

The module: Tissue of the body

Session 5 practical

Duration : 1 hr

Glandular Tissues P2

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Endocrine Glands:

are ductless glands which secrete hormones directly into the circulatory system.

The endocrine glandular cells are arranged into two patterns

First pattern

Secretions stored
outside the cell
extra cellular
Ex Adrenal gland

Second pattern

Secretions
stored inside
the cell
(intracellular)
Ex thyroid gland



The second pattern:-

Ex.: Adrenal gland

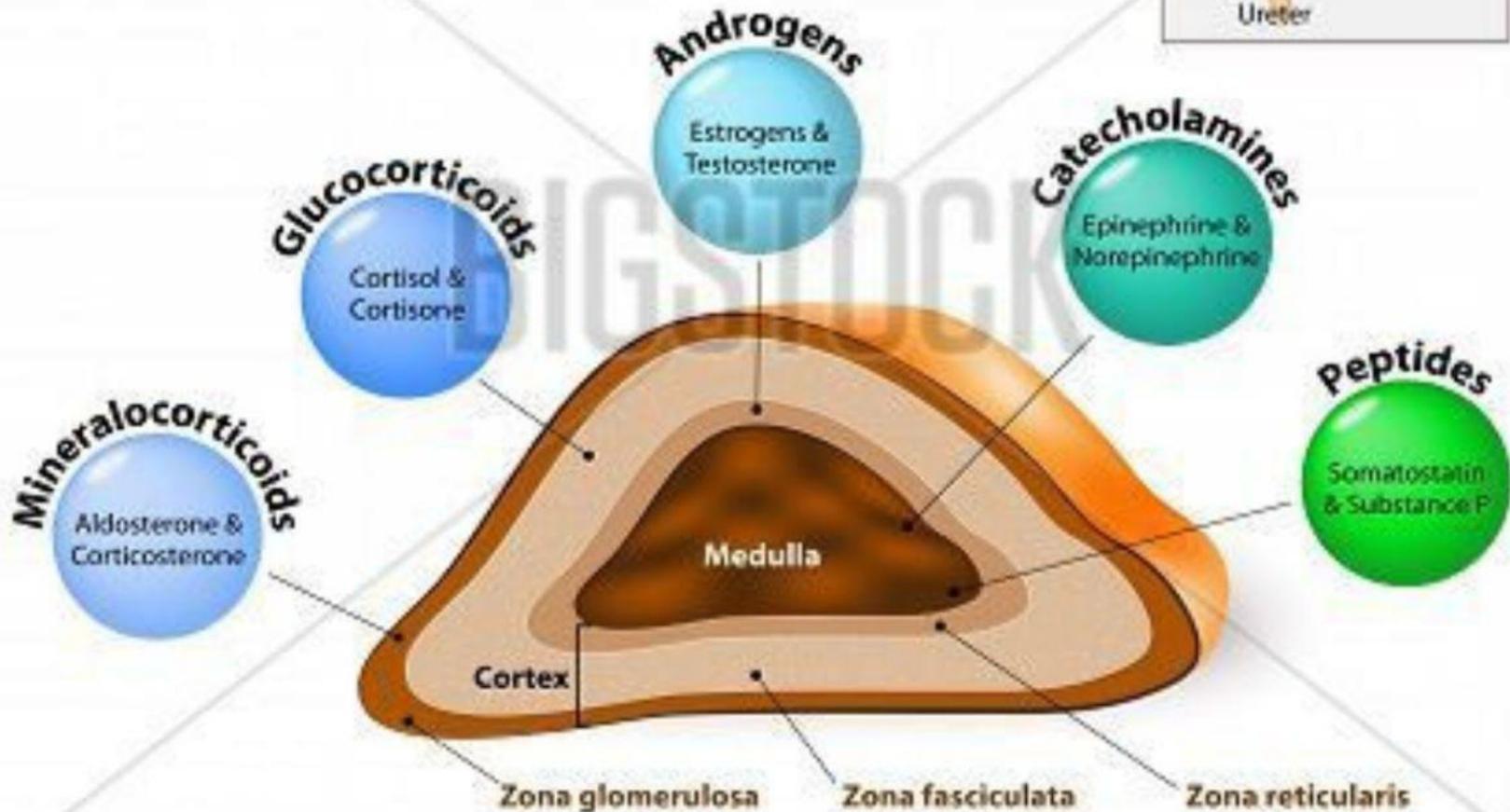
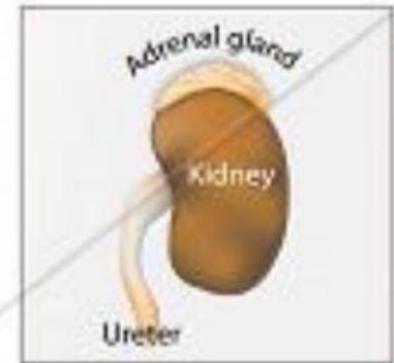
- Adrenal glands are small, flattened, paired organs that lie near the superior poles of the kidney.
- Secretions are stored in the secretory granules (precursors of the actual **hormones**) in the cytoplasm of glandular cells
- Glandular cells are arranged in **clusters** or **clumps** or **CORDS** separated by extensive meshwork of **SINUSOIDS**.
- Adrenal gland has two different embryonic origins: outer, **Cortex** (mesodermal origin) and inner, **Medulla** (ectodermal

