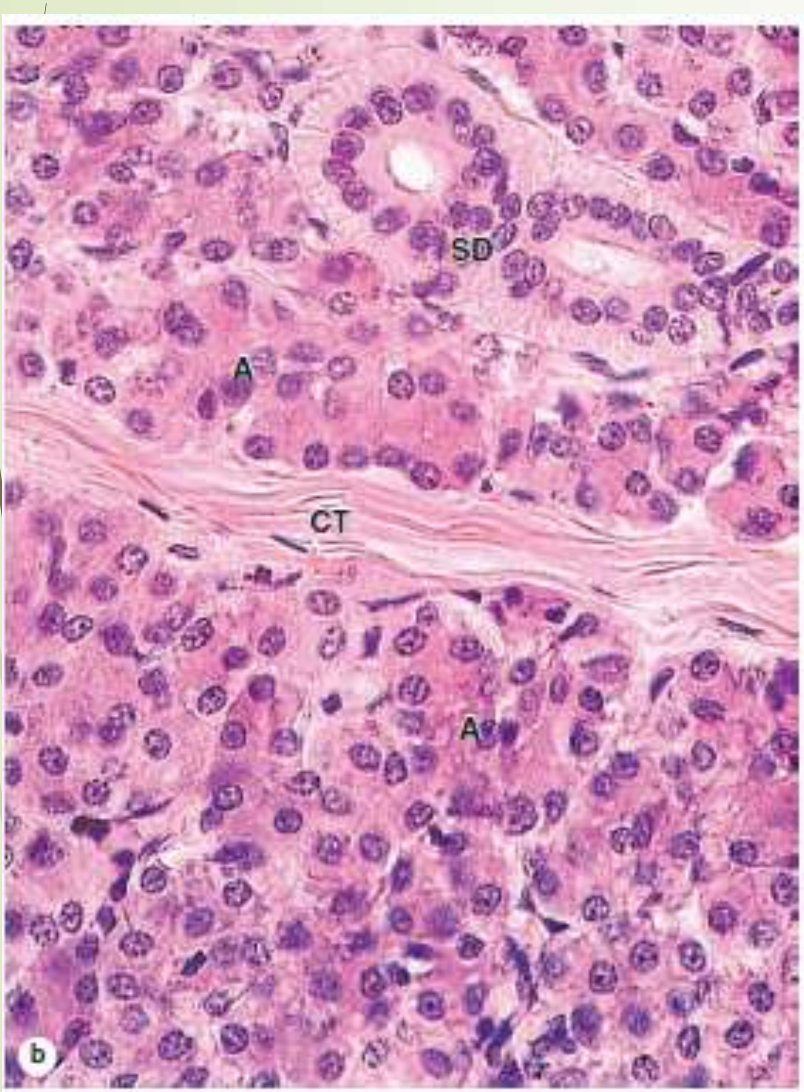
1. Overview of pancreas
2. Histology and ultrastructure of Exocrine pancreas: Duct and Acini

Overview of pancreas

- Surrounded by connective tissue
- Lobulus are separated by connective tissue septa carrying blood and lymphatic vessels, nerves and excretory ducts
