

Endocrine glands histology lecture 2

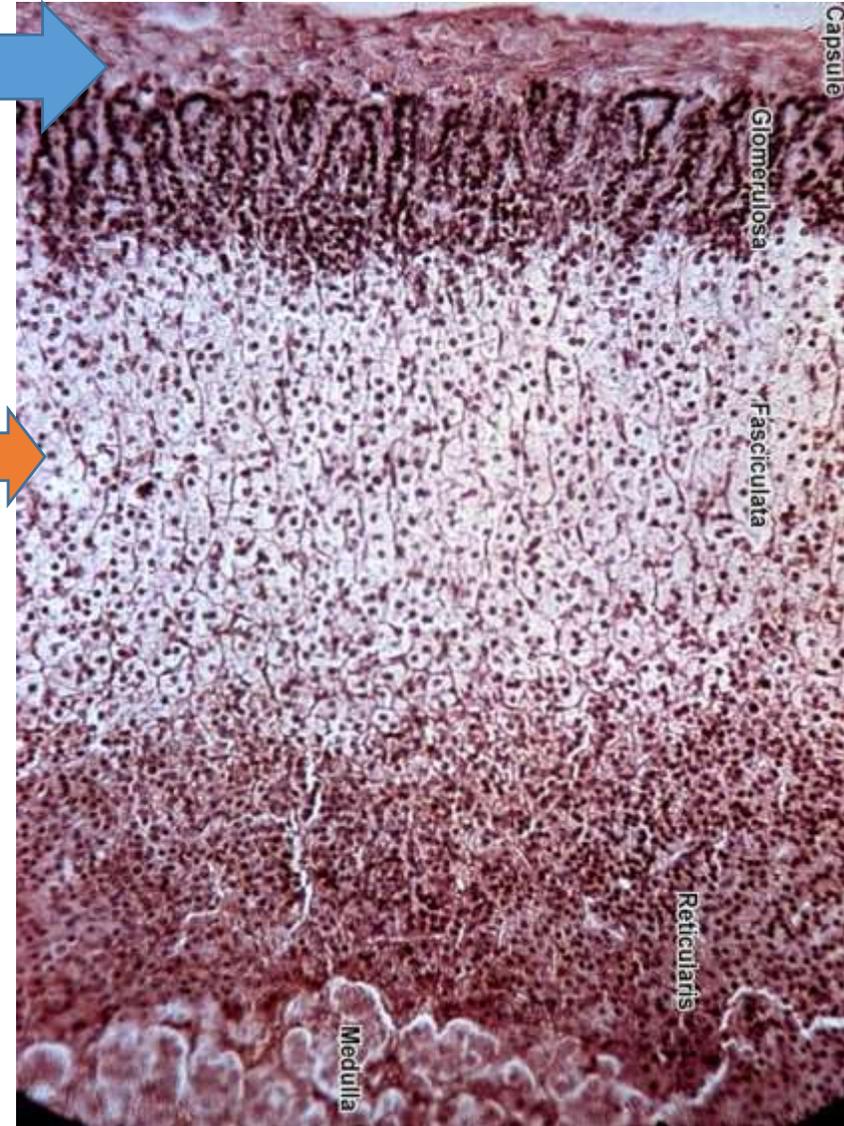
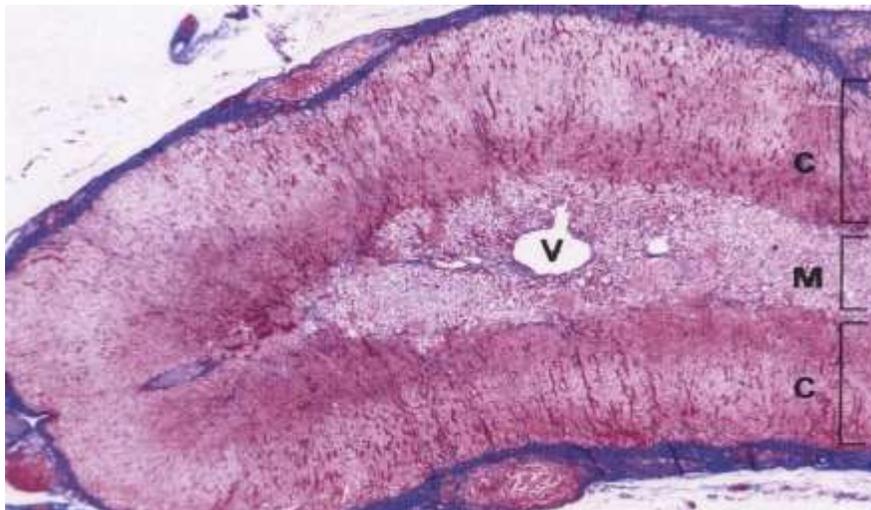
Dr AMAL ALBTOOSH



ADRENAL GLANDS or suprarenal gland

Stroma : The gland is surrounded by a thick connective tissue capsule.