origin

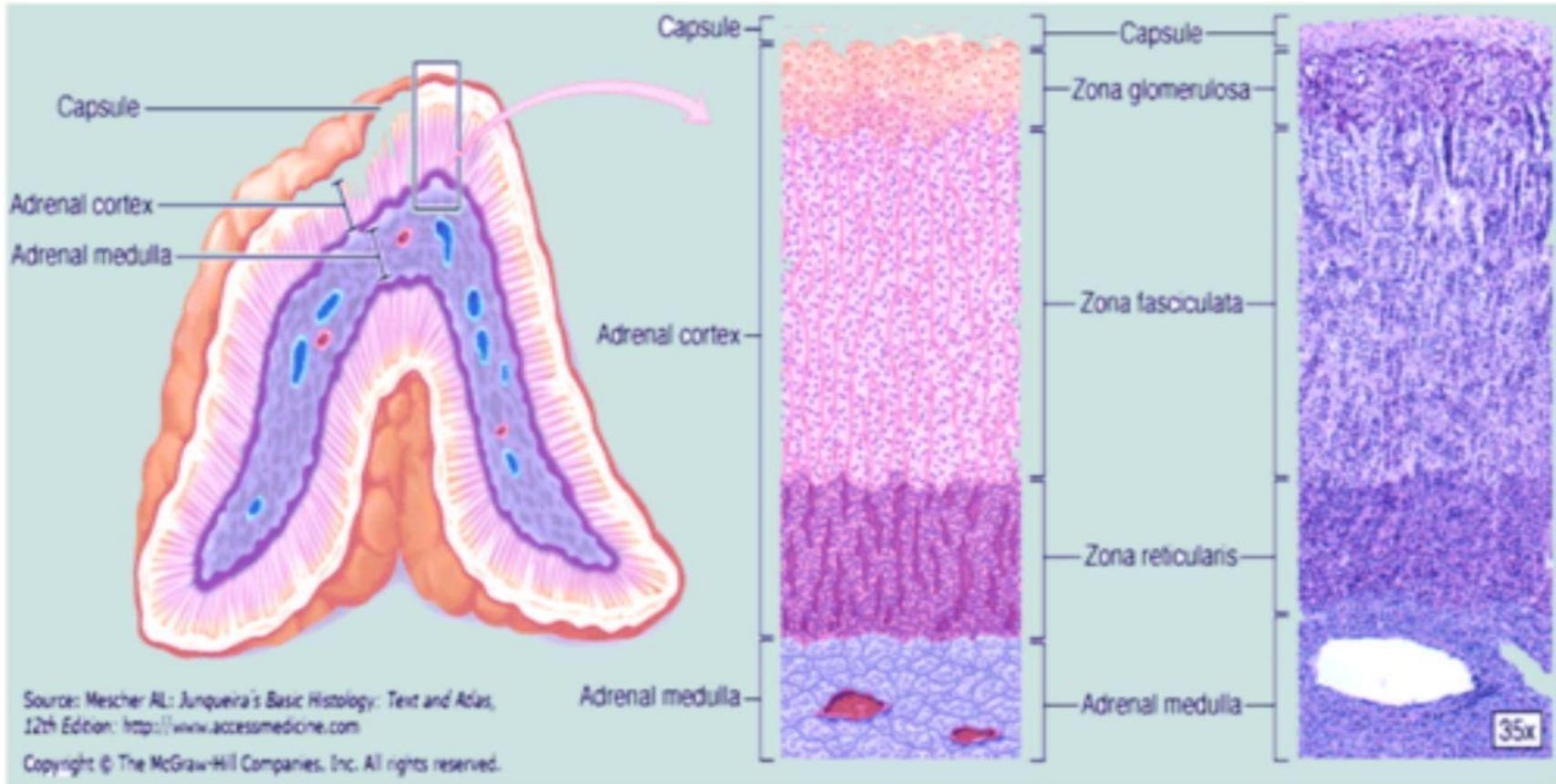


ADRENAL GLAND