- Functional histolic unit : ACINUS



Centroacinar cells
Basal lamina
Intercalated duct
Zymogen granules
Acinar cells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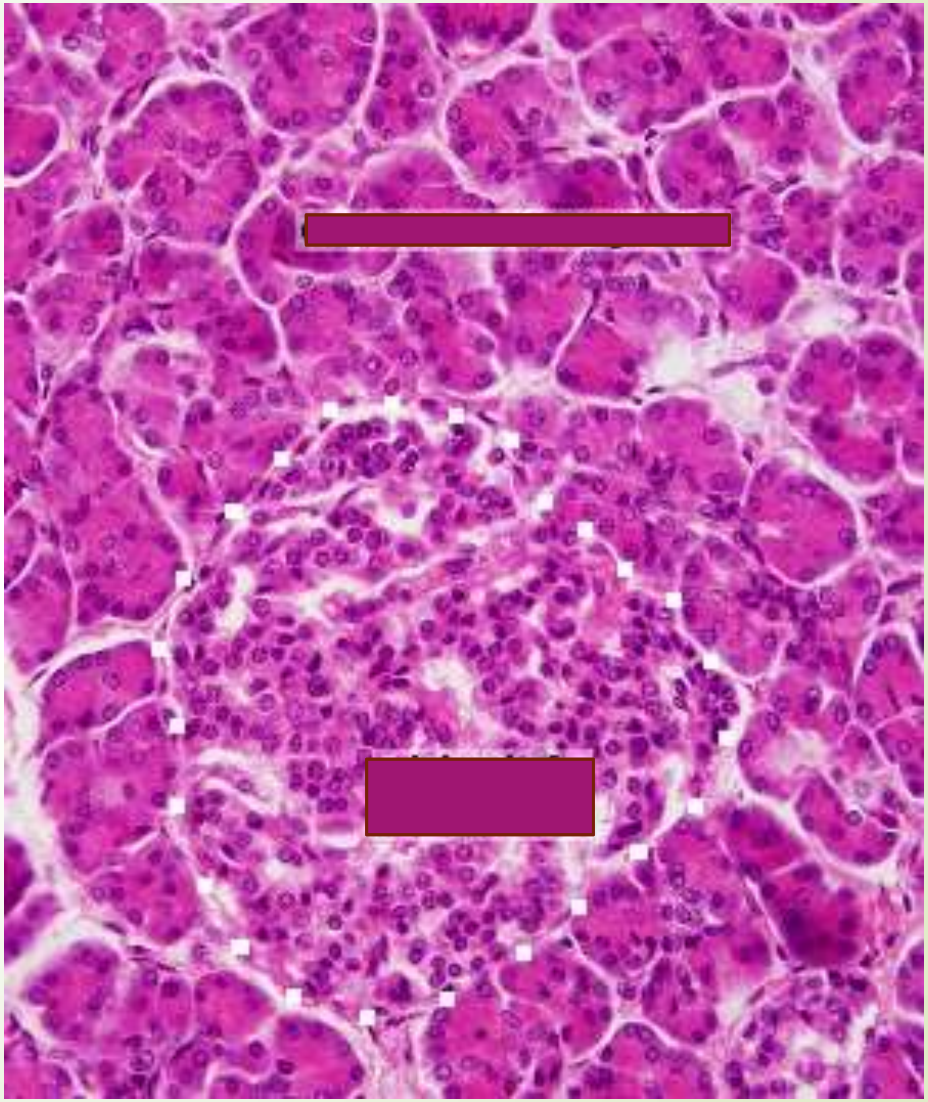


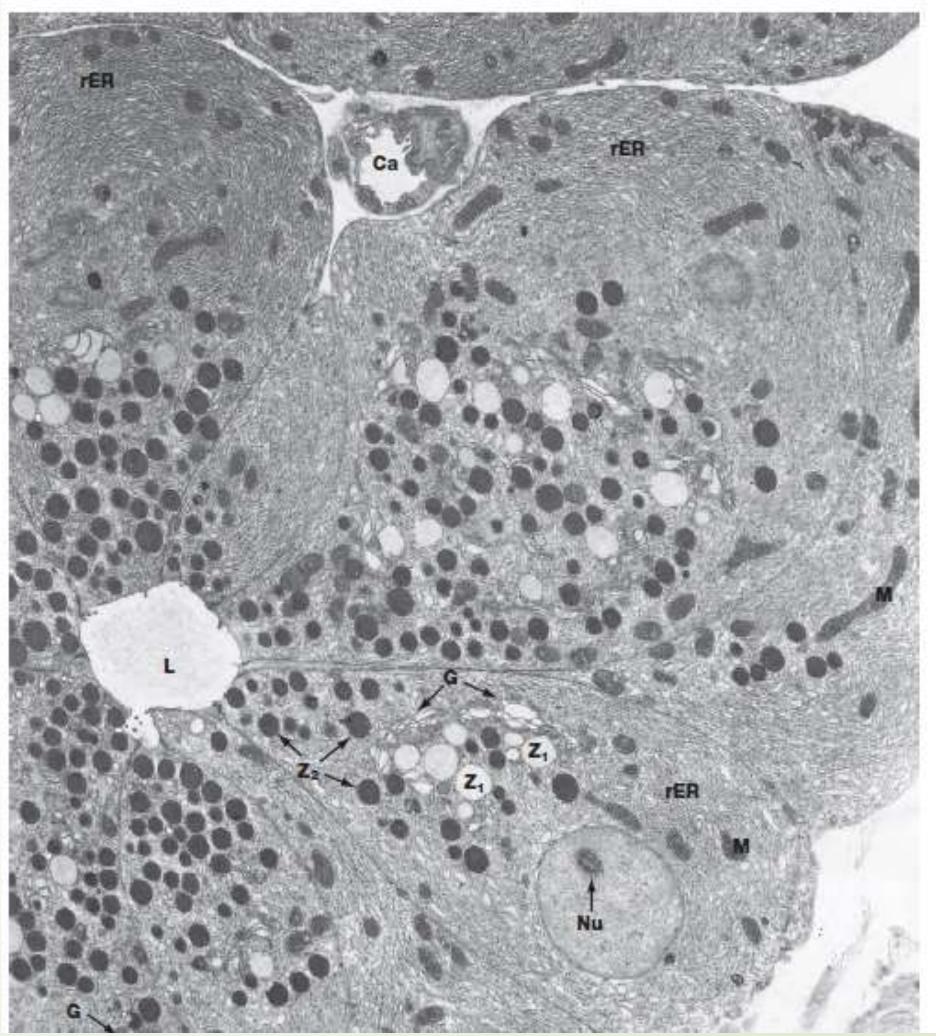
Pancreatic Acinar Cell

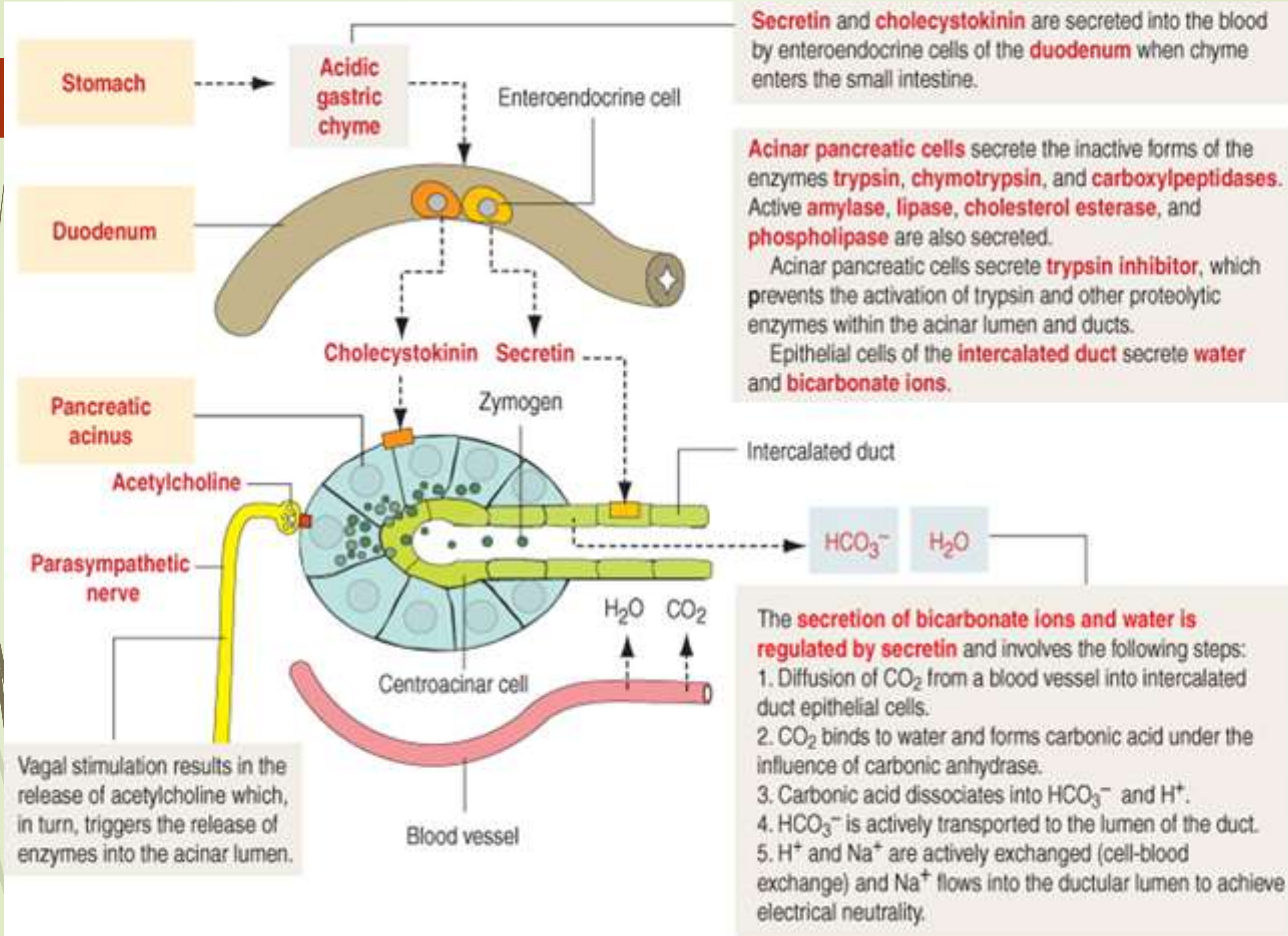