Parenchyma : consist of
outer **cortex** (the main part)
inner **medulla** 10%



	Cortex	Medulla
Colour	Yellow	Reddish-brown
Position	Peripheral	Central
Origin	(mesodermal)	Neural crest (ectodermal)



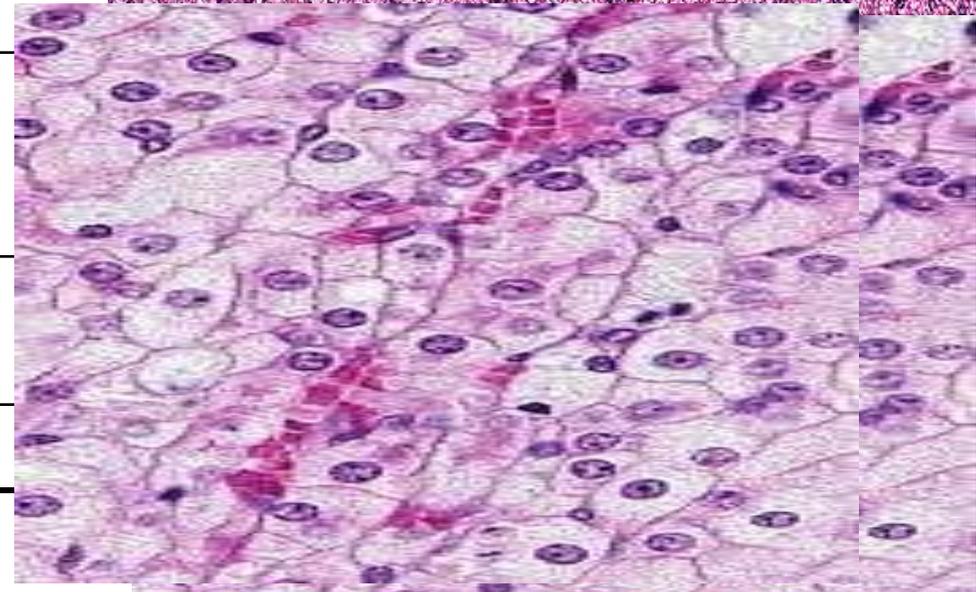
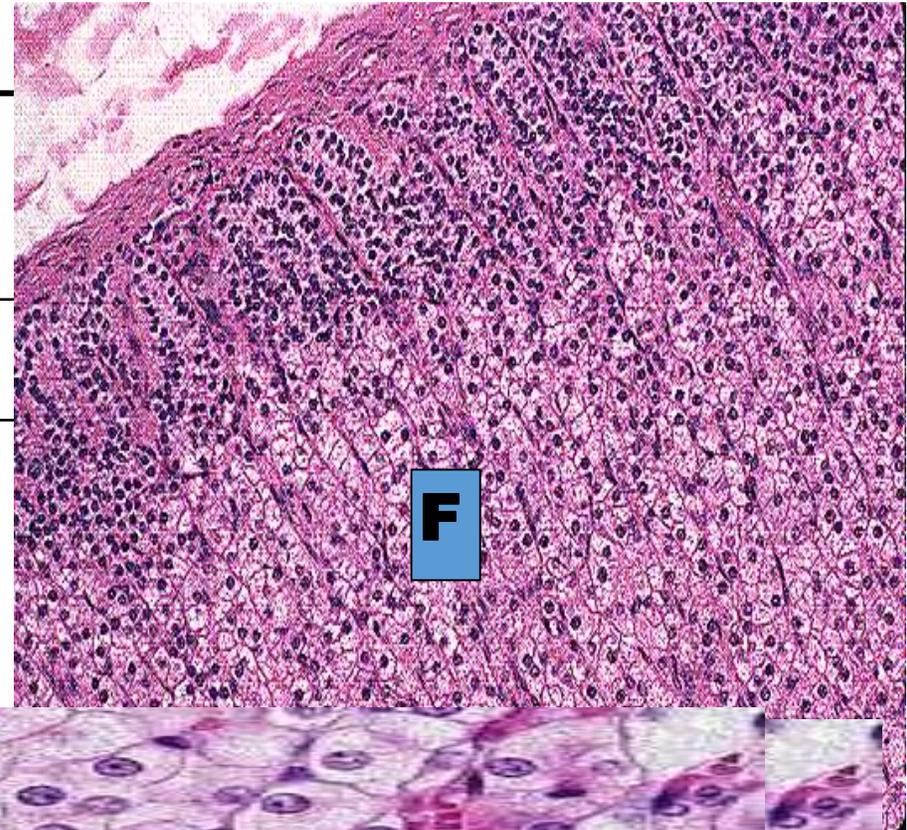
Zones of the cortex

Cortex	Z. Glomerulosa
% of volume	15%
Shape of cells	Columnar or pyramidal cells Closely packed
Arrangement	rounded or arched clusters
Cytoplasm (Acidophilic)	Slightly vacuolated
Lipid droplets	few
Function	mineralocorticoids



