

# Digestive Organs

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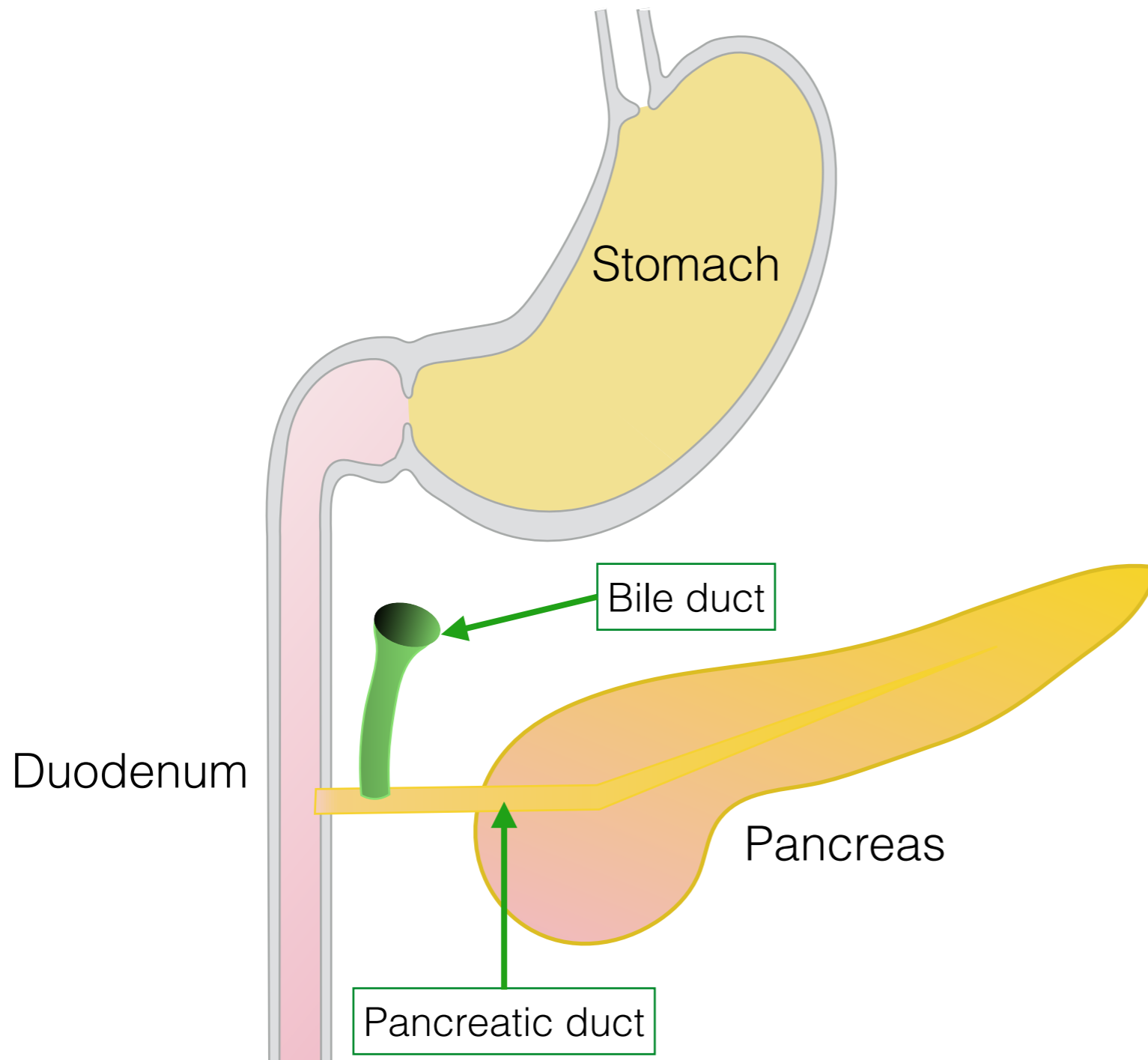
# What we'll talk about...

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- Pancreas
- Salivary glands
- Liver

Pancreas

# Pancreas secretes bicarbonate and digestive enzymes into the duodenum.



## Pancreatic Secretions

### Zymogens

- Trypsinogens
- Chymotrypsinogen
- Proelastase
- Proprotease E
- Procarboxypeptidase A
- Procarboxypeptidase B

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### Active Enzymes

- $\alpha$ -Amylase
- Carboxyl ester lipase
- Lipase
- RNAase
- DNAase
- Colipase

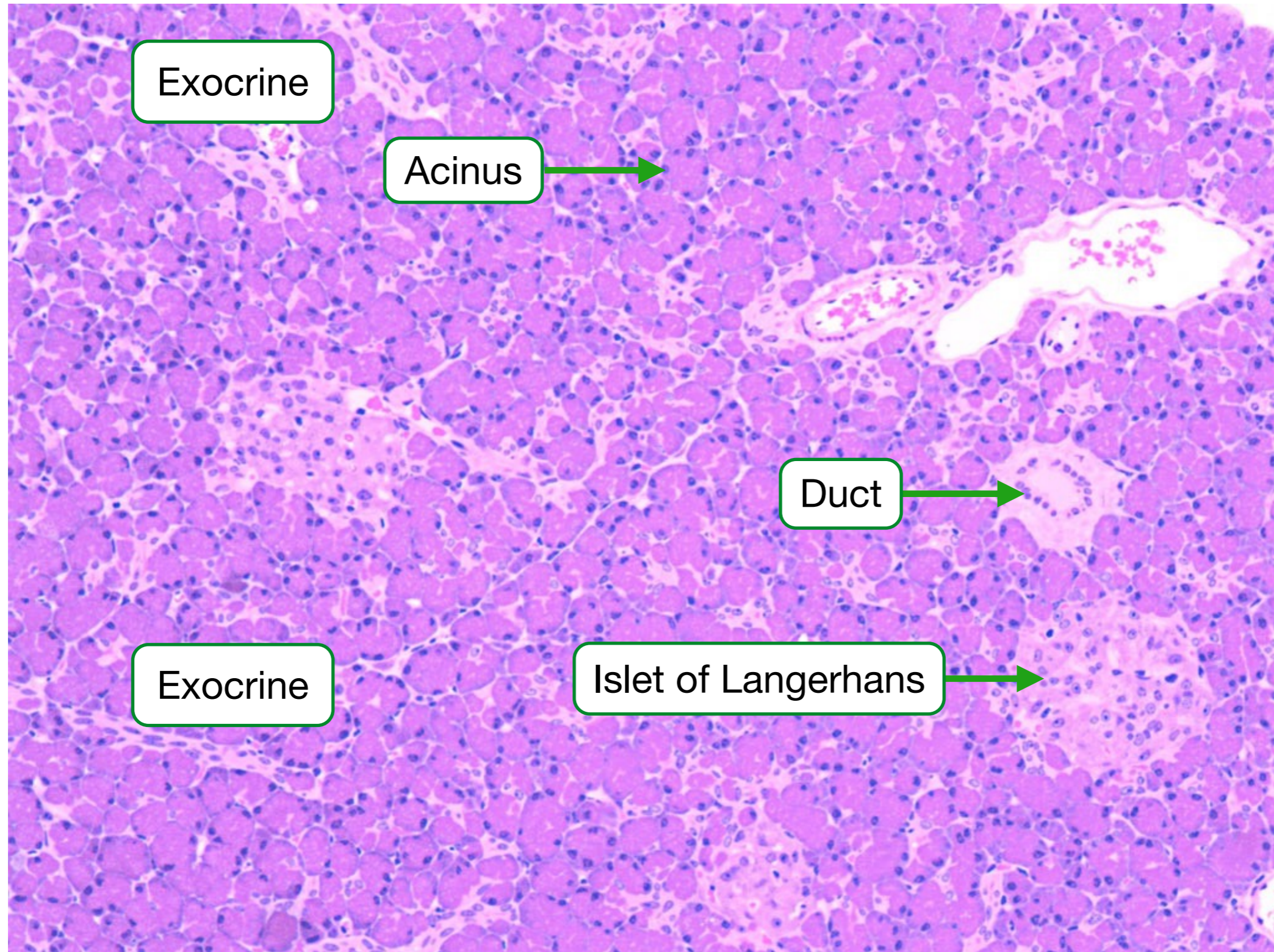
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### Non-Protein

