



# PANCREAS

**Color index:**

Slides.. **Important** ..**Notes** ..Extra..

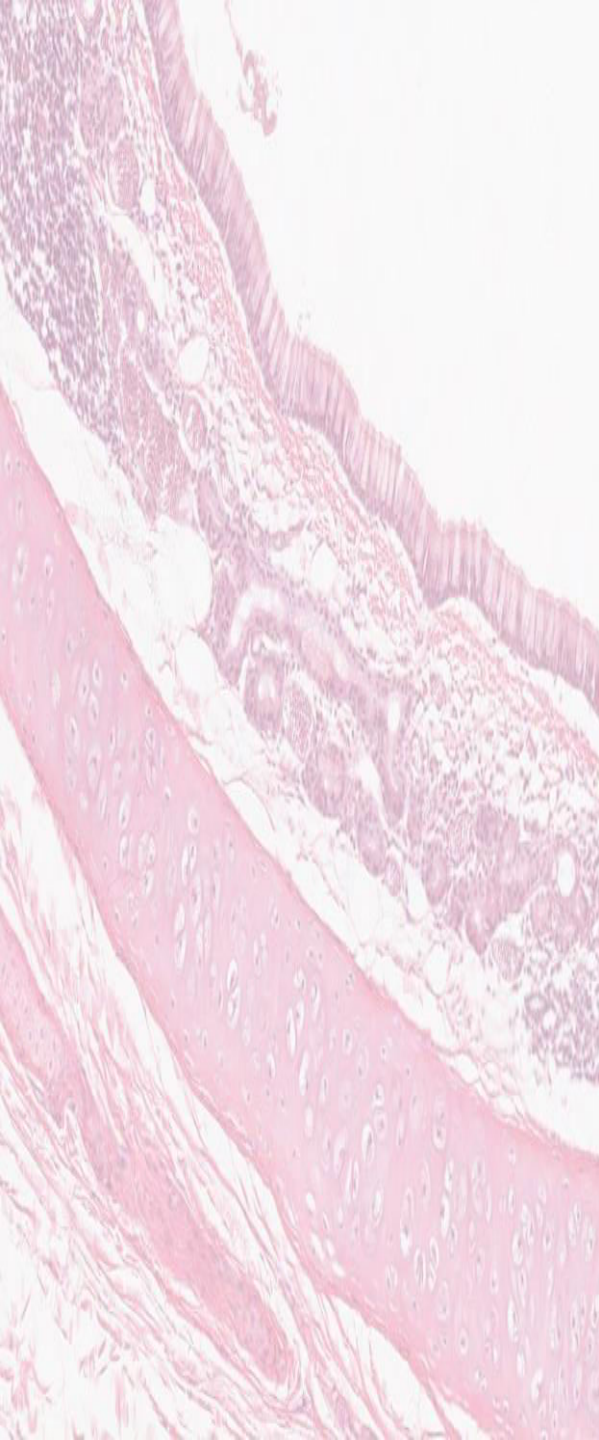


وَمَنْ يَتَوَكَّلْ عَلَى اللَّهِ فَهُوَ حَسْبُهُ

# Objectives :

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

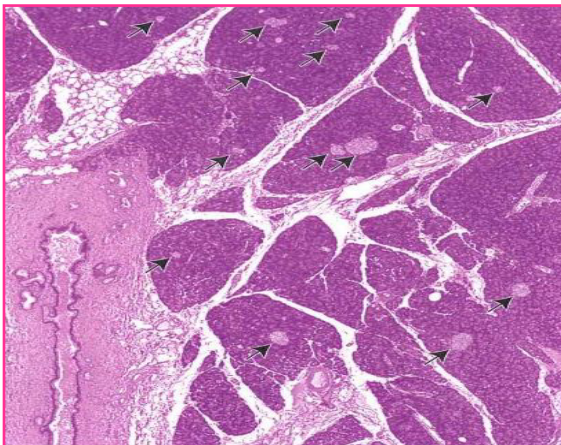
- ✓ The endocrine part of the pancreas within the exocrine part.
- ✓ The histological features of the cells of islet of Langerhans.
- ✓ The function of different cells of islets of Langerhans.



# Endocrine Pancreas

## Islets (island) of Langerhans:

جزر باهتة في بحر غامق



Pale-staining spherical **vascular** collections of endocrine cells, scattered among the acini.

Richly vascularized by fenestrated capillaries

**Doesn't have capsule but** Each islet is surrounded and supported by reticular fibers.

1 million islets in human pancreas.