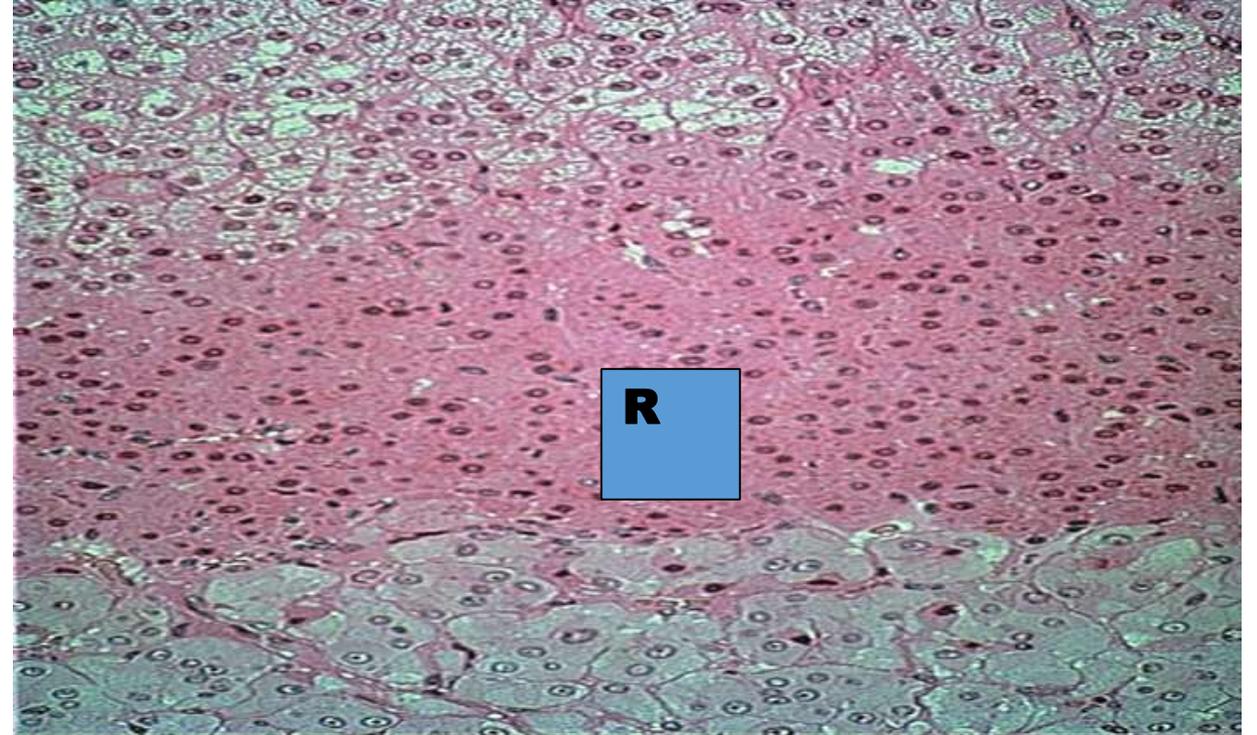
Zones of the cortex

Cortex	Z. Fasciculata Spongiosocytes
% of volume	65%
Shape of cells	Polyhedral
Arrangement	Cords 1 or 2 cell thick
Cytoplasm (Acidophilic)	Numerous vacuoles (spongiosocytes)
Lipid droplets	numerous
Function	glucocorticoids



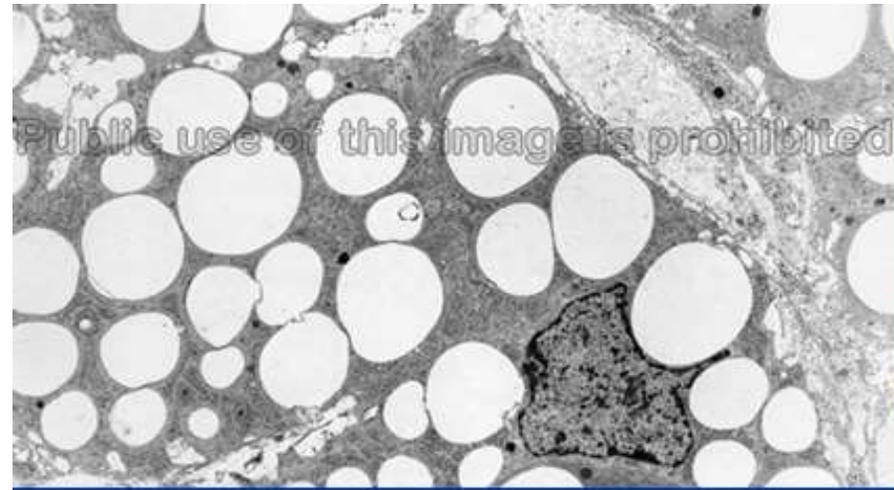
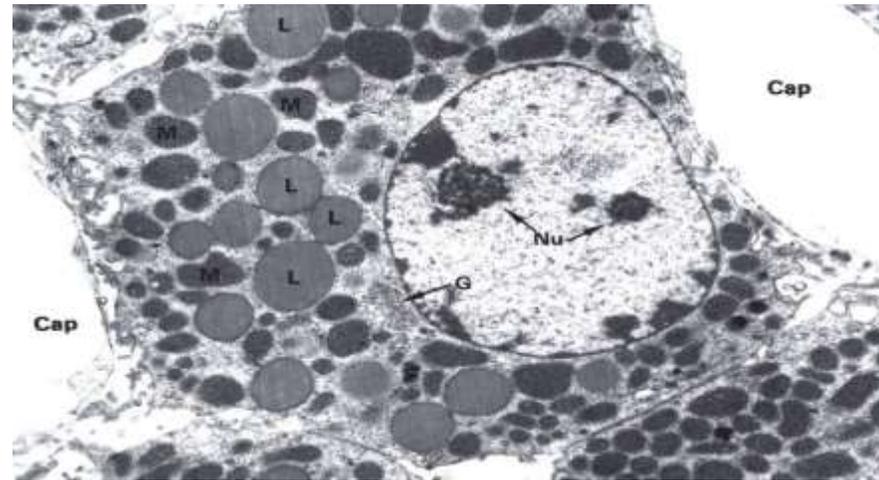
Zones of the cortex

Cortex	Z. Reticularis
% of volume	7%
Shape of cells	Polyhedral
Arrangement	Anastomosing Irregular cords
Cytoplasm (Acidophilic)	less
Lipid droplets	less
Function	Sex hormones



Cells in adrenal cortex are **steroid secreting cells**

- Extensive smooth ER
- Mitochondria with tubular cristae
- Golgi apparatus
- Lipid droplets
- Spongiocytes in zona fasciculata
(highly vacuolated cells due to lipid droplets)