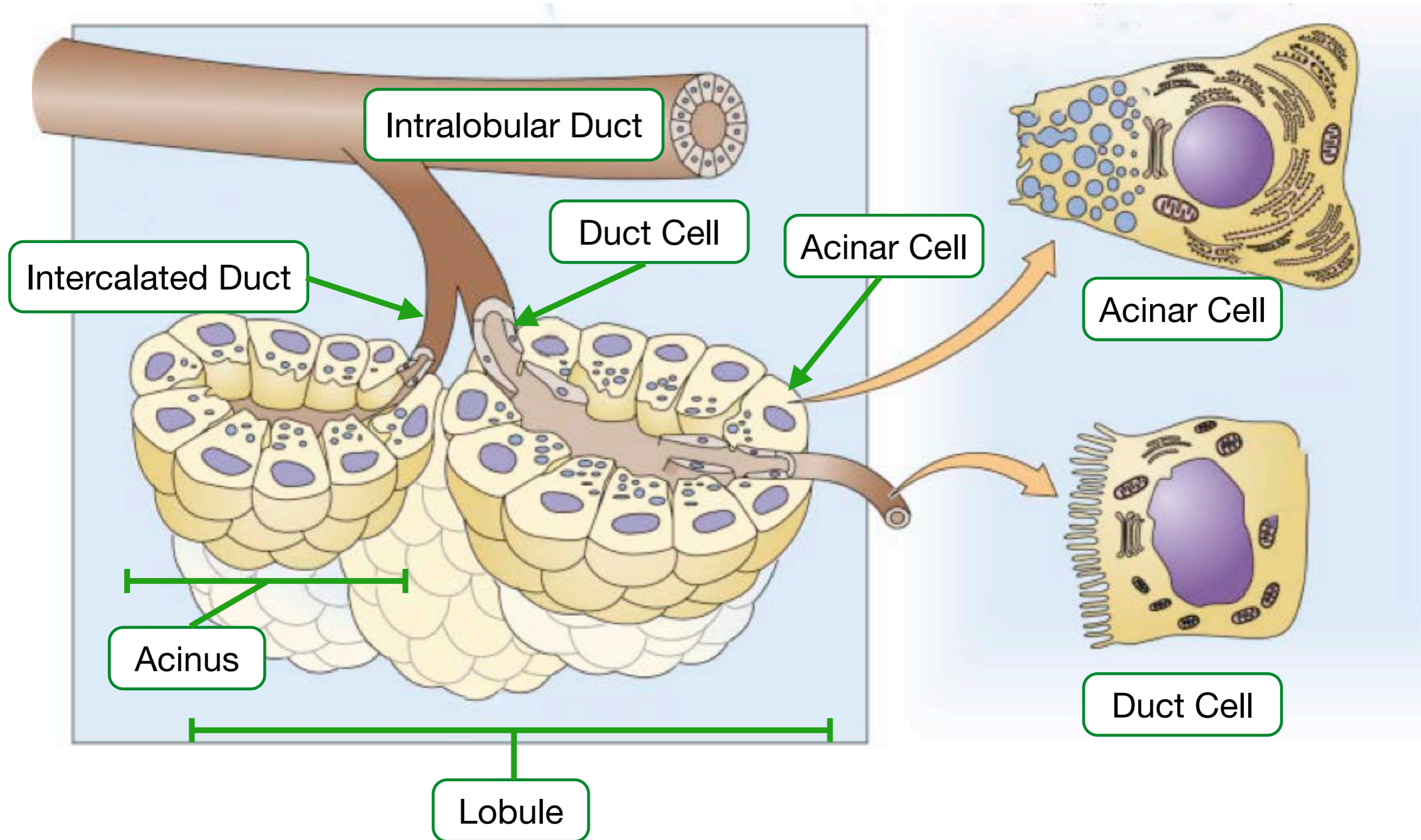
- Bicarbonate
- $\text{Na}^+$ ,  $\text{Cl}^-$

Pancreas contains exocrine and endocrine domains.

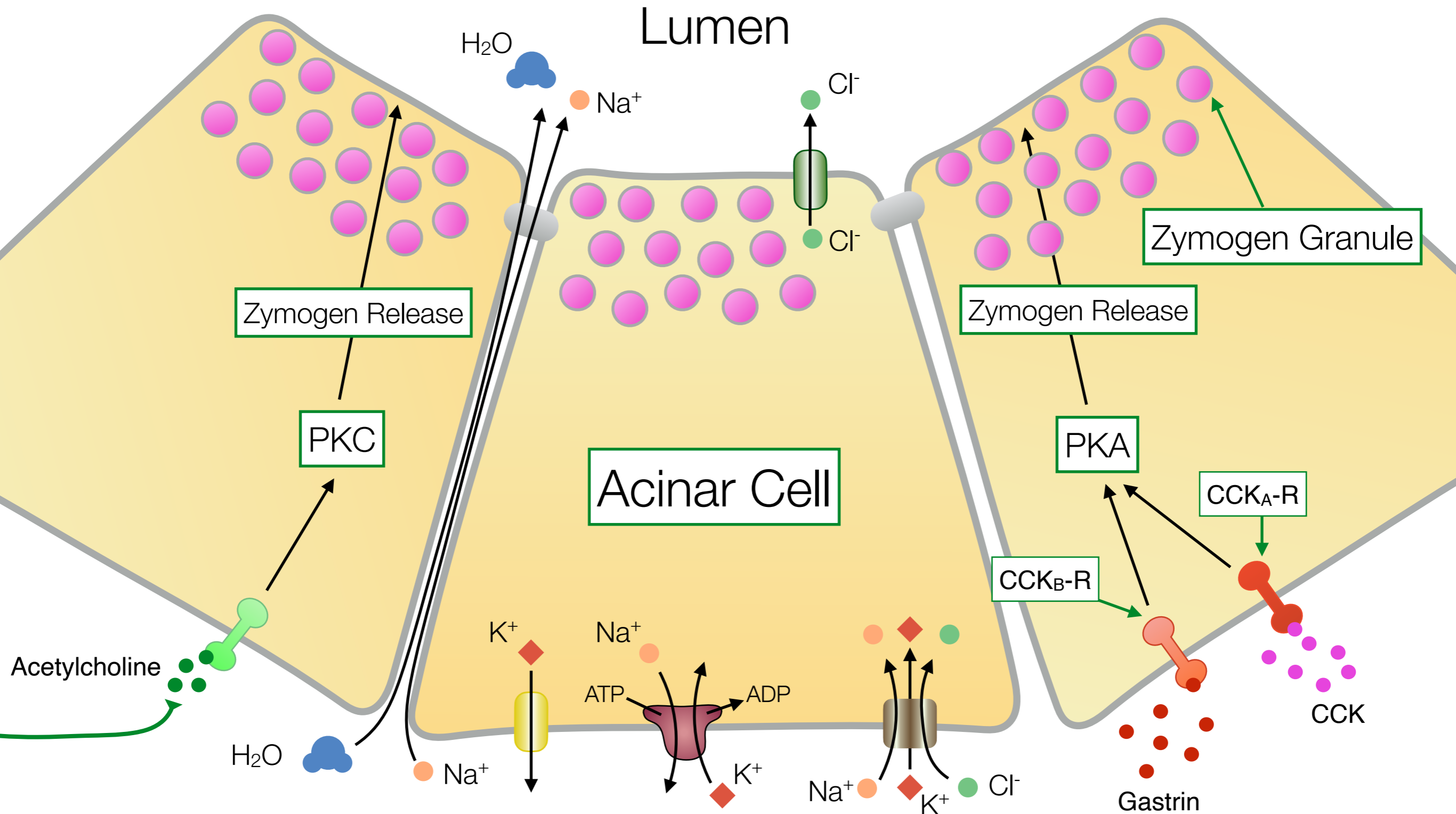
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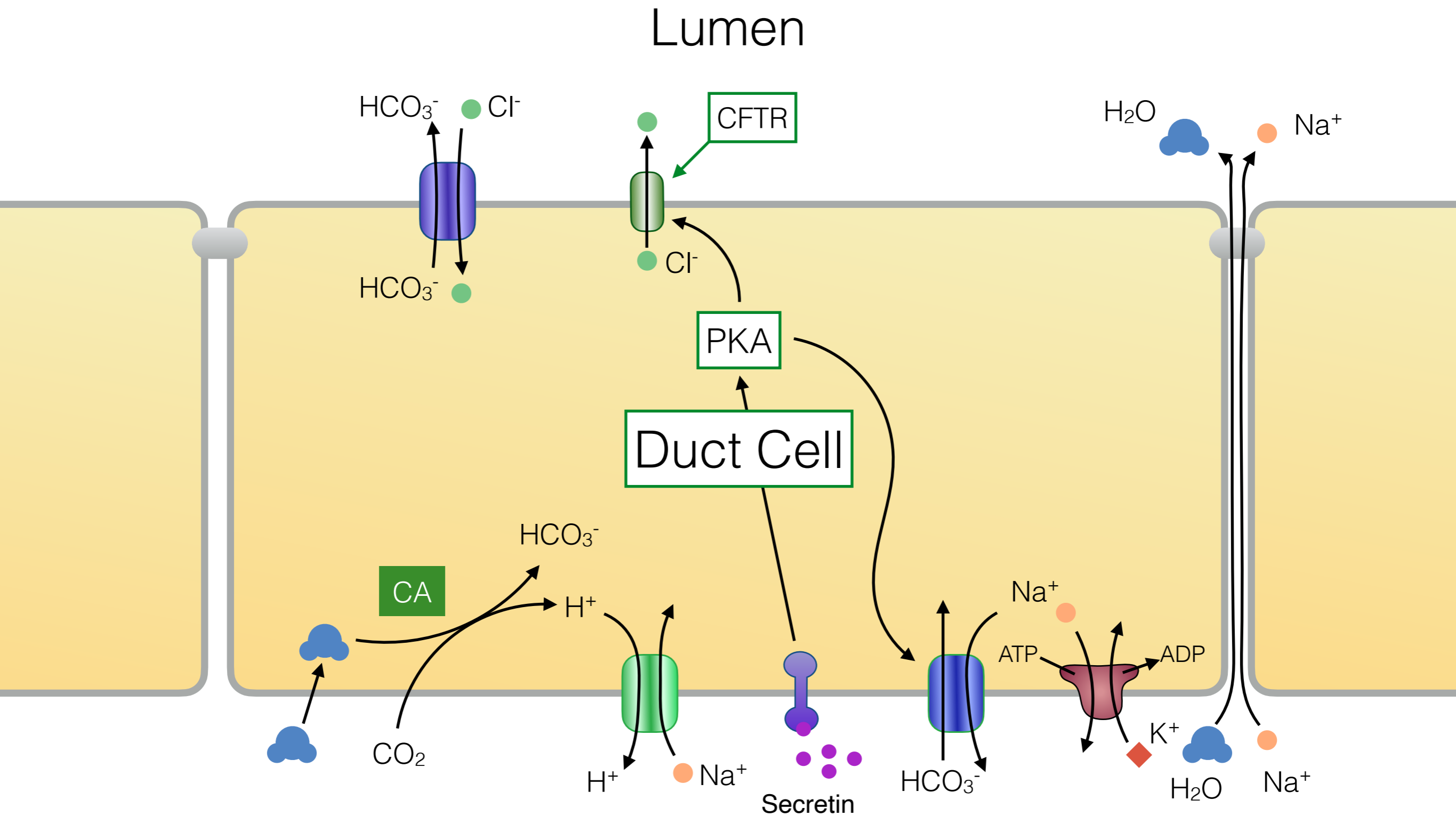
Pancreas and salivary glands have a tubulo-acinar structure.