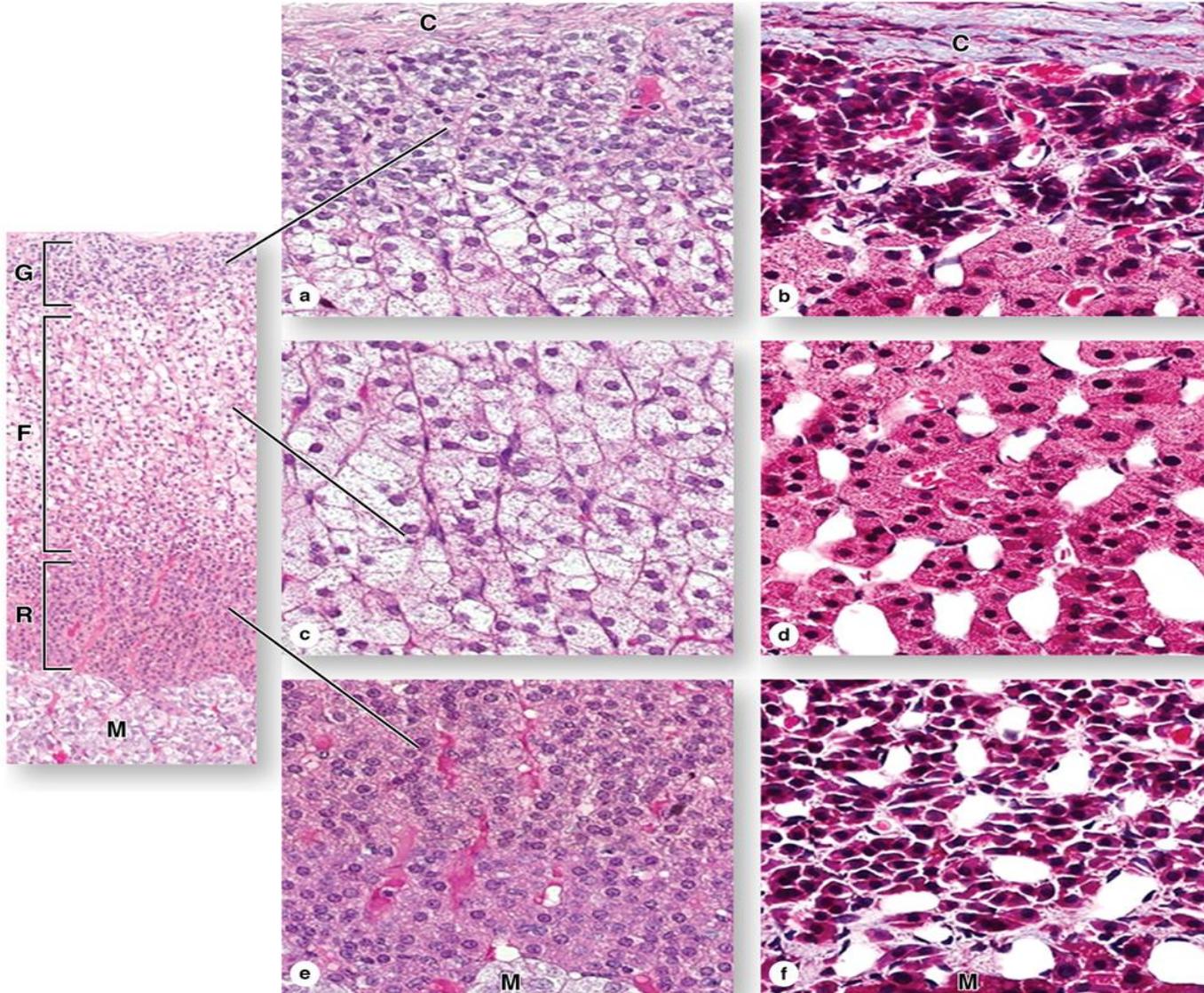
(hormones)