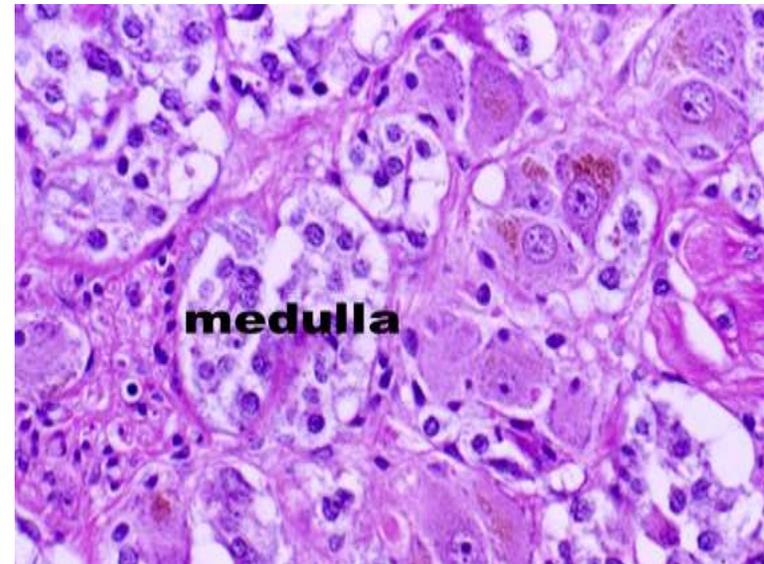
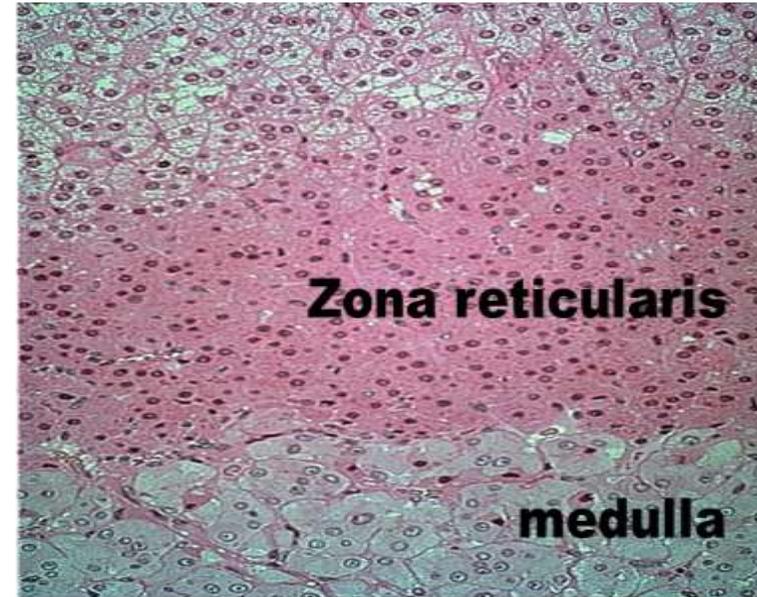


Adrenal medulla

- Highly vascular
- Cells are arranged in **strands or small clusters** with capillaries and venules, weakly **basophilic**.

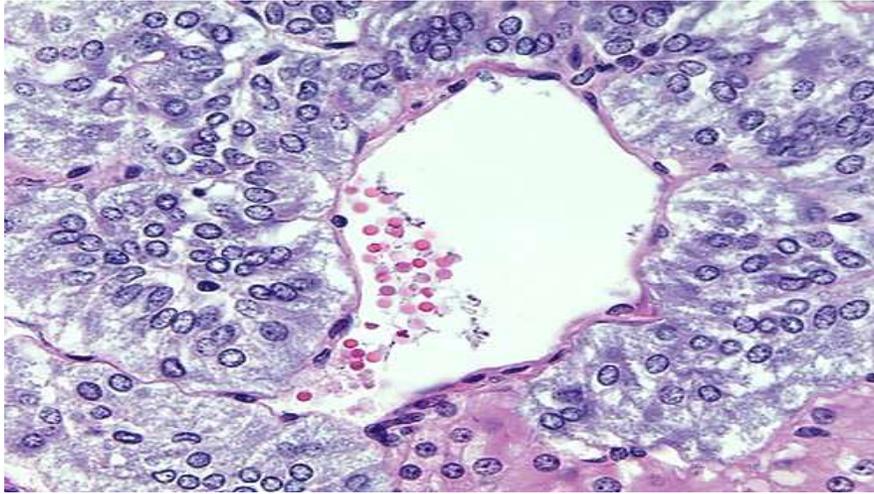
It includes **Chromaffin cells**:

- ✓ granules of these cells can be stained with **potassium bichromate**.
- ✓ Chromaffin cells are, like **ganglion cells** of the PNS, derived from **neural crest** cells.