# Acinar cells store and release digestive enzymes.



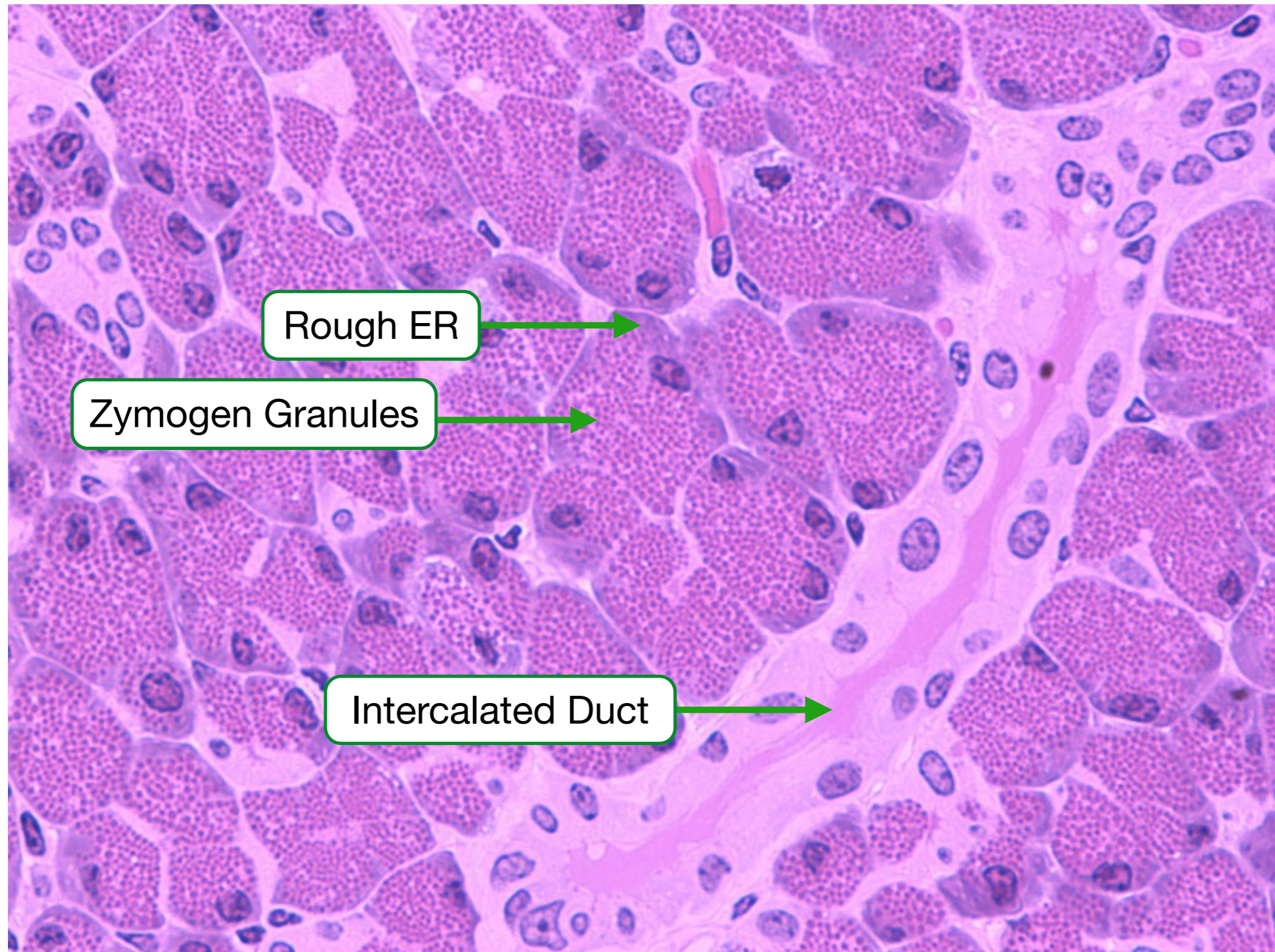
# Pancreatic duct cells secrete bicarbonate.



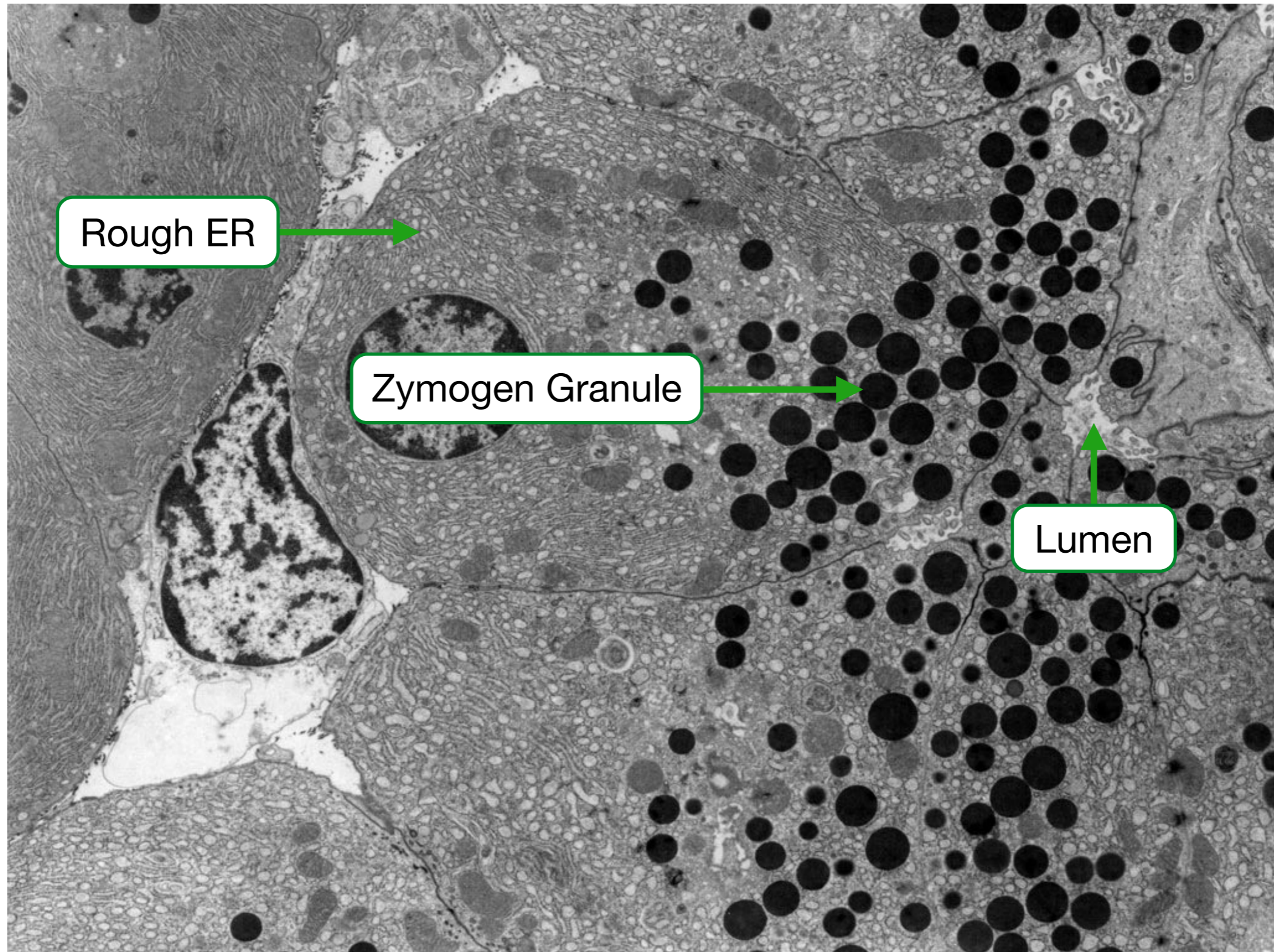


Acinar cells contain zymogen granules and rough ER and duct cells have a pale cytoplasm.

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Electron micrograph reveals the lumen defined by the apical surface of acinar cells.