RER → syntesized inactive proenzyme

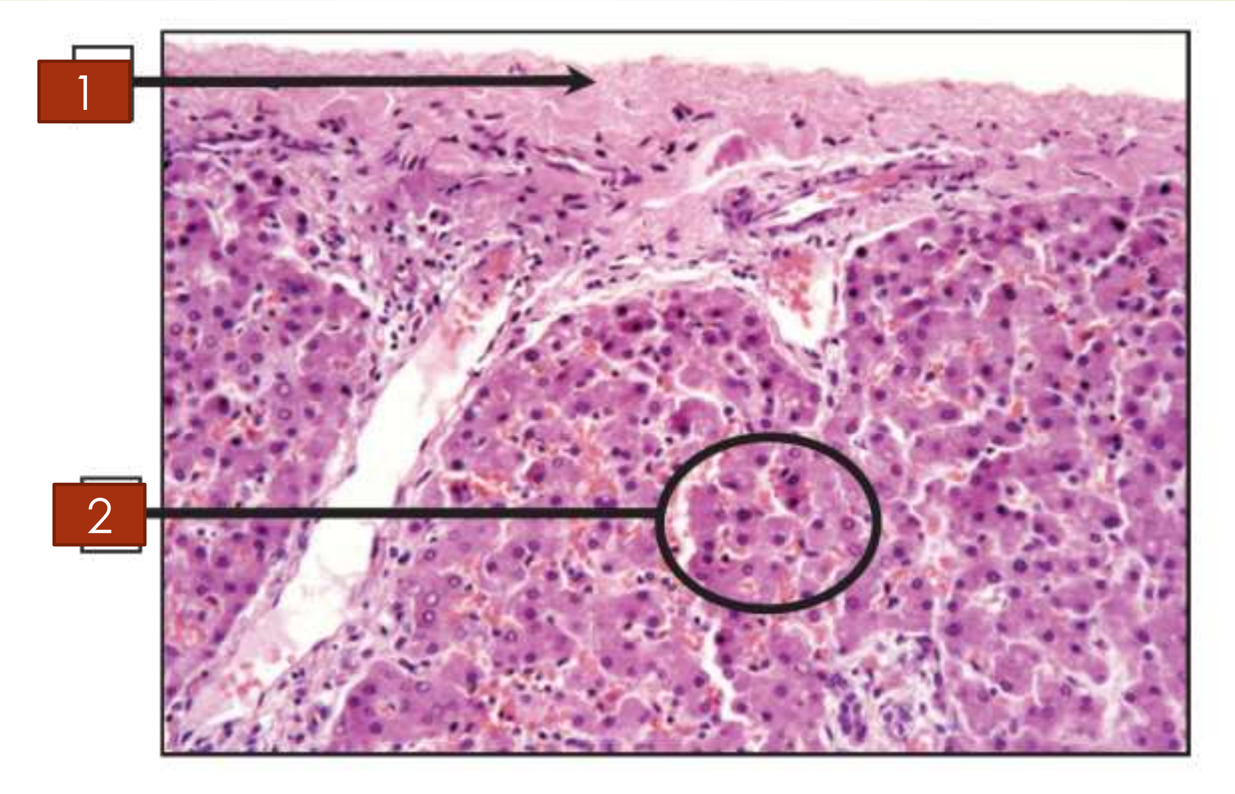
Golgi aparatus → concentrated in vesicle to form zymogen granules

Each zymogen contain several pancreatic enzymes

Damage to the pancreatic acinar cells releases pancreatic enzymes into the local tissues.