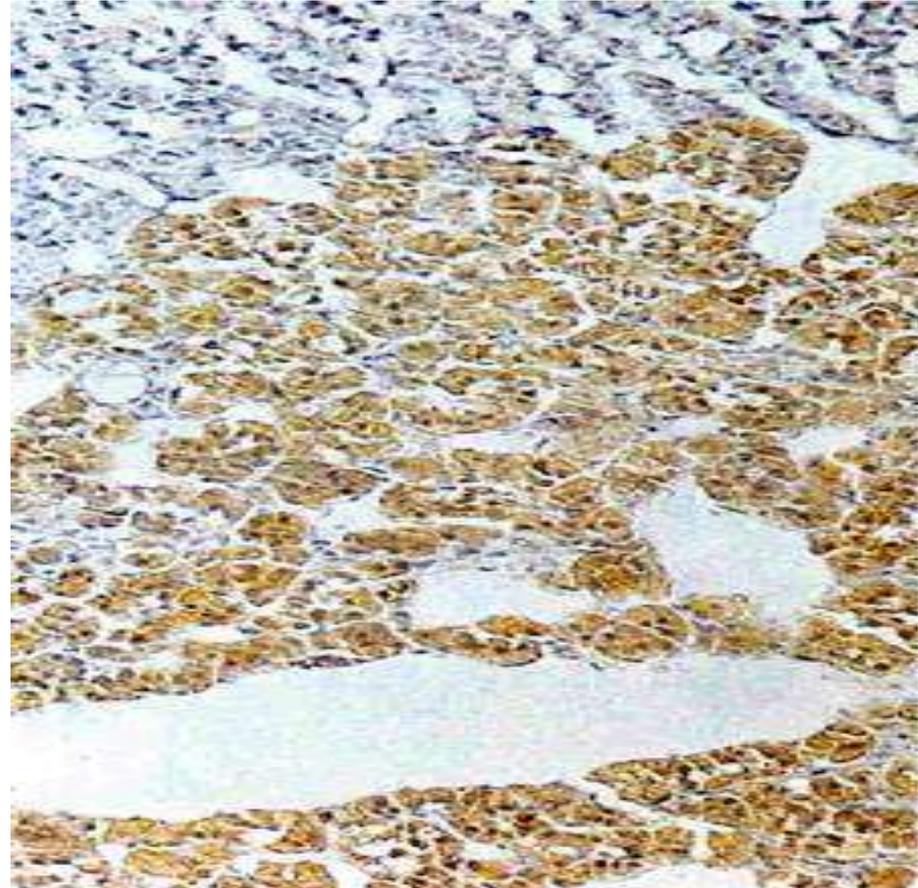


Chromaffin cells

epinephrine cells & nor epinephrine cells

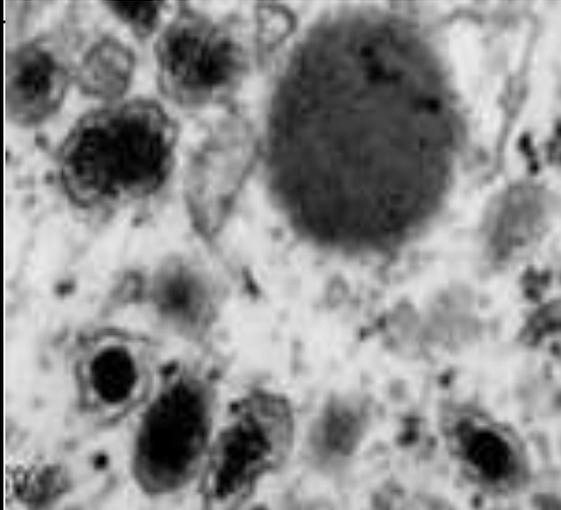


- LM:** large ovoid cells
large spherical nuclei
- pale basophilic cytoplasm
 - arranged in rounded groups or short cords intimately related to BVs

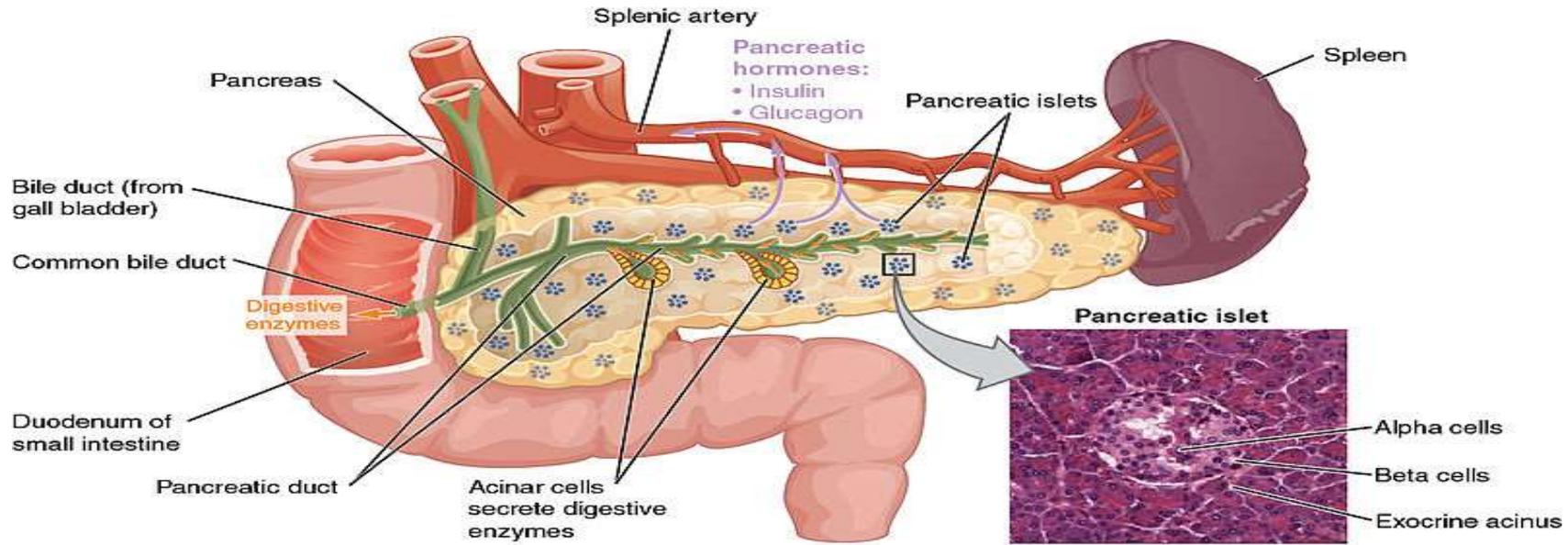


Chromaffin reaction

Granules of epinephrine & norepinephrine

Granules in:	Epinephrine-secreting cells	Norepinephrine-secreting cells
Size	Small	larger
Contents	Fill the granule	Do not
	<p>EM</p> <p>protein synthesizing cells: rER mitochondria prominent Golgi membrane-limited electron-dense granules of either epinephrine or norepinephrine</p>	