# Salivary Glands

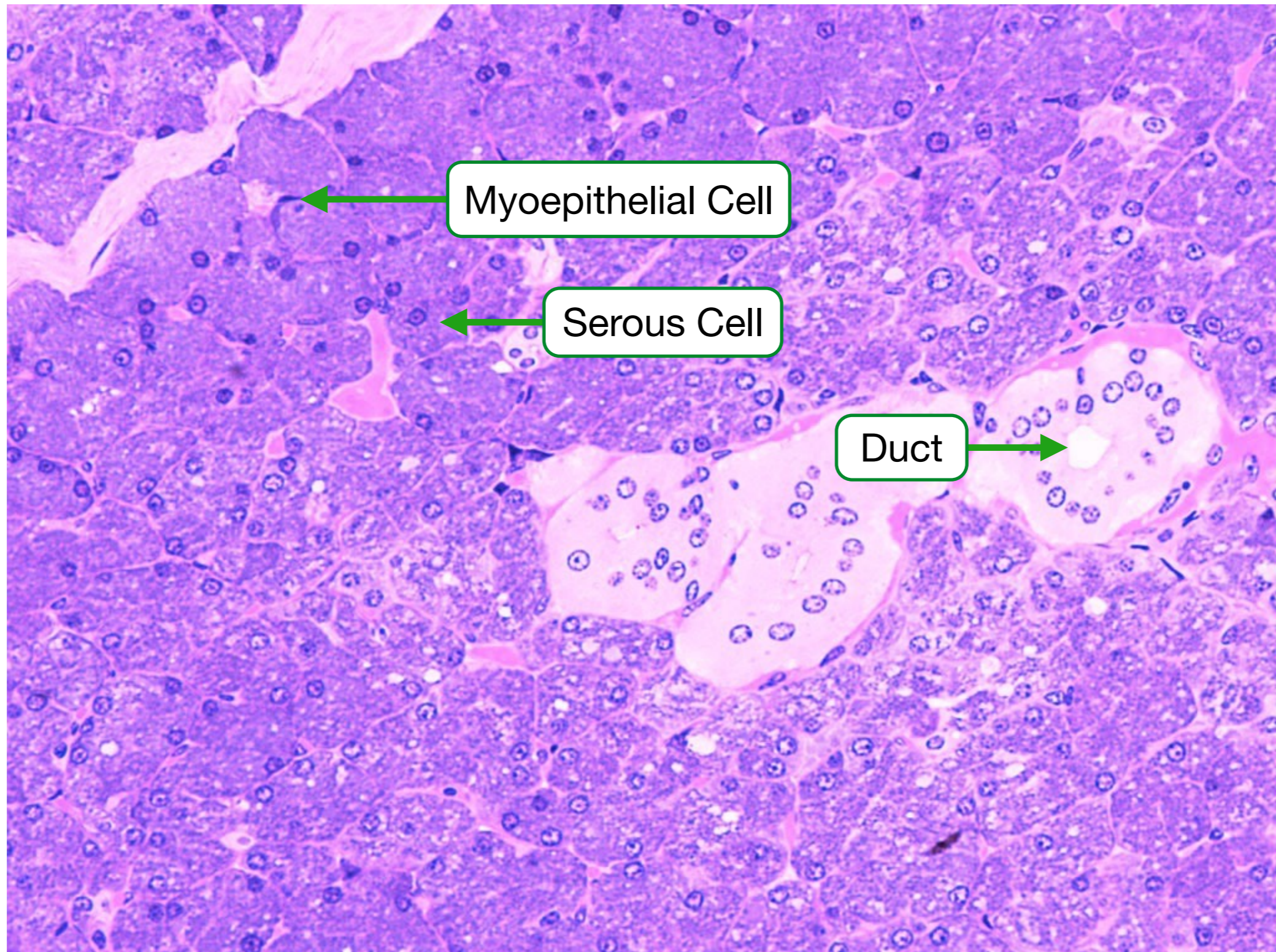
Digestion starts in the oral cavity with the production of saliva.

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- Parotid Gland
- Sublingual Gland
- Submandibular Gland

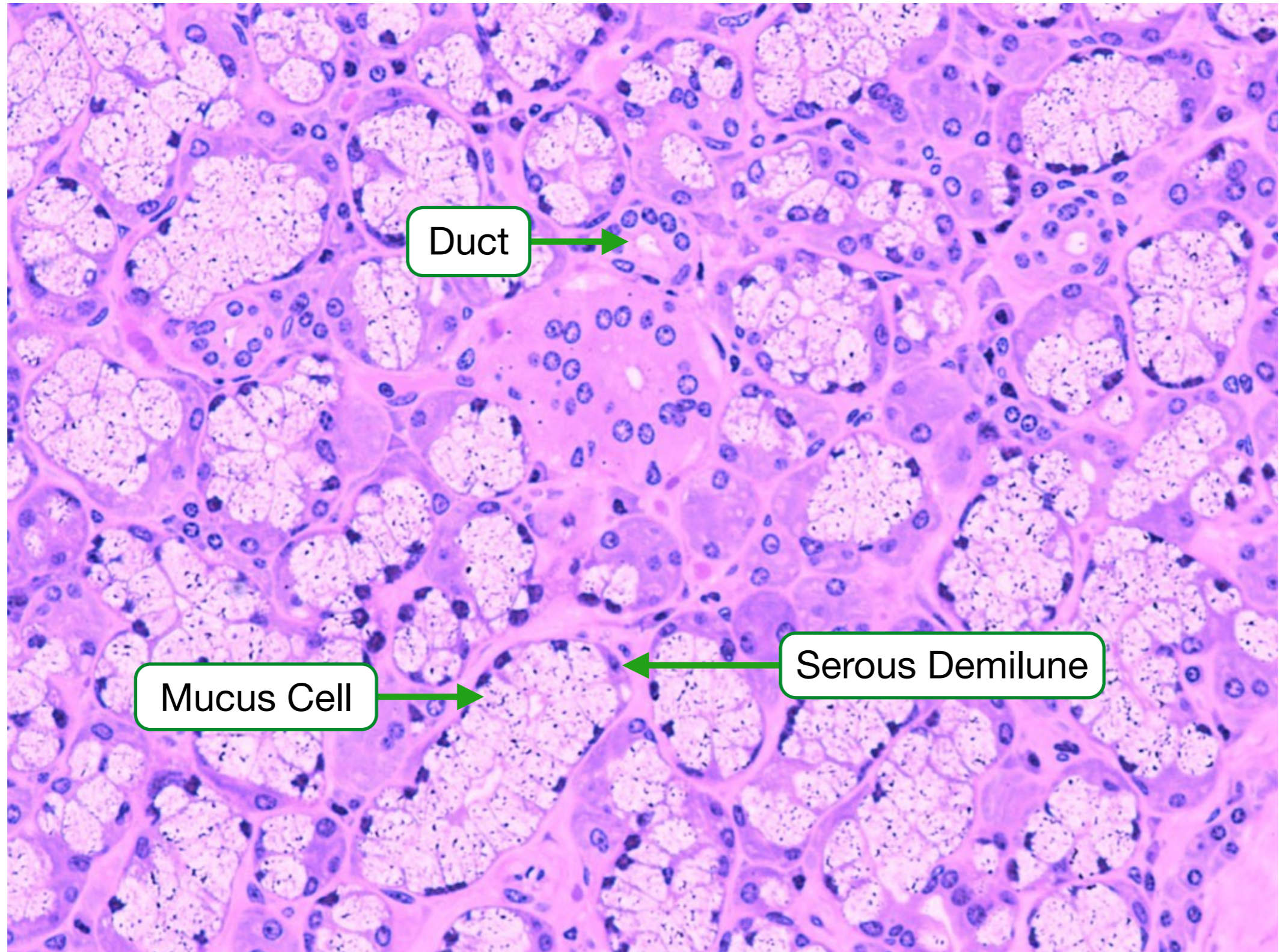
Parotid glands contain mostly serous, exocrine cells.

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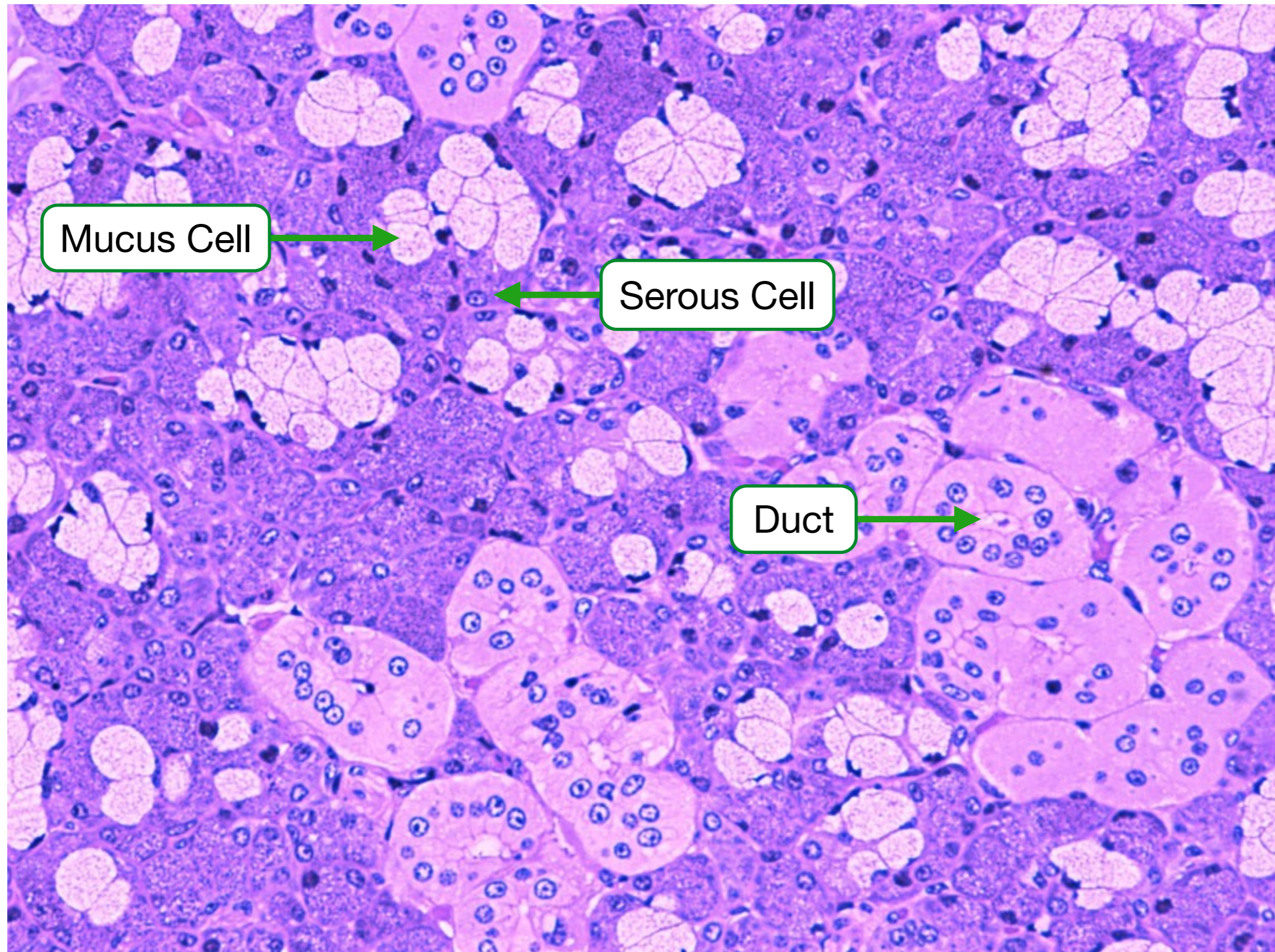
Sublingual glands contain mostly mucus-secreting cells.