Secretin and cholecystokinin are secreted into the blood by enteroendocrine cells of the duodenum when chyme enters the small intestine.
Stomach
Acidic gastric chyme
Enteroendocrine cell
Duodenum
Acinar pancreatic cells secrete the inactive forms of the enzymes trypsin, chymotrypsin, and carboxylpeptidases. Active amylase, lipase, cholesterol esterase, and phospholipase are also secreted.
Acinar pancreatic cells secrete trypsin inhibitor, which prevents the activation of trypsin and other proteolytic enzymes within the acinar lumen and ducts.
Epithelial cells of the intercalated duct secrete water and bicarbonate ions.
Cholecystokinin
Secretin
Zymogen
Pancreatic acinus
Intercalated duct
Acetylcholine
HCO_3^-
H_2O
Parasympathetic nerve
H_2O
CO_2
The secretion of bicarbonate ions and water is regulated by secretin and involves the following steps:
1. Diffusion of CO_2 from a blood vessel into intercalated duct epithelial cells.
2. CO_2 binds to water and forms carbonic acid under the influence of carbonic anhydrase.
3. Carbonic acid dissociates into HCO_3^- and H^+.
4. HCO_3^- is actively transported to the lumen of the duct.
5. H^+ and Na^+ are actively exchanged (cell-blood exchange) and Na^+ flows into the ductular lumen to achieve electrical neutrality.
Centroacinar cell