PANCREAS



Exocrine
Acinar and duct tissue

Endocrine
Islets of Langerhans



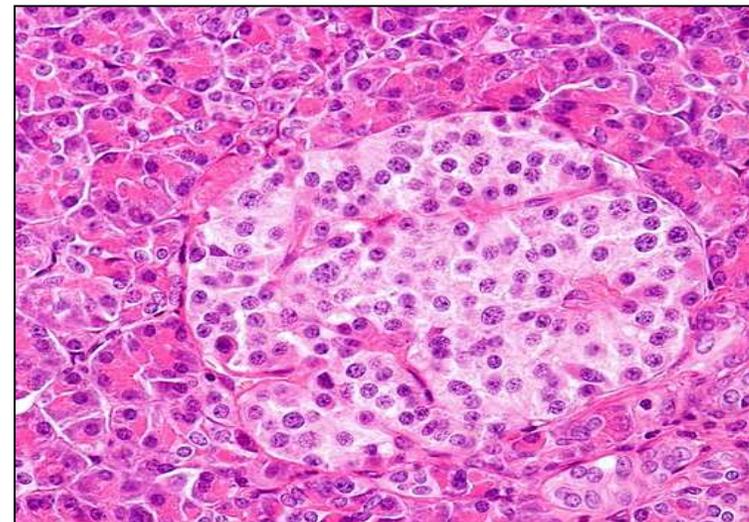
PANCREAS

- ❑ Exocrine and endocrine gland.
- ❑ The exocrine part produces pancreatic juice.
- ❑ The endocrine part, ~1% , consists of the cells of the **islands of Langerhans**.

Endocrine part: Islets of Langerhans

Masses of pale staining cells scattered between the pancreatic acini

- They are more in the **tail** than head of pancreas
- The cells are separated by fenestrated capillaries (highly vascularized)
- Cells of islets of Langerhans are Alpha, Beta, Delta, F (PP) cells



❑ **Structure** : of the islands of Langerhans.

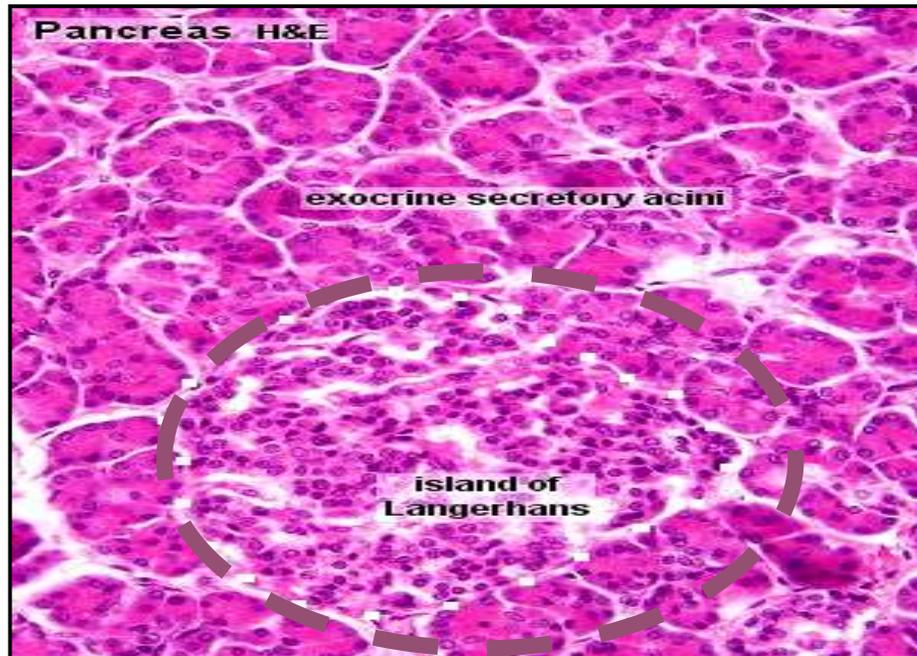
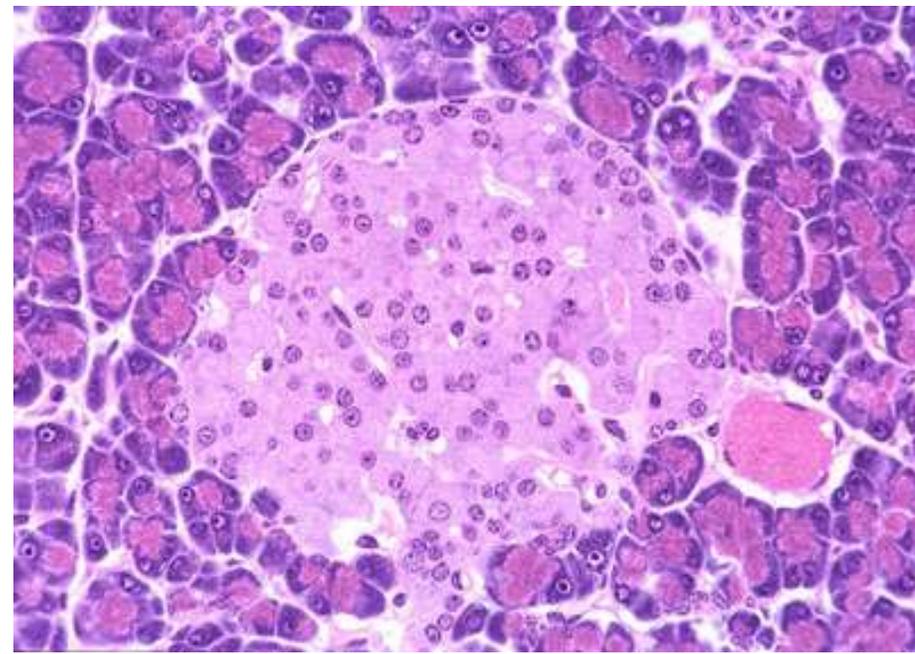
Stroma:

Surrounded by **thin** capsule

Parenchyma

cellular composition of the islands

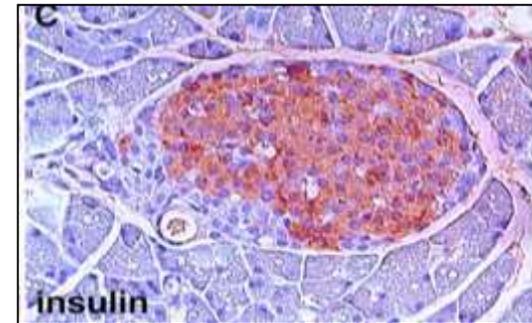
- ❑ **70% beta-cells, insulin.** Insulin stimulates
- ❑ **20% alpha-cells, glucagon.**
- ❑ **5- 10 % delta-cells** which secrete somatostatin,
- ❑ **F- cells (PP)**



Beta (B) cells (70%):

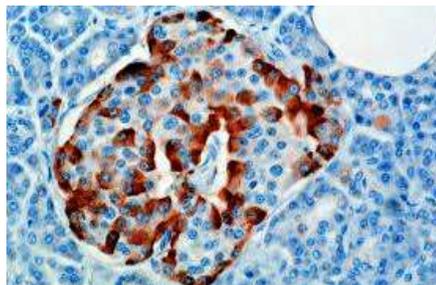
- Produce **insulin** which **lower** blood sugar
- Cells are **small** in size, **most numerous** cell type, **central** in location in islets
- Stain **blue**
- EM: appear in two functional stages active & resting
- When active synthesize insulin. When resting packed with granules storing insulin
- Cells divide at very slow rate

Beta cells



Alpha (A) cells (20%):

- Produce **glucagon** which **increase** blood sugar
- Cells **larger in** size, **fewer** in number, **peripheral** location in Islets
- Stain **pink**



Alpha cells

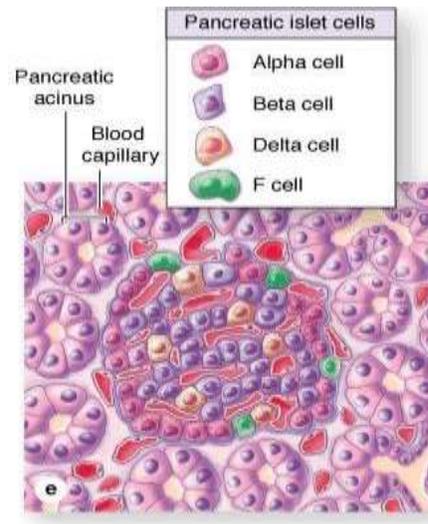
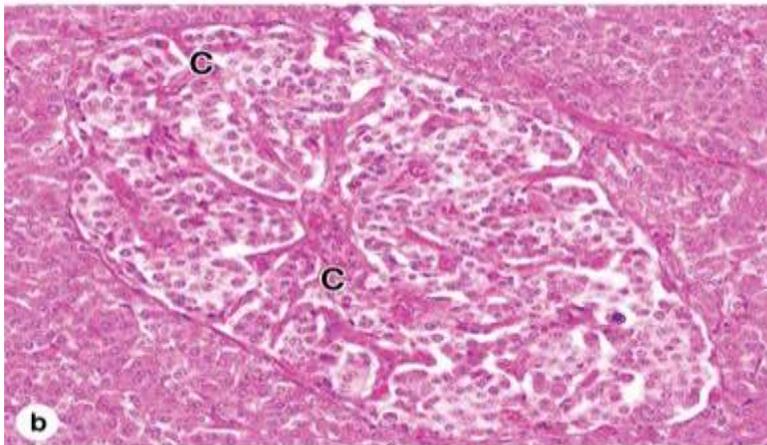


Delta cells:

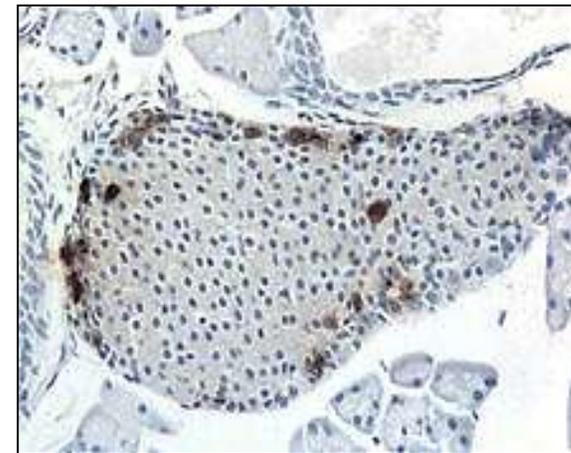
- Secret **somatostatin** (growth inhibiting factor)
- Cells scattered at periphery and less abundant

F (PP) cells:

- Very few
- Secrete **pancreatic polypeptide h.**
- Regulate exocrine pancreas secretions



Delta cells



PP cells

DIFFUSE NEUROENDOCRINE SYSTEM

- ✓ most of these cells are derived from endodermal cells of the embryonic gut or bronchial buds.
- ✓ These secretory cells are considered neuroendocrine because they produce many of the same polypeptides and neurotransmitter-like molecules

❖ **GIT (enteroendocrine cells) :**

G cells EC cells

ECL cells D cells

S cells

• **Respiratory system**

Bronchial Kulchitsky cells

Small granule cells

Neuroepithelial bodies

among tracheobronchial epithelium.

• **Other sites**

1. Myocardium: → cardiodilatins and atrial naturetic polypeptides

2. Hypothalamus: supraoptic and paraventricular nuclei → oxytocin and vasopressin

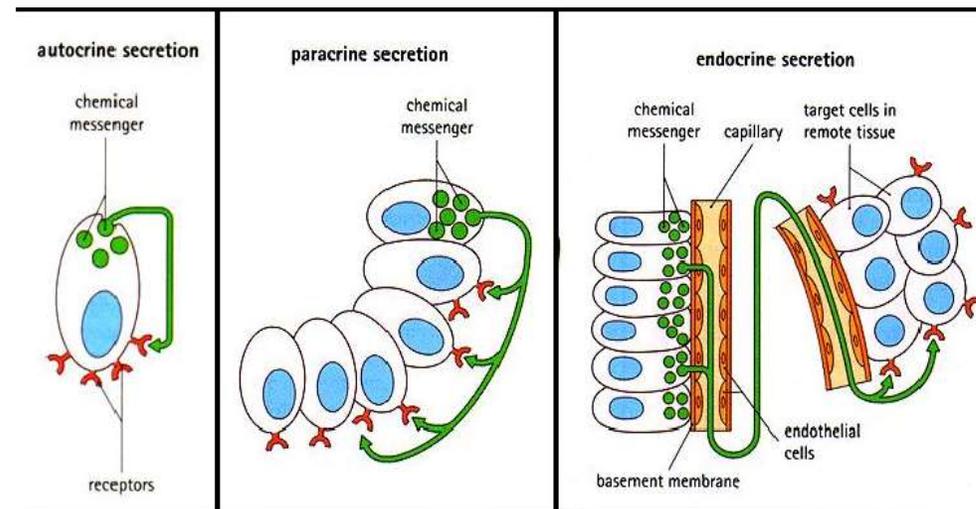
3. Endocrine system:
pinealocytes, parafollicular cells, chief cells, cells of islets of Langerhans and some adenohipophyseal and adrenal medullary chromaffin cells

Diffuse neuroendocrine system

- Apudocytes or **APUD cells**
- Classification according to staining activity
 1. **Argentaffin cells:** ppt silver in absence of reducing agent
 2. **Argyrophilic cells:** ppt silver in presence of reducing agent
 3. **Chromaffin like cells:** bind K dichromate

• Mode of action

1. Endocrine → target organ
2. Paracrine → surrounding tissue
3. Autocrine → themselves
4. Neuroendocrine → neurosecretion



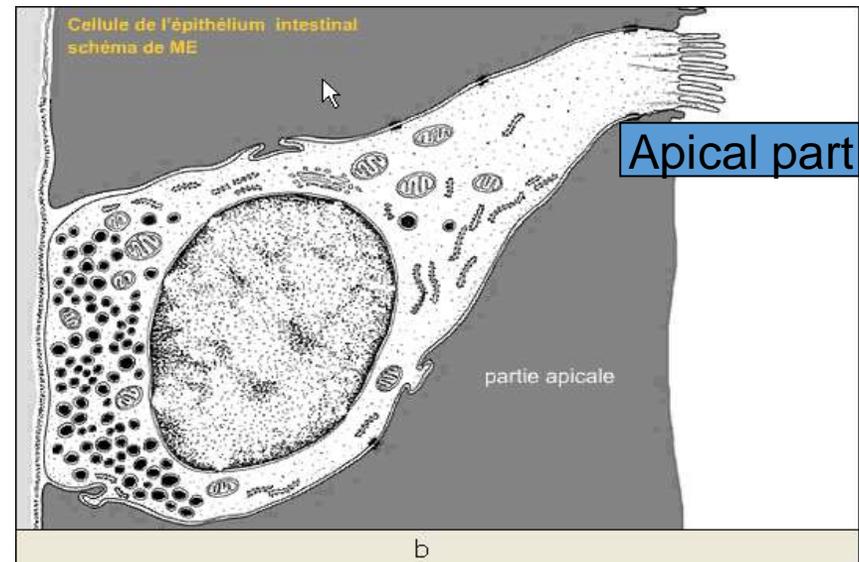
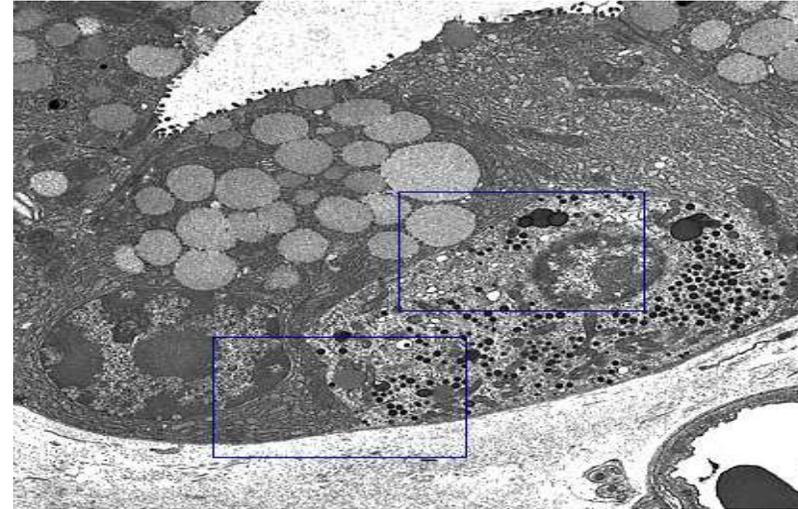
Microscopic features

- **Two types:**

1. **Open type**

2. **Closed type**

- Electrolucent cytoplasm
- Few small secretory granules **at the base** or vascular pole
- Small **infranuclear** Golgi
- **Sparse** rER



APUD of small intestine

Enteroendocrine cells