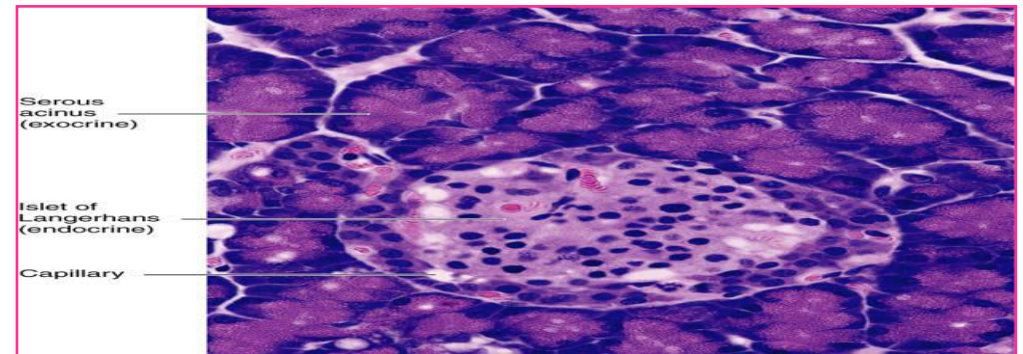
Most numerous in the tail of pancreas.

## Cells of the Islets:

5 types of cells in each islet

<b><math>\beta</math> (B) cells:</b>	secrete insulin.
<b><math>\alpha</math> (A) cells:</b>	secrete glucagon.
<b><math>\delta</math> (D) cells:</b>	secrete somatostatin.
<b>G cells:</b>	secrete gastrin.
<b>PP cells:</b> also called F cells	secrete pancreatic polypeptide.

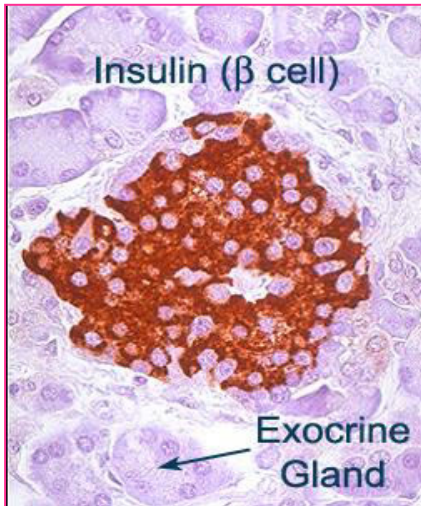
Cannot be differentiated from one another by routine stains, **but we can use Immunohistochemistry & E/M for differentiation**



# Endocrine Pancreas: Cells of the Islets

## $\beta$ (B) cells:

- Constitute 70% of islet cells.
- Concentrated in islet **center**.
- **Function:** secrete insulin which  $\downarrow$  blood sugar.



## $\alpha$ (A) cells:

- Constitute 15-20%.
- Concentrated in islet **periphery**.
- Granules are much more numerous, more tightly packed, smaller, and denser than those of  $\beta$  cells.
- **Function:** secrete glucagon which  $\uparrow$  blood sugar.



## $\delta$ (D) cells:

- Constitute 5-10% of islet cells.
- Scattered (**doesn't have a certain distribution**) throughout the islet.
- Granules are less dense than those of  $\beta$  and  $\alpha$  cells.
- **Function:** secrete somatostatin which  $\downarrow$  release of hormones from **endocrine pancreas and enzymes from exocrine pancreas**.

## G cells:

- Constitute 1% of islet cells.
- Scattered throughout the islet.
- **Function:** secrete gastrin which  $\uparrow$  production of HCl by parietal cells of the stomach.