Vagal stimulation results in the release of acetylcholine which, in turn, triggers the release of enzymes into the acinar lumen.
Blood vessel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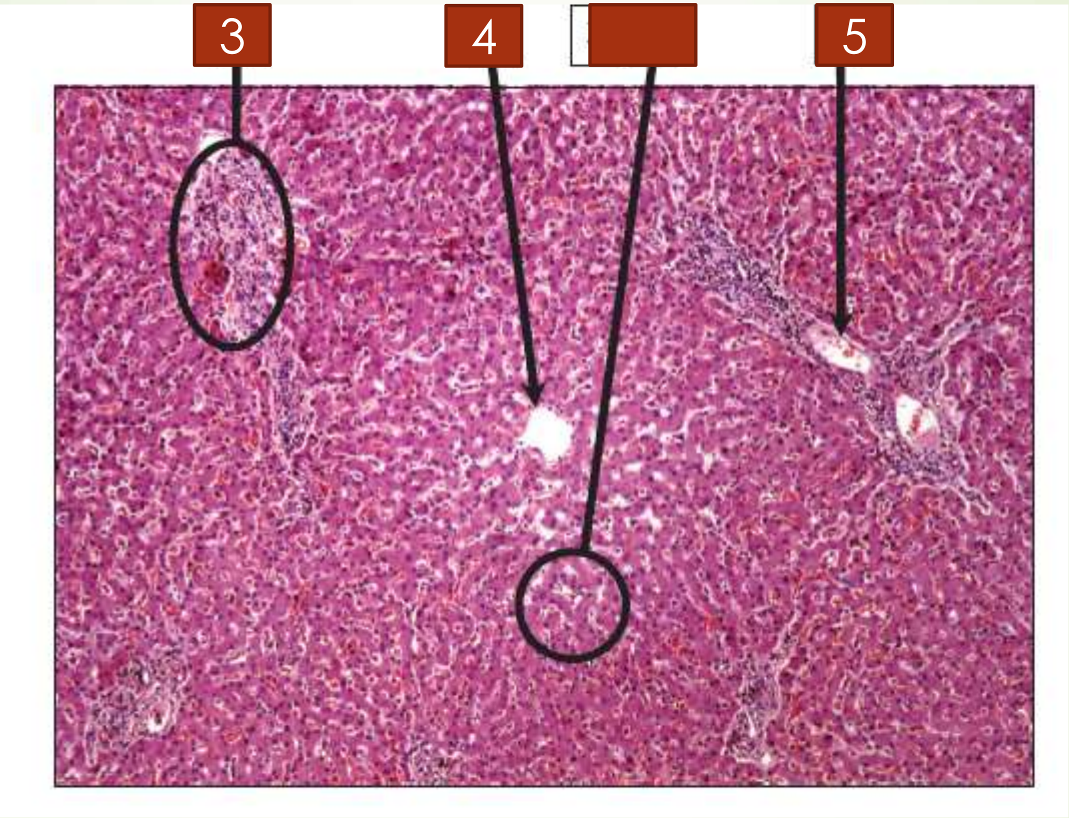
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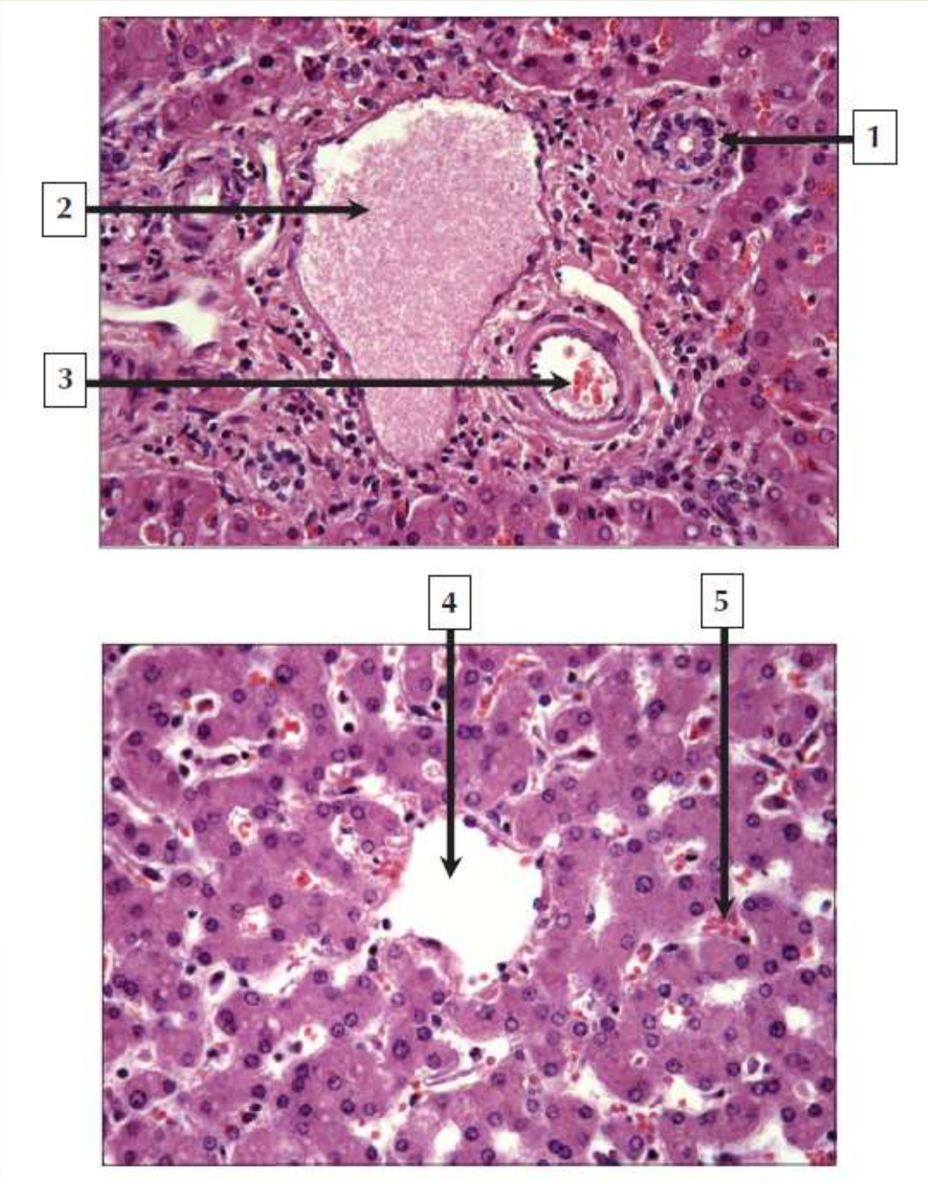
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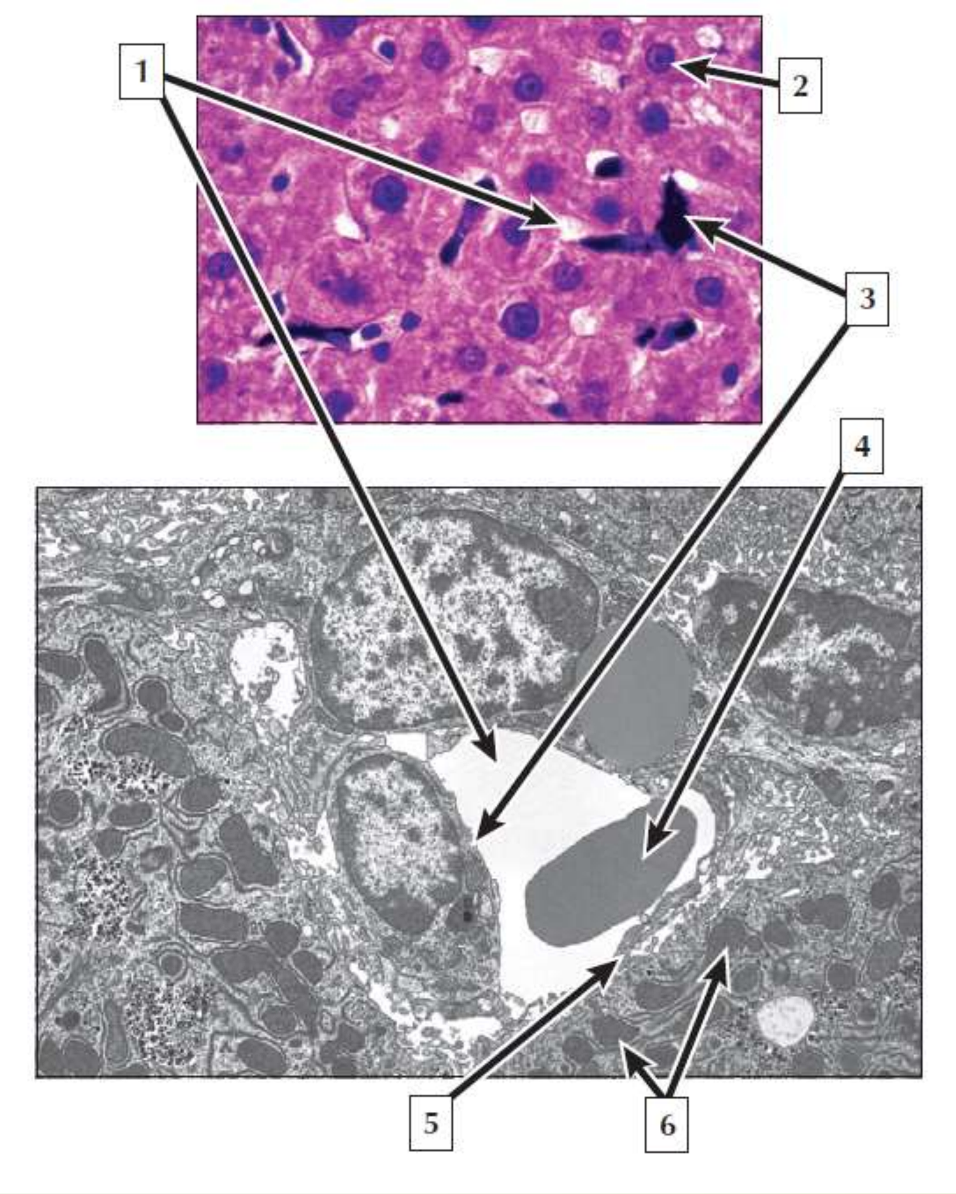
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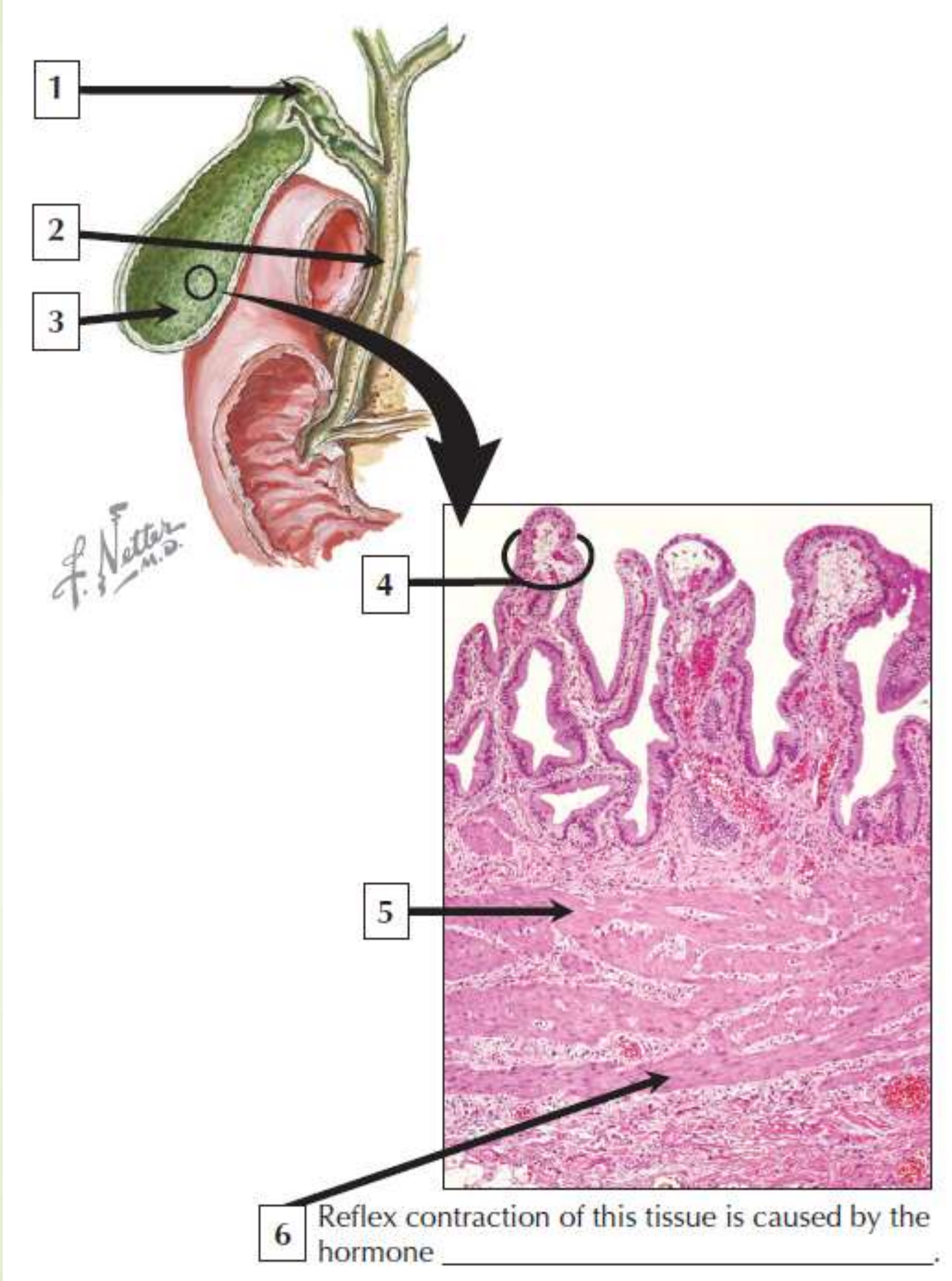