Histology of Adrenal Gland



Cortex of the adrenal gland



**Zona
glomerulosa**

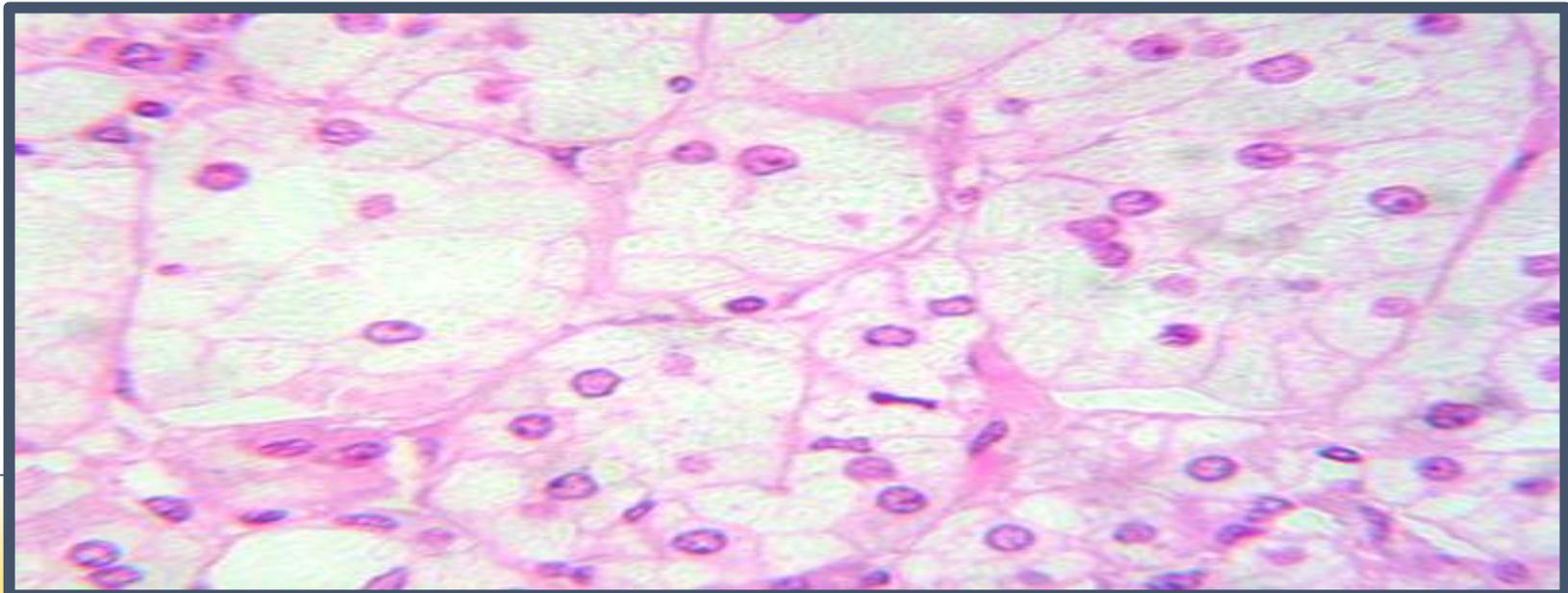
**Zona
fasciculata**

**Zona
reticularis**

Zona glomerulosa

The **outer layer** beneath the capsule

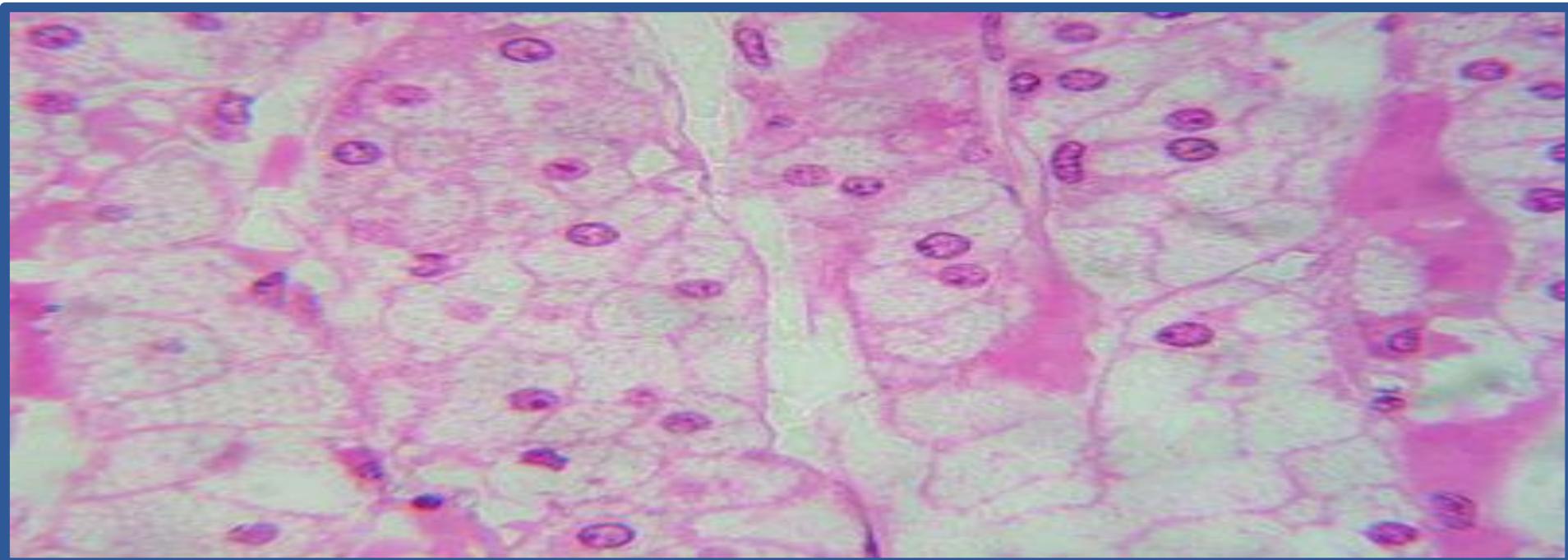
- It composed of cells are arranged in **irregular ovoid clusters or hairpin-like columns**, separated by blood capillaries
- .
- The **cytoplasm** of its cells has a **pale** stain due to its content of lipid droplets, while the **nuclei** stain **dark**.
- Its cells secrete **mineralocorticoids (aldosterone)**



Zona Fasciculata

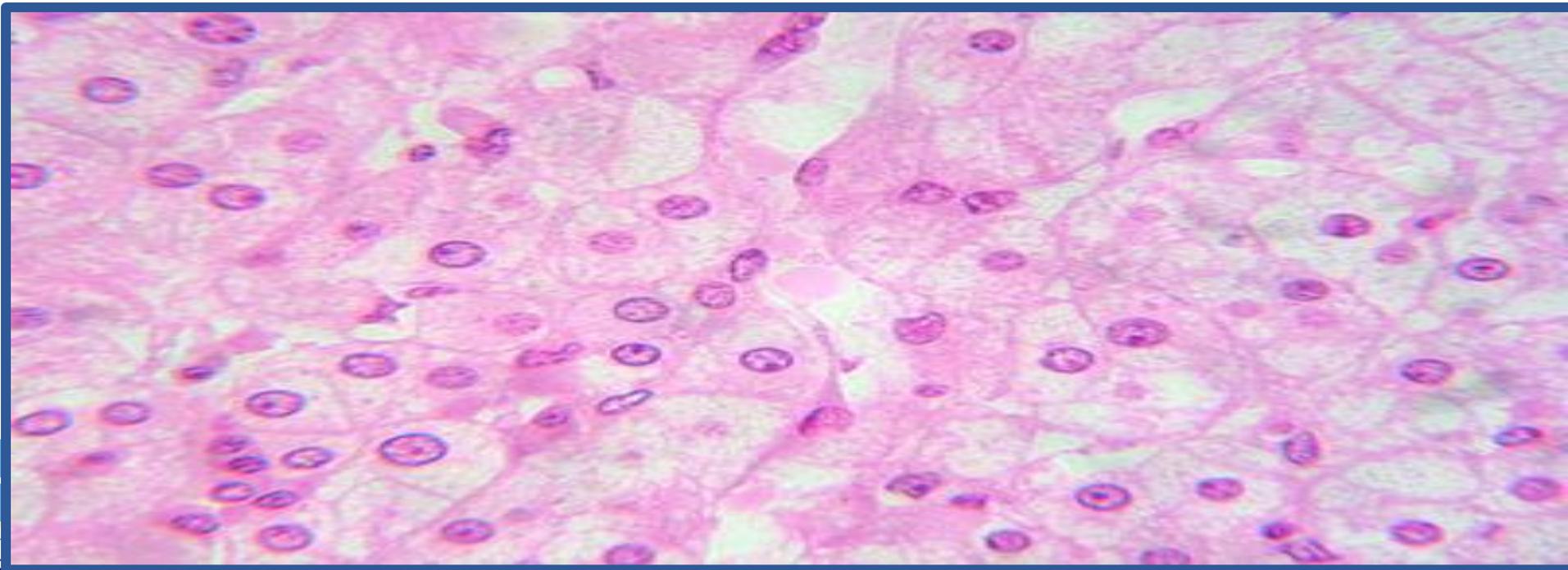
The **middle** and **broadest** layer of the cortex

- Its cells are arranged in **parallel cords** (only one cell thick), perpendicular to the capsule.
- Its cells are **larger** and **more pale** than the first layer due to the more abundant cytoplasm containing many lipid droplets.
- Its cells secrete **glucocorticoids (cortisol and corticosterone)**.



Zona Reticularis

- The **innermost** layer of the cortex and borders the medulla.
- Its cells are arranged in **branching cords or clusters** separated by wide capillaries
- Its cells are **much smaller** and **dark-staining** than the middle layer
- Its cells secrete small quantities of **androgens (testosterone)** and smaller quantities of **glucocorticoids**

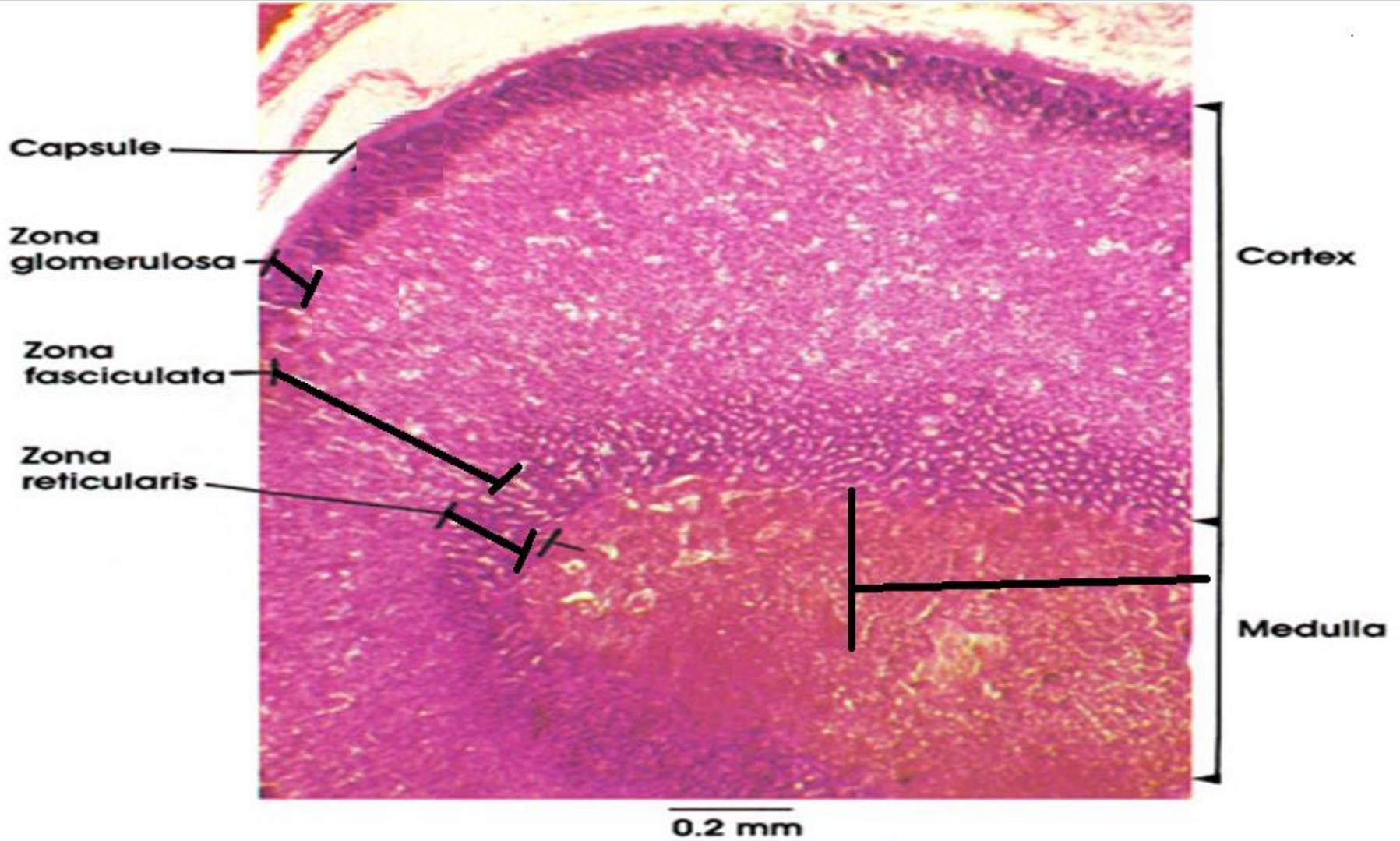


Medulla of adrenal gland

It's the **central adrenal tissue** which surrounded completely with the cortex.

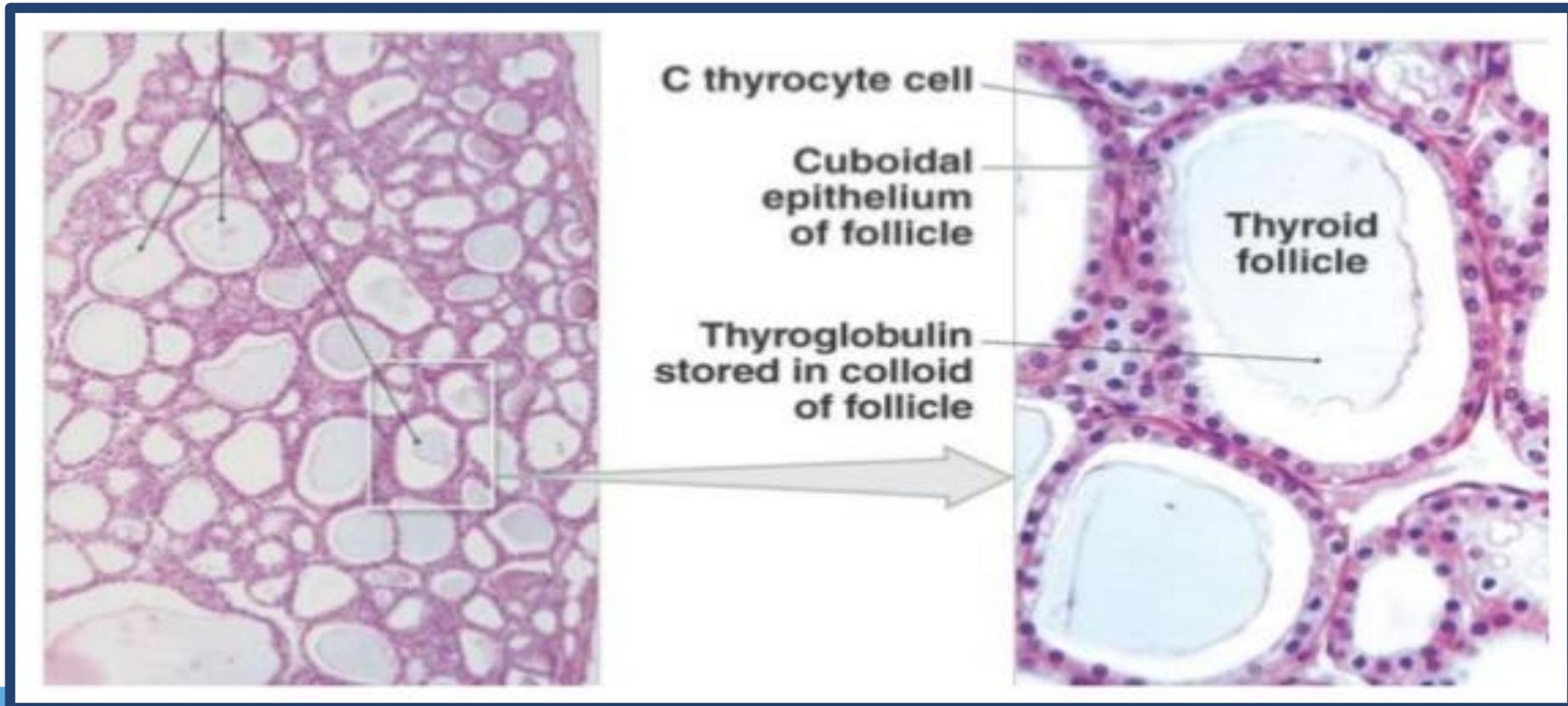
- Its cells (**chromaffin cells, small and dark-staining**) are arranged in **clusters or short cords** separated by numerous sinusoids.
- Its cells secrete catecholamine hormone, **adrenaline (epinephrine)** and **noradrenaline (norepinephrine)** under conditions of stress.





Thyroid gland

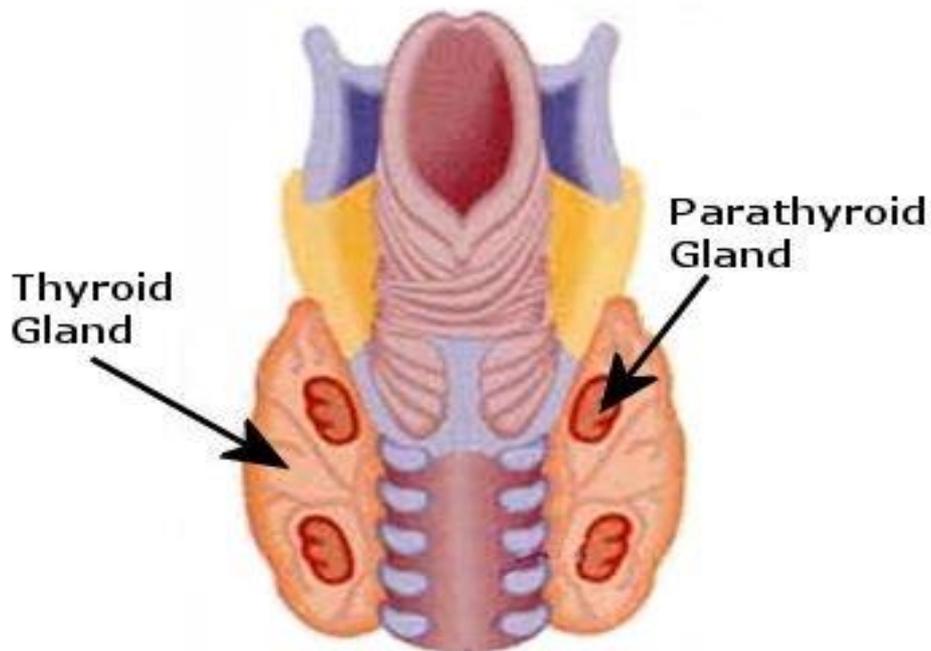
Secretions are stored inside **follicles** (central eosinophilic lumen)
(**thyroglobulin**) for 2 -3 months



Parathyroid gland

Four parathyroid glands, each a small ovoid structures ($5 \times 4 \times 2$ mm) on the posterior wall of the thyroid.

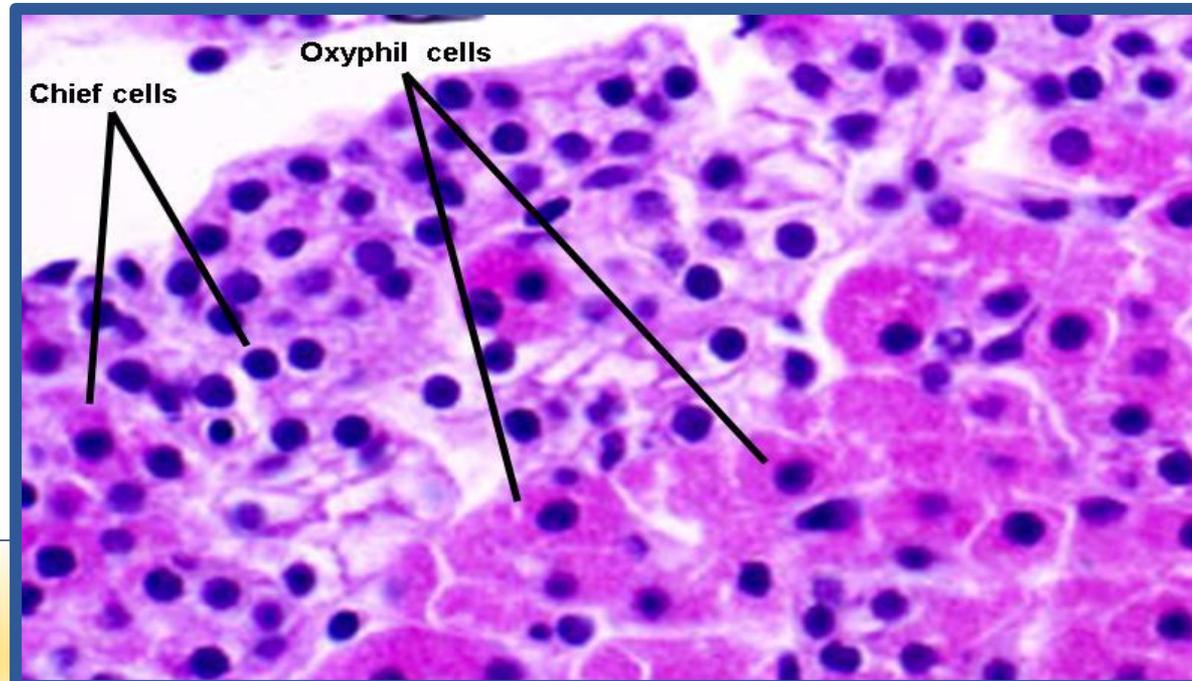
- Each gland is composed of masses and cords of epithelial cells, supported by reticular fibers and in association with a rich network of capillaries.