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Submandibular glands contain a mix of mucus-secreting and serous cells.

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Liver



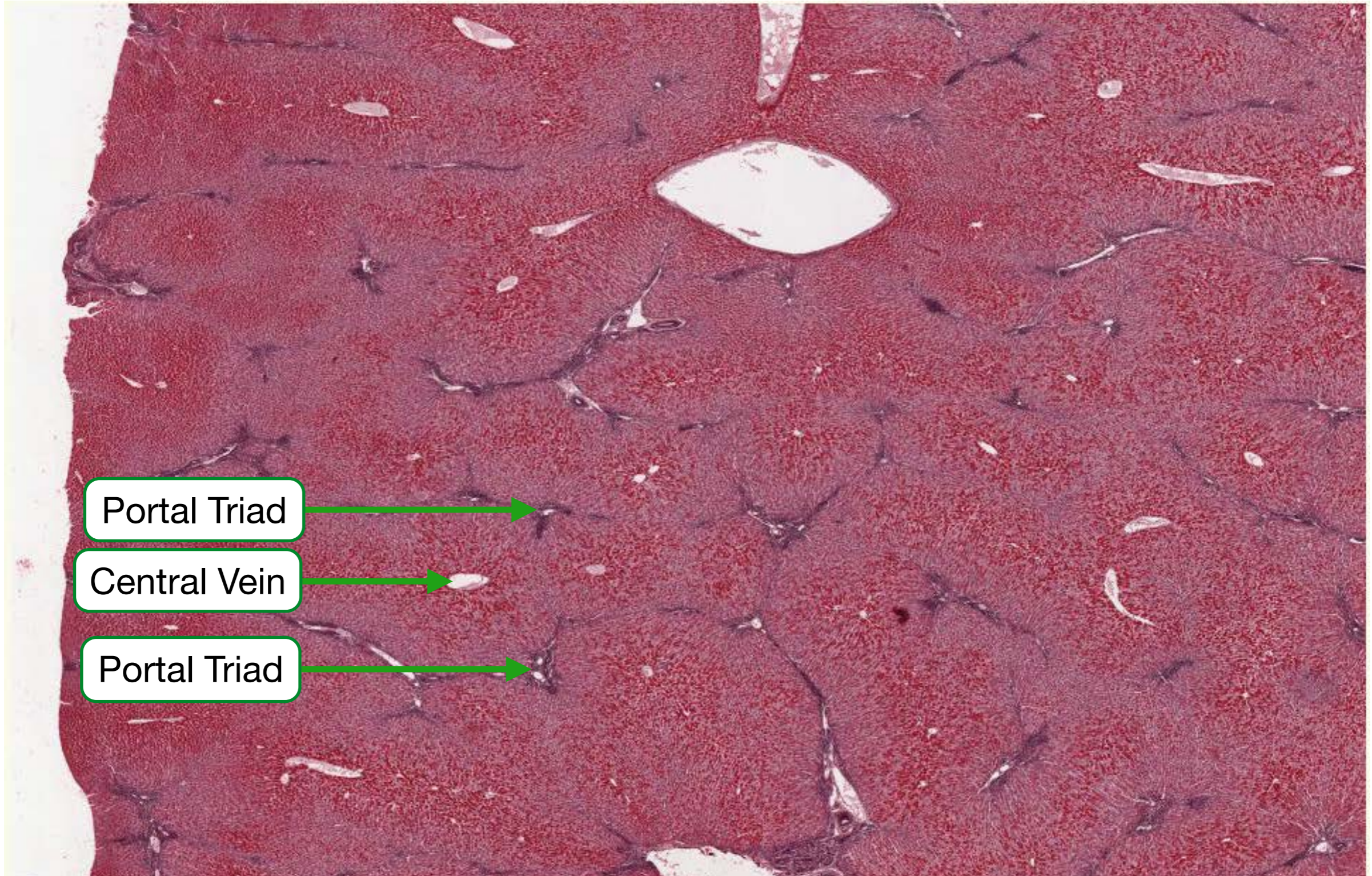
# The liver perform many essential function.

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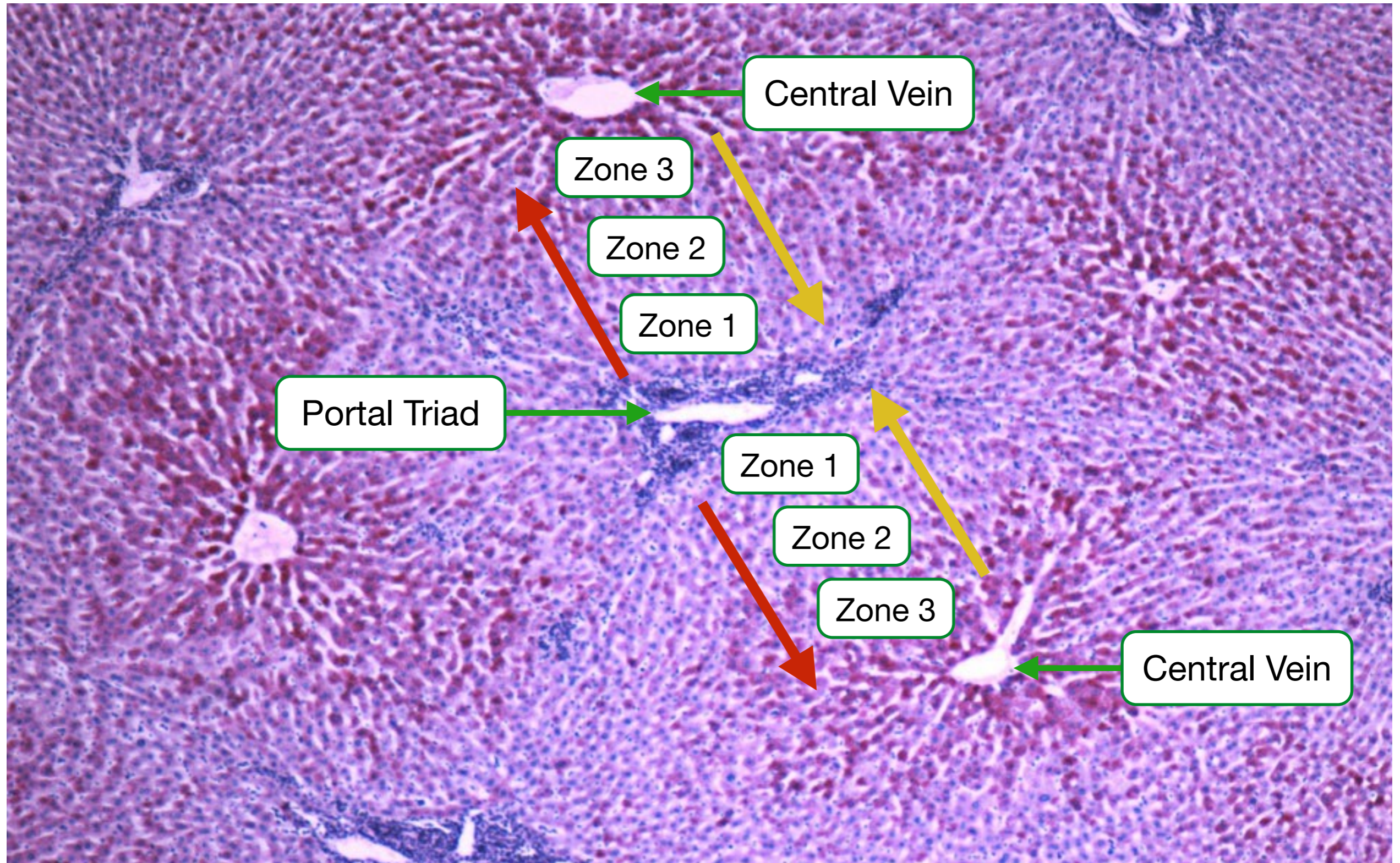
- Solubilization and absorption of lipid
- Elimination of waste products
- Processing of nutrients
- Synthesizes plasma proteins
- Detoxifies Drugs
- Store Glycogen

The liver has vascular portal triads surrounding a central vein.

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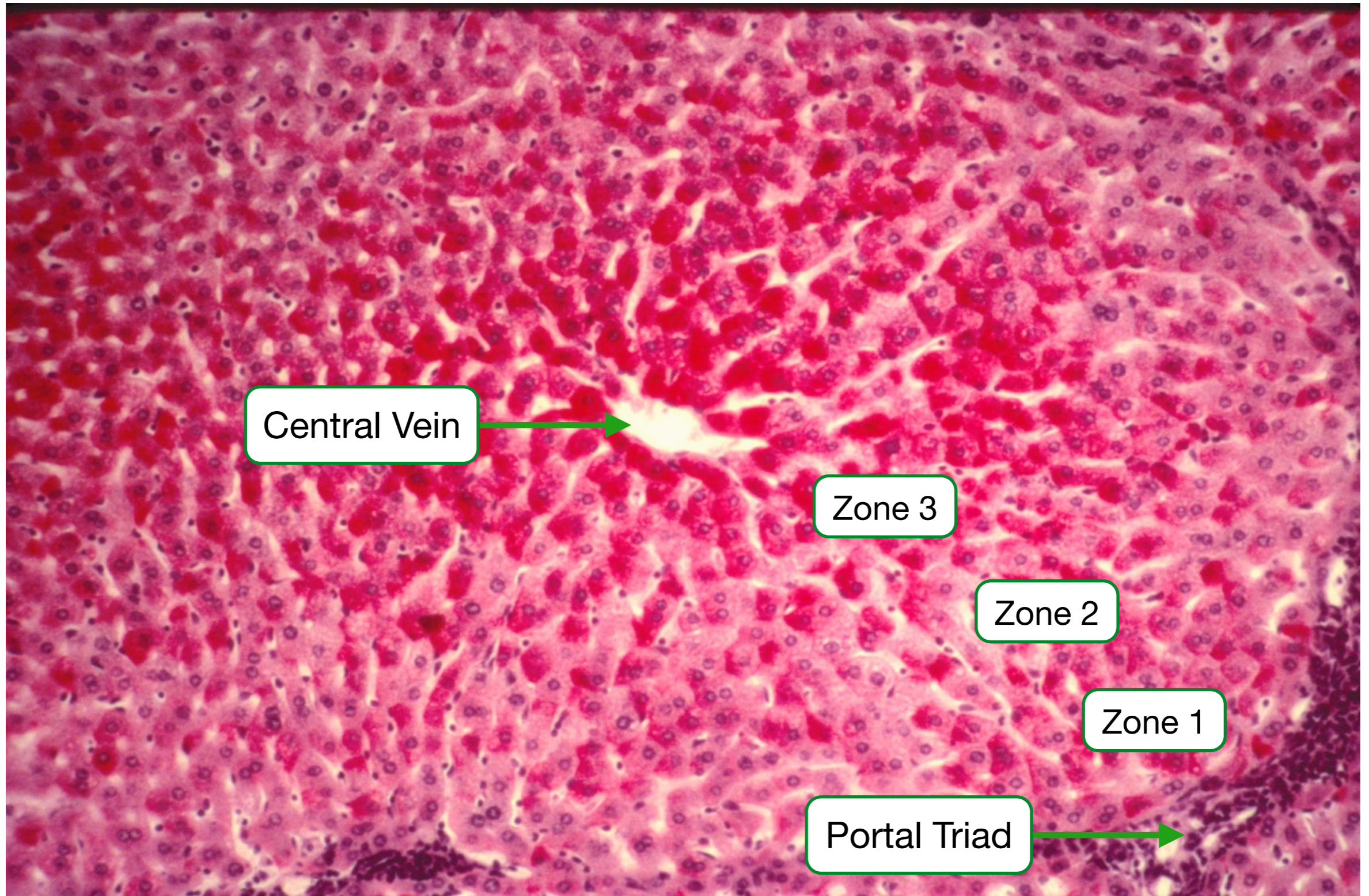


Hepatocytes are arranged in zones with different physiological and biochemical properties.



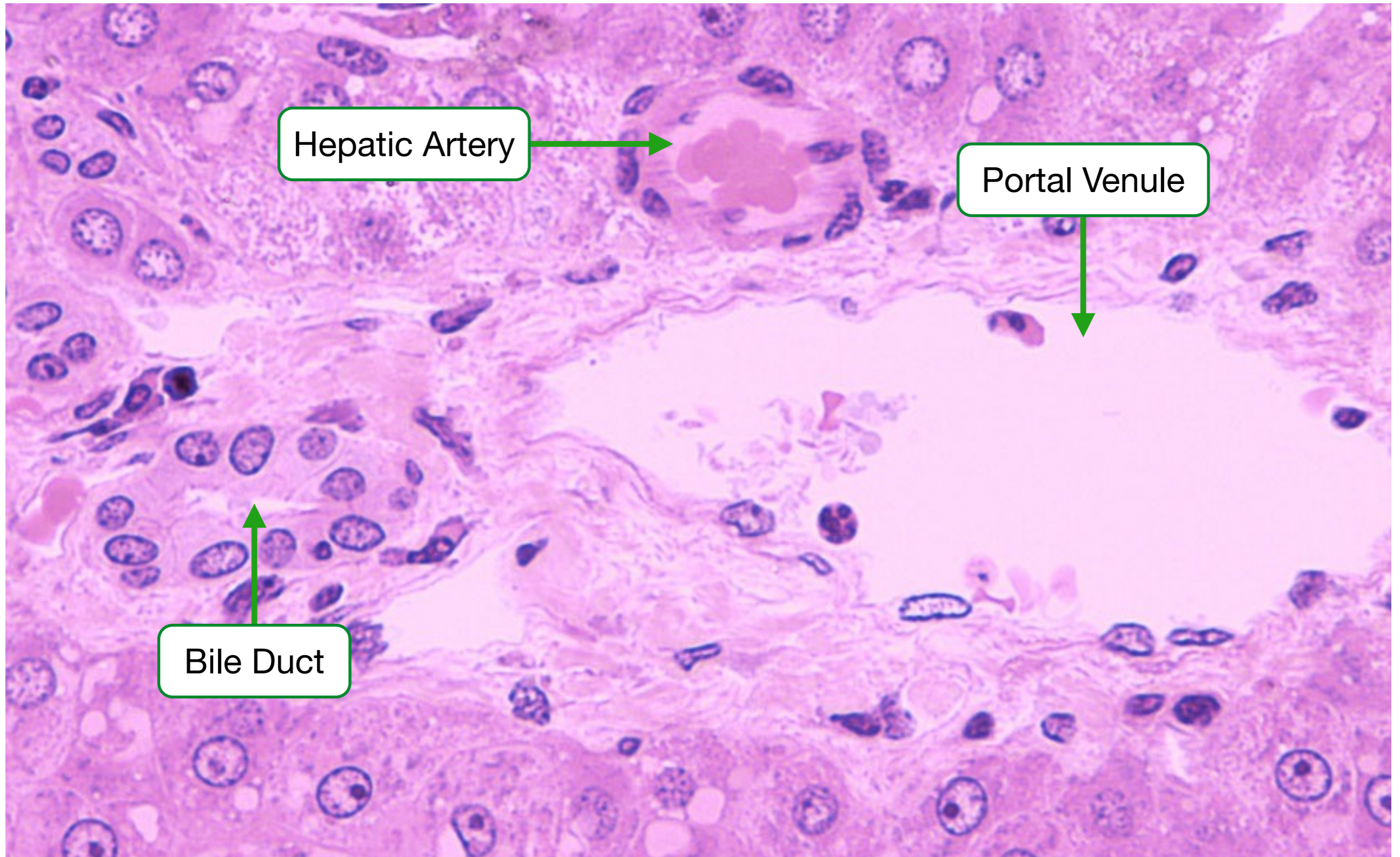
Hepatocytes in zone 3 contain more glycogen than those in zone 1.

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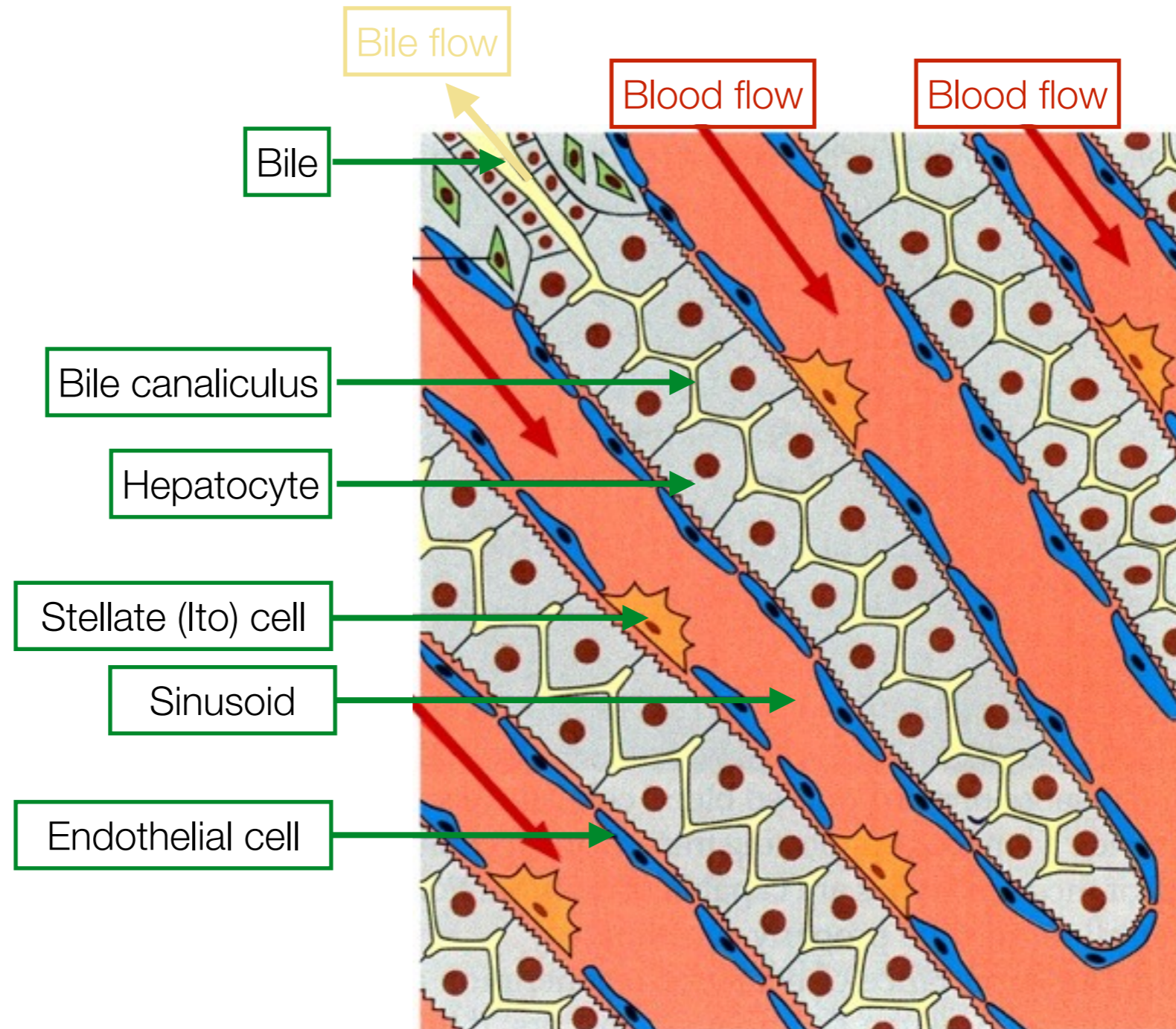
Portal triads contain a hepatic artery, portal venue and bile duct.

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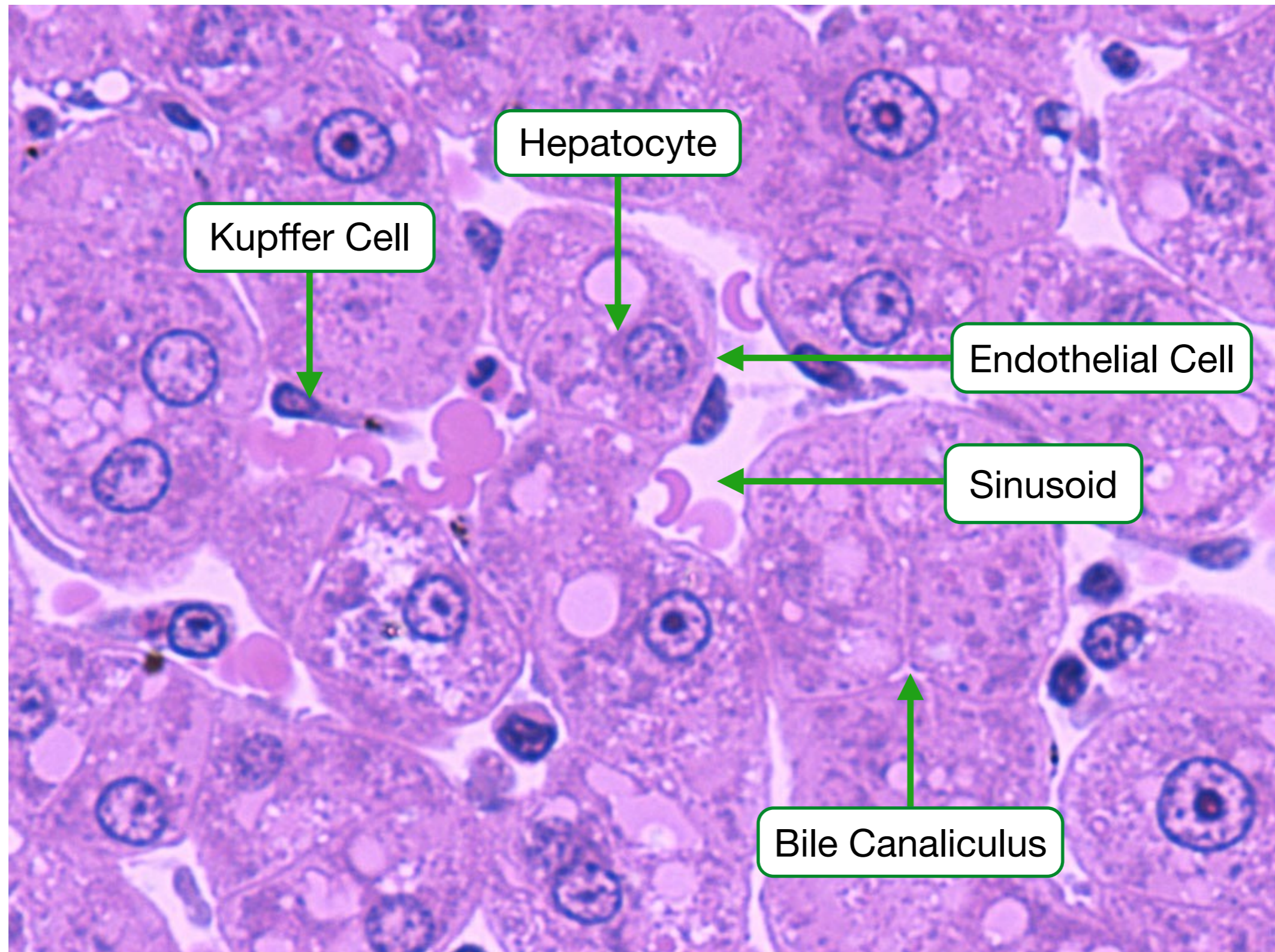


The apical surface of hepatocytes faces the bile duct while the basal surface faces blood.

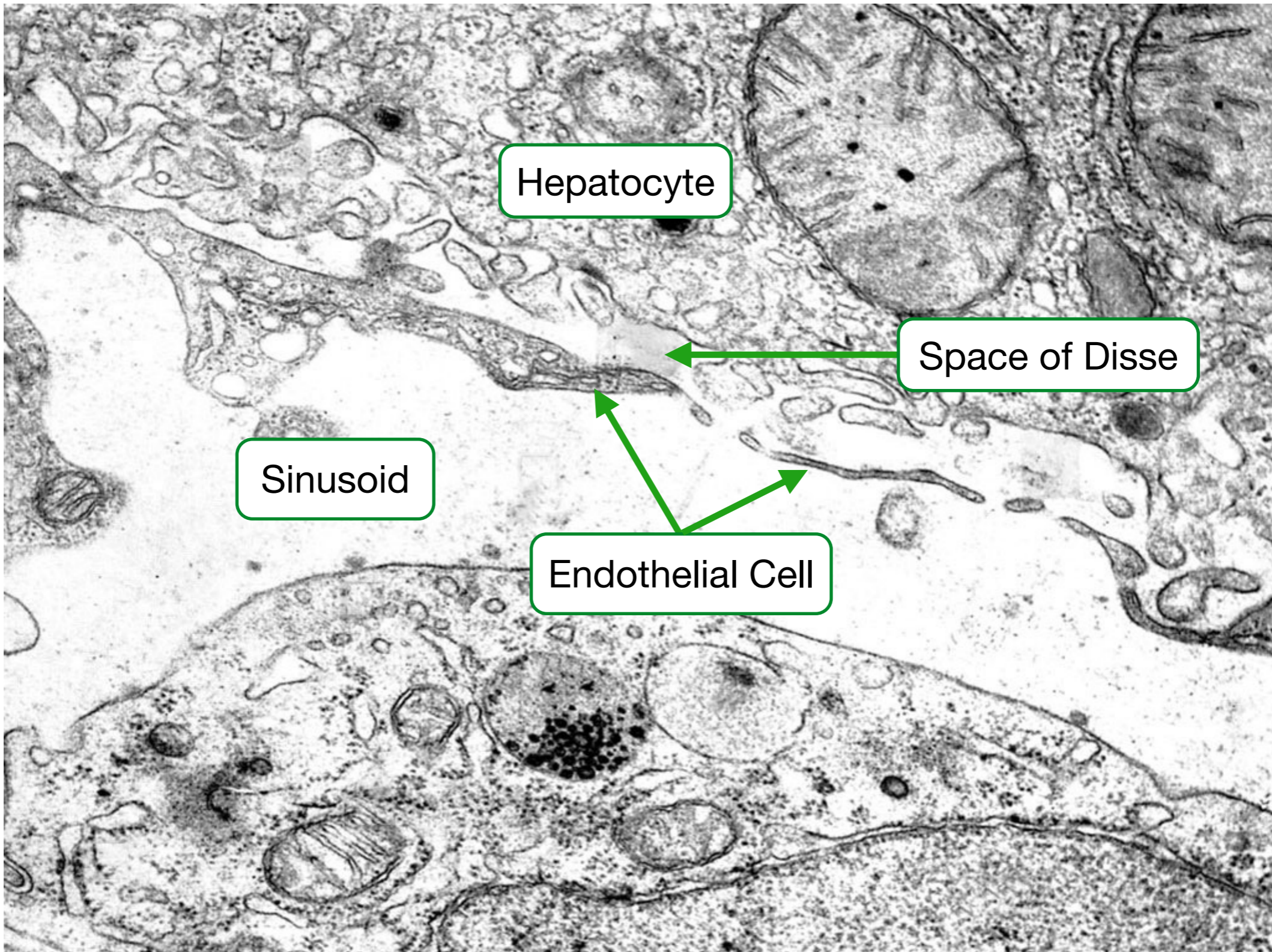
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Blood flows past hepatocytes through sinusoids.