## PP cells:

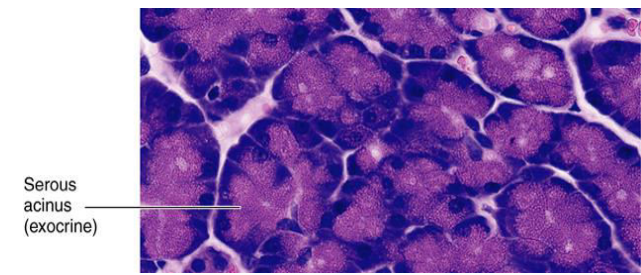
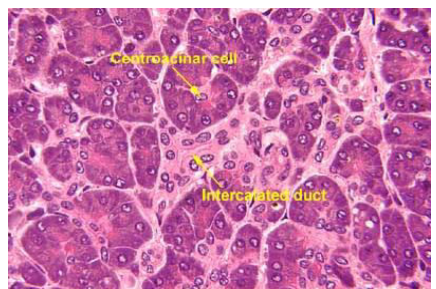
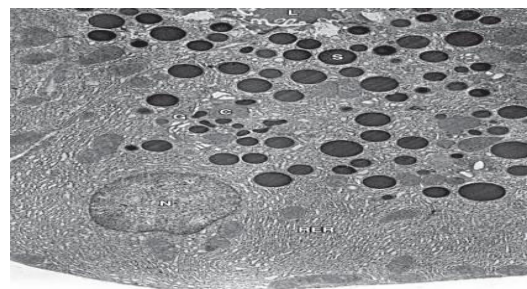
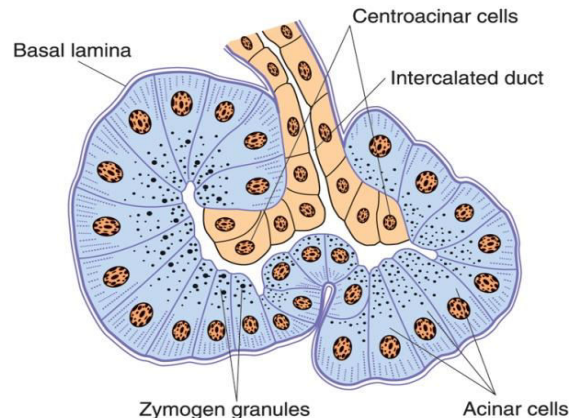
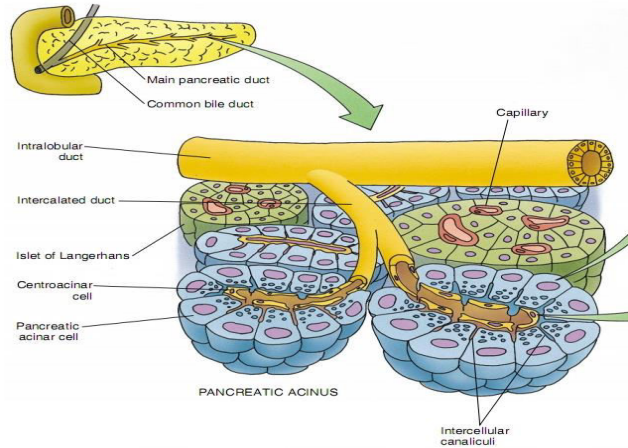
- Constitute 1% of islet cells.
- Scattered throughout the islet.
- **Function:** secrete pancreatic polypeptide which  $\downarrow$  **exocrine** secretions of pancreas.



# Exocrine Pancreas

- **Stroma:** Capsule, septa & reticular fibers.
- **Parenchyma:** Pancreas is a **mixed** gland:

<p><b>Exocrine part</b> (acini &amp; ducts): produces <b>digestive pancreatic enzymes.</b></p>	<p><b>Endocrine part</b> (islets of Langerhans): produces <b>hormones.</b></p>
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Pancreatic Acini:	Duct System:
<ul style="list-style-type: none"> <li>- <u>They are serous acini:</u> secreting a <b>thin fluid</b> rich in <b>digestive pancreatic enzymes.</b></li> <li>- <u>The Acinar cells:</u> <b>rosette shape</b> <ul style="list-style-type: none"> <li>○ <b>Pyramidal in shape.</b></li> <li>○ <b>Nuclei are basal.</b></li> <li>○ <b>Cytoplasm:</b> Basal part <b>Basophilic</b> (due to abundant rER) <b>to secrete proteins</b> Apical part <b>Acidophilic</b> (due to secretory granules).</li> </ul> </li> <li>- <u>No Myoepithelial Cells</u> around the acini.</li> </ul>	<ol style="list-style-type: none"> <li><b>Centroacinar cells: simple cuboidal</b> Their nuclei appear in the <b>center of the acini.</b> They represent the beginning of the ducts. <b>First ductal cells, have serous secretions</b> like parotid.</li> <li><b>Intercalated ducts</b> (low cuboidal).</li> <li><b>Intralobular ducts</b> (<b>NOT prominent</b>).</li> <li><b>Interlobular ducts.</b> <b>Inter = between</b></li> <li><b>Main pancreatic duct.</b></li> </ol>

## MCOs

**1) Islets of Langerhans are most numerous in which part of the following?**

A-Tail      B-Head

C-Neck      D-Body

**2) Which cell of the following is the most numerous in islets of Langerhans?**

A- A cell      B- B cell

C- D cell      D- PP cell

**3) Which cell of the following is found in periphery of the islets?**

A- A cell      B- B cell

C- D cell      D- PP cell

**4) Islets of Langerhans contain fenestrated capillaries?**

A-True      B-False

**5) What is the function of PP cell ?**

A- Decrease endocrine and exocrine part

B-Increase exocrine part

C-Decrease exocrine part

D-increase both part

**6) Which cell is present in 5-10% of islets of Langerhans?**

A- A cell      B- B cell

C- D cell      D- PP cell

1-A

2-B

3-A

4-B

5-C

6-D



# Thank you & good luck

- Histology team

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## References:

- ✓ Females' and Males' slides.
- ✓ Doctors' notes