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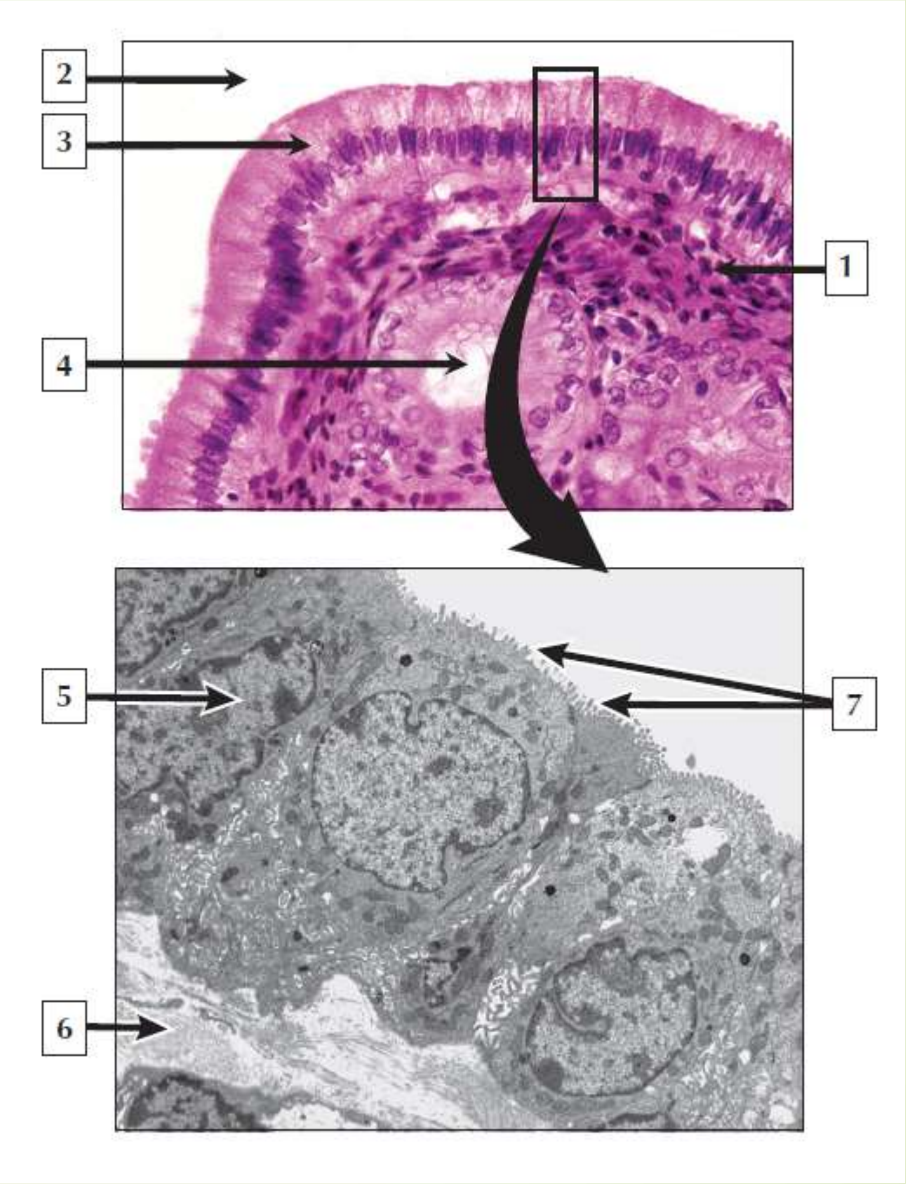
Reflex contraction of this tissue is caused by the hormone ______________________.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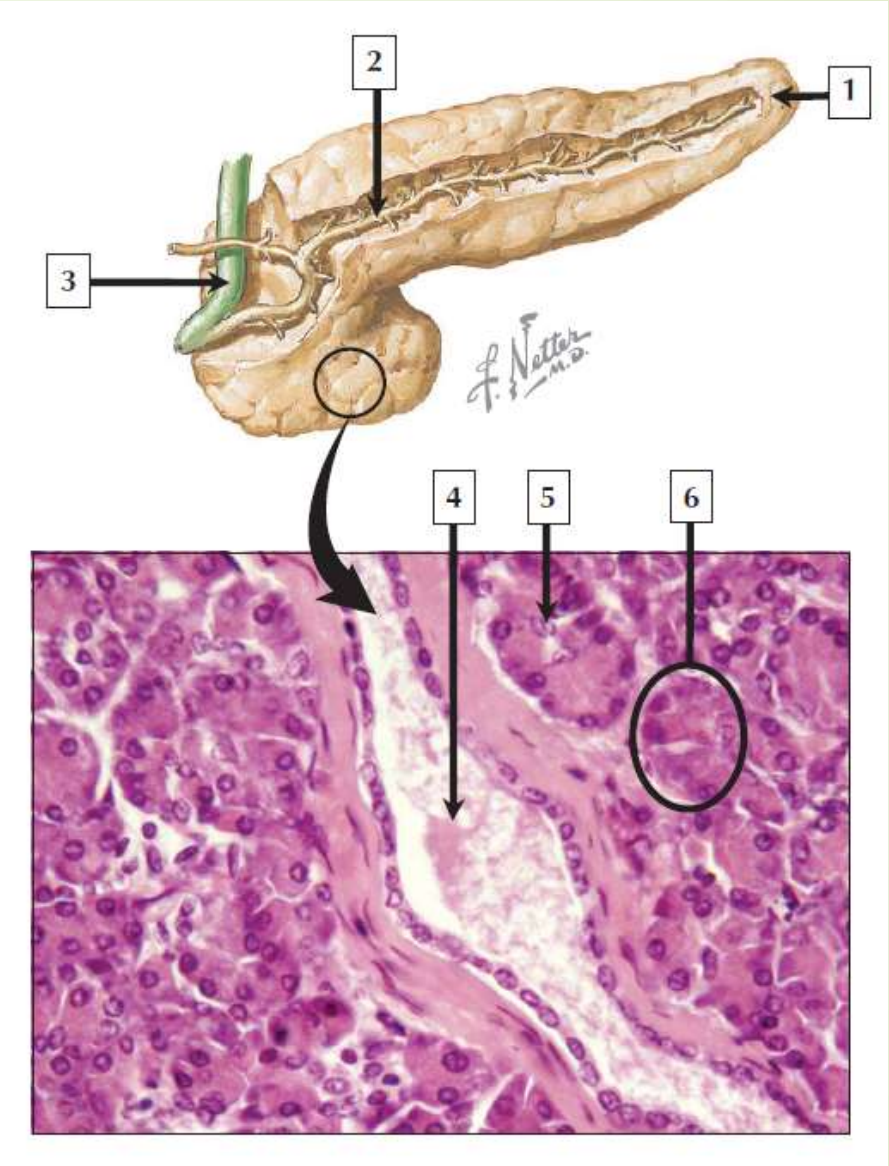
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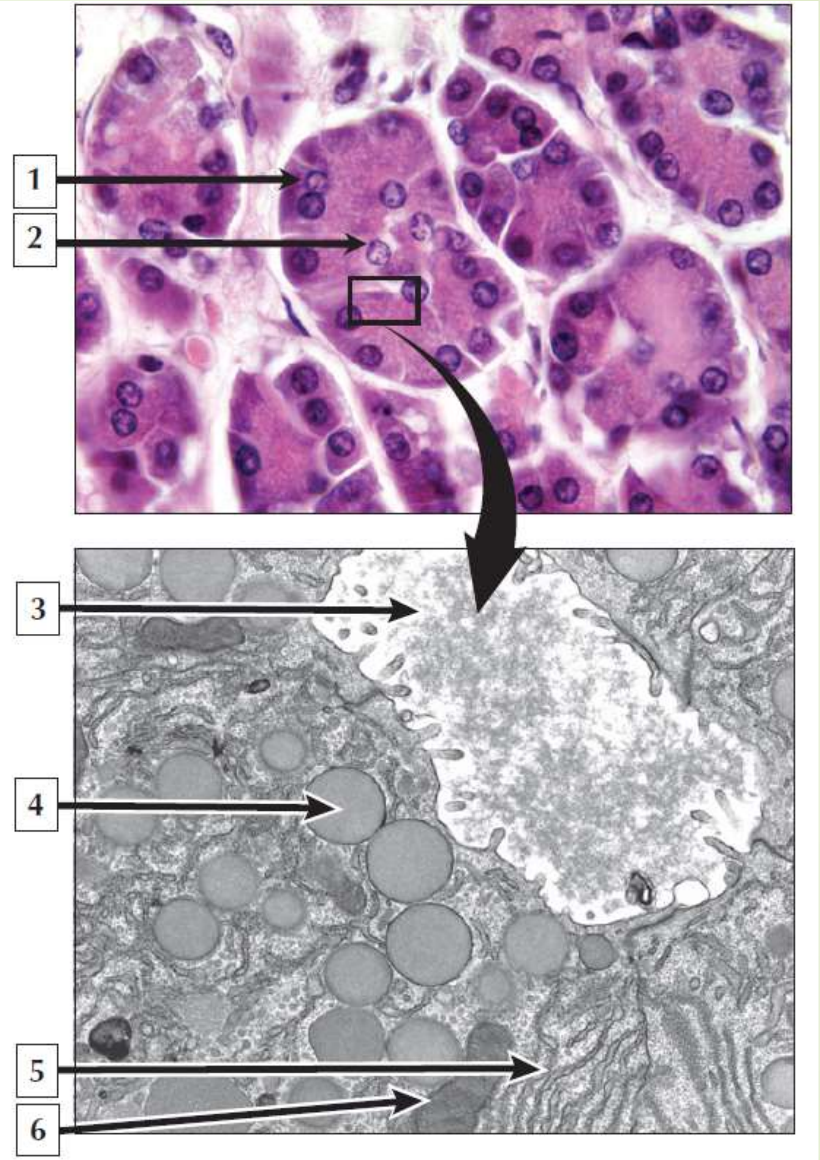
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