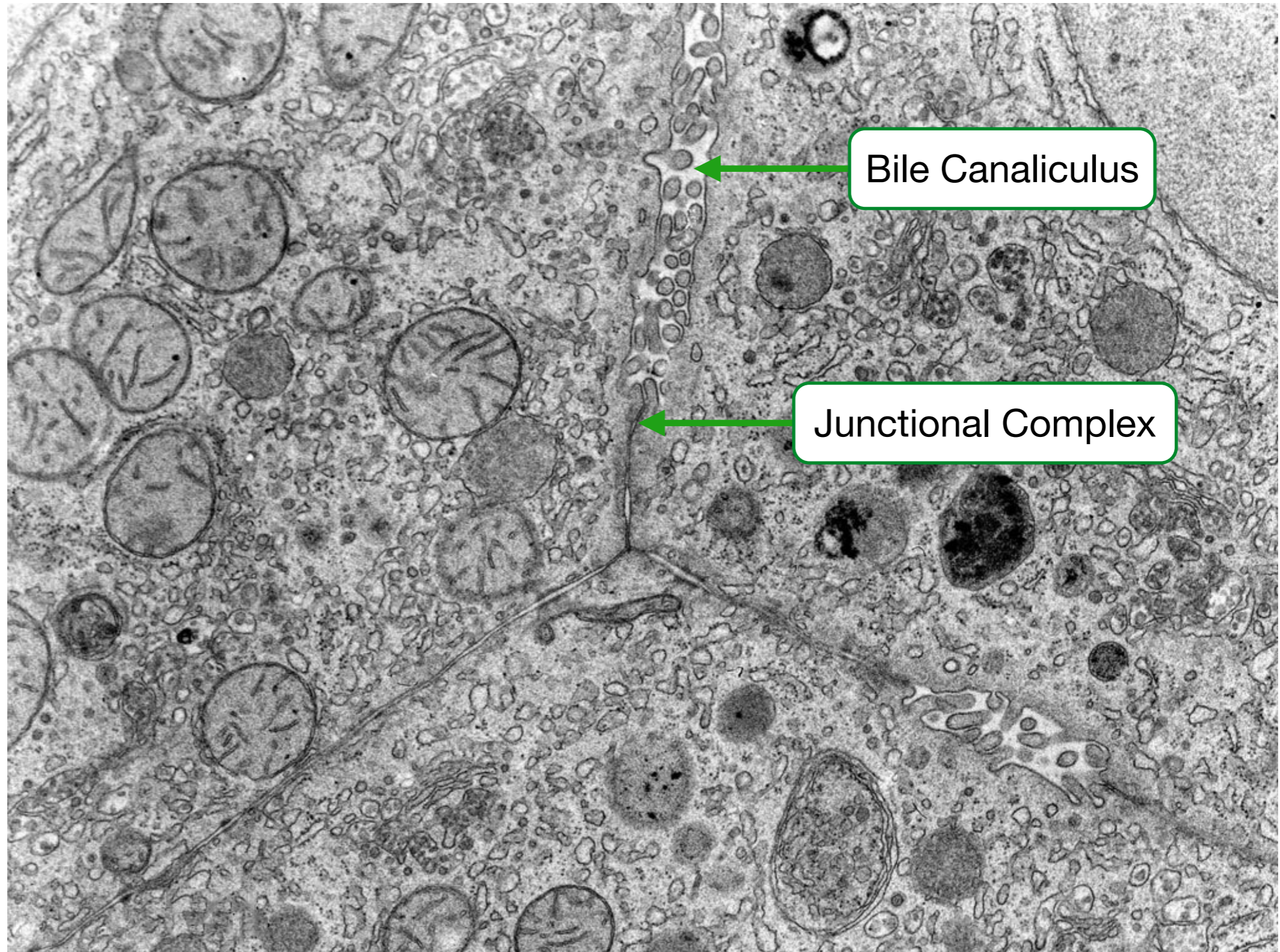
A discontinuous endothelium separates blood from hepatocytes.



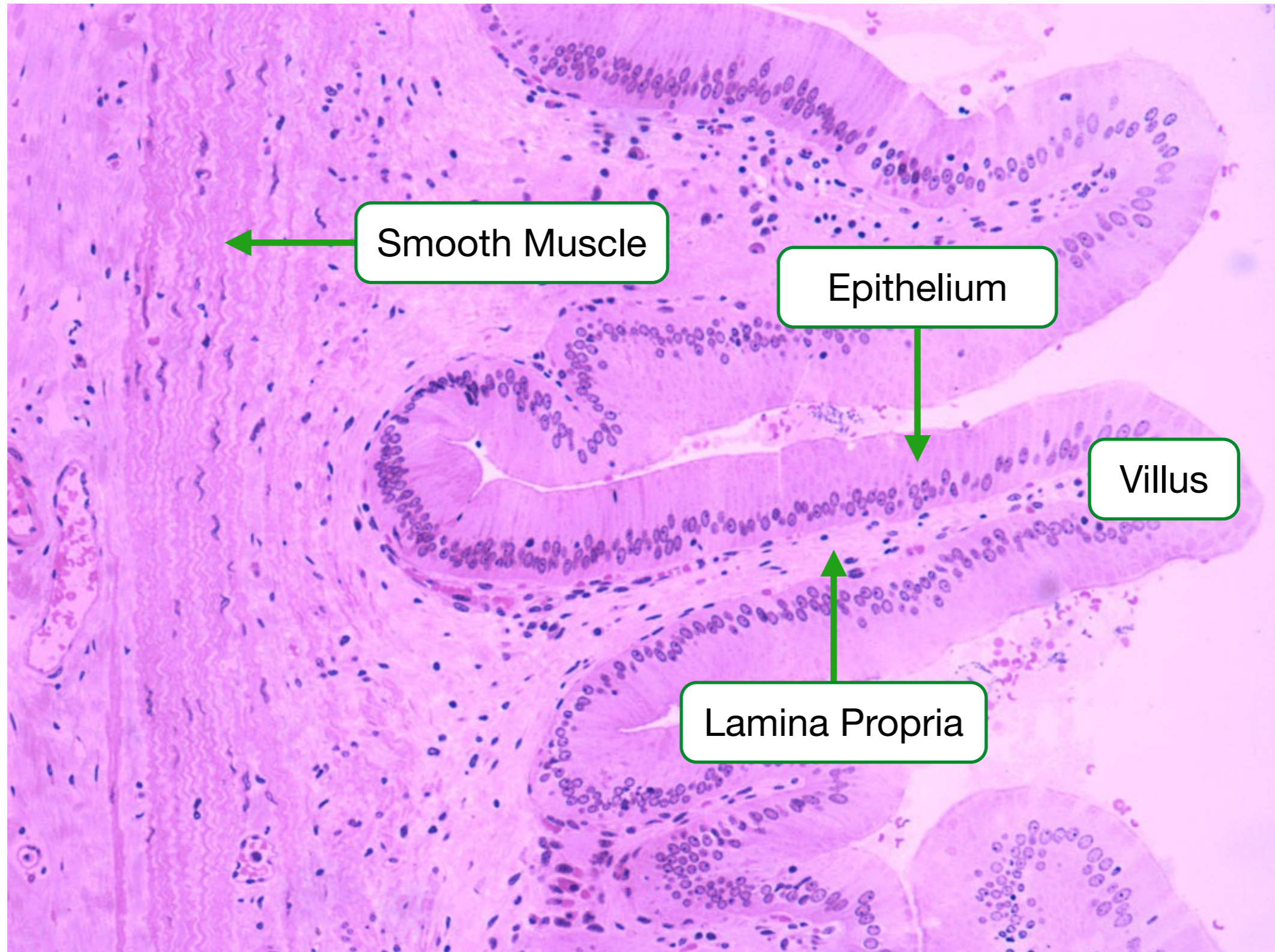


The apical surface and junctional complexes of hepatocytes defines the bile canaliculus.

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Gall bladder stores and concentrates bile from the liver.



# Take home messages...

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- Pancreas secretes digestive enzymes and bicarbonate into the duodenum.
- Three main salivary glands differ in their number of serous cells and mucus-secreting cells.
- Hepatocytes differ in the biochemical activities based on their proximity to portal triads.
- Discontinuous endothelium of sinusoids exposes hepatocytes to proteins, lipoprotein particles and other large macromolecules.
- Hepatocytes secrete bile from their apical surface into channels called canaliculi.