



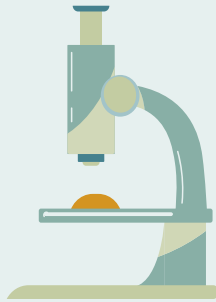
MED439  
KING SAUD UNIVERSITY

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# Pancreas

Color index:

Slides

Important

Doctors notes

Extra

[Editing file](#)

## ► Objectives:

By the end of this lecture, the student should be able to describe:

1. The endocrine part of the pancreas within the exocrine part.
2. The histological features of the cells of islet of Langerhans.
3. The function of different cells of islets of Langerhans.

# Pancreas

## Stroma

## Parenchyma

Pancreas is a **mixed** gland

Capsule

Septa

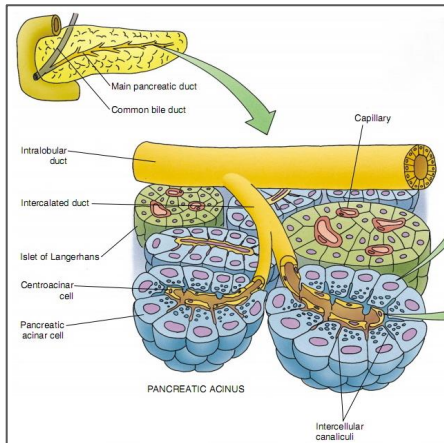
Reticular fibers

Exocrine part

Endocrine part

(acini & ducts):  
produces digestive  
pancreatic enzymes.

(islets of Langerhans):  
produces hormones.



# ► Exocrine Pancreas

## Pancreatic Acini

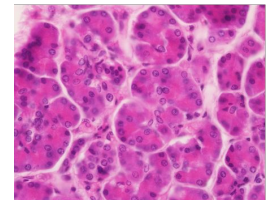
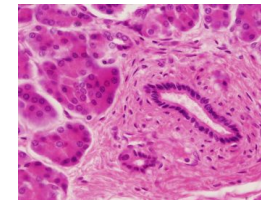
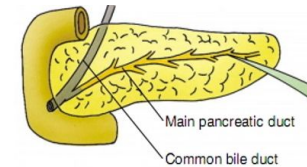
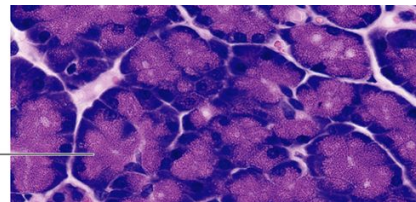
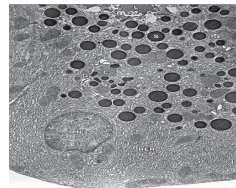
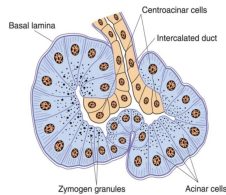
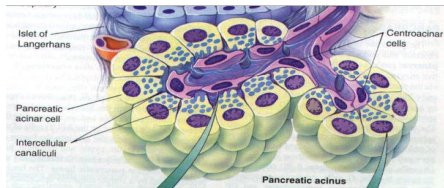
- They are serous acini: secreting a thin fluid rich in digestive pancreatic enzymes.
- Centroacinar cells: Their nuclei appear in the center of the acini. They represent the beginning of the ducts.
- No myoepithelial cells around the acini.

## Pancreatic Acinar Cells

- Pyramidal in shape. **rosette shape**
- Nuclei are basal, rounded and vesicular.
- Cytoplasm :
  - Basal part basophilic (due to abundant rER). **secrete proteins**
  - Apical part acidophilic (due to secretory granules).

## Duct System

- Centroacinar cells (low cuboidal).
  - **simple cuboidal**
  - **First ductal cells, have serous secretions**
- Intercalated ducts (low cuboidal).
- Intralobular ducts (low columnar):  
These are **NOT prominent**
- Interlobular ducts (simple columnar).  
**Inter = between**
- Main pancreatic duct (tall columnar).



Remember? #GIT



# ► Endocrine Pancreas

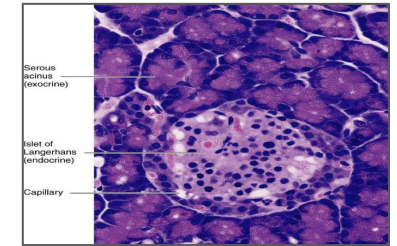
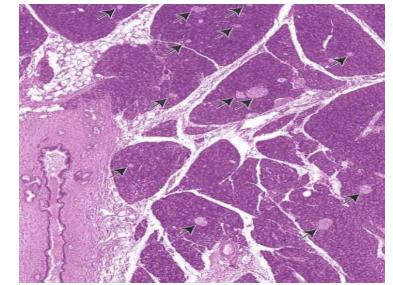
## Islets of Langerhans:

- Pale-staining spherical **vascular** collections of endocrine cells, scattered among the acini.
- Richly vascularized by fenestrated capillaries.
- Each islet is surrounded and supported by reticular fibers.
- 1 million islets in human pancreas.
- Most numerous in the **tail** of pancreas. **Doesn't have capsule**

## Cells of the Islets:

5 types of cells in each islet

Can not be differentiated from one another by routine stains. **but we can use Immunohistochemistry & E/M for differentiation**



| <b>β (B) cells:</b>   | <b>α (A) cells:</b>   | <b>δ (D) cells:</b>  | <b>G cells</b>  | <b>PP cells</b>   |
|---|---|--|---|---|
| <ul style="list-style-type: none"> <li>- Constitute 70% of islet cells.</li> <li>- Concentrated in islet <b>center</b>.</li> <li>- Function: <b>secrete insulin</b> which ↓ blood sugar.</li> </ul> | <ul style="list-style-type: none"> <li>- Constitute 15-20%.</li> <li>- Concentrated in islet <b>periphery</b>.</li> <li>- Granules are much more numerous, more tightly packed, smaller, and denser than those of β cells.</li> <li>- Function: <b>secrete glucagon</b> which ↑ blood sugar.</li> </ul> | <ul style="list-style-type: none"> <li>- Constitute 5-10%</li> <li>- <b>Scattered</b> throughout the islet.</li> <li>- Granules are less dense than those of β and α cells.</li> <li>- Function: <b>secrete somatostatin</b> which ↓ release of hormones from endocrine pancreas and enzymes from exocrine pancreas.</li> <li>- (doesn't have a certain distribution)</li> </ul> | <ul style="list-style-type: none"> <li>- Constitute 1% of islet cells.</li> <li>- <b>Scattered</b> throughout the islet.</li> <li>- Function: <b>secrete gastrin</b> which ↑ production of HCl by parietal cells of the stomach.</li> </ul> | <ul style="list-style-type: none"> <li>- Constitute 1% of islet cells.</li> <li>- <b>Scattered</b> throughout the islet.</li> <li>- Function: <b>secrete pancreatic polypeptide</b> which ↓ exocrine secretions of pancreas.</li> </ul> |

# Doctor's notes (female)

Pancreas is a mixed gland formed of:

**1- Exocrine part:** any exocrine gland is formed of acini & duct system.

- Acini are the functional secretory cells of enzymes & centroacinar cells are unique for pancreas
- Acinar cells:
  - Basal part is blue (basophilic) due to rich ribosomes and RER in cytoplasm, also because the nucleus is basal.
  - Apical part is pink (acidophilic) because of rich secretory granules.The apical part which is close to the lumen has microvilli to increase surface area for more enzymatic secretion.
- Duct system
  - Centroacinar cells: inside the acinus in the center.
  - Intercalated ducts: extension of centroacinar but it's outside the acinus.
  - Intralobular ducts: inside the the lobule, not prominent because it's within the lobule.
  - Interlobular ducts: between the lobules.
  - The interlobular ducts are connected to each other to form larger duct (main pancreatic duct).

**2- Endocrine part:** formed of Islets of langerhans.

- Islets of langerhans are pale dots/patches present in the lobules in the tail of pancreas.
- The number of islets of langerhans is larger in the tail of pancreas and much less in the body & the head.
- It's highly vascularized (rich in blood vessels) because it's endocrine.
- We cannot differentiate between the 5 cells of islet by H&E stain. However, we can use immunohistochemistry (immunostaining).
- Granules in  $\alpha$  cells are more & packed while granules in  $\beta$  cells are less & scattered.
- D cells secrete somatostatin: inhibit secretion of other 5 cells by paracrine effect (distributed locally), also inhibit the acini (exocrine part) surrounding it so decreases enzyme secretion.
- PP cells: inhibit only exocrine part.
- D cells: inhibit both exocrine and endocrine.

# MCQs

Q1) Which of the following is true about the acini of the pancreas?

- A- It's mucous acini
- B- It's serous acini
- C- contain myoepithelial cells
- D- they don't secrete enzymes

Q2) Which of the following is a feature of pancreatic acinar cell?

- A- It's basophilic
- B- It's acidophilic
- C- Its nucleus is basal and flat
- D- It's pyramidal in shape

Q3) Which of the following is NOT prominent in the duct system of the pancreas?

- A- intercalated ducts
- B- Intralobular ducts
- C- Interlobular ducts.
- D- Main pancreatic duct.

Q4) Which part of the pancreas has numerous of islets of langerhans?

- A- Head of the pancreas
- B- Neck of the pancreas
- C- Body of the pancreas
- D- Tail of the pancreas

Q5) Which of the following constitutes most of islets cells?

- A-  $\alpha$  (A) cells
- B-  $\beta$  (B) cells
- C-  $\delta$  (D) cells
- D- G cells

Q6) Which of the following has numerous of granules?

- A-  $\alpha$  (A) cells
- B-  $\beta$  (B) cells
- C-  $\delta$  (D) cells
- D- G cells

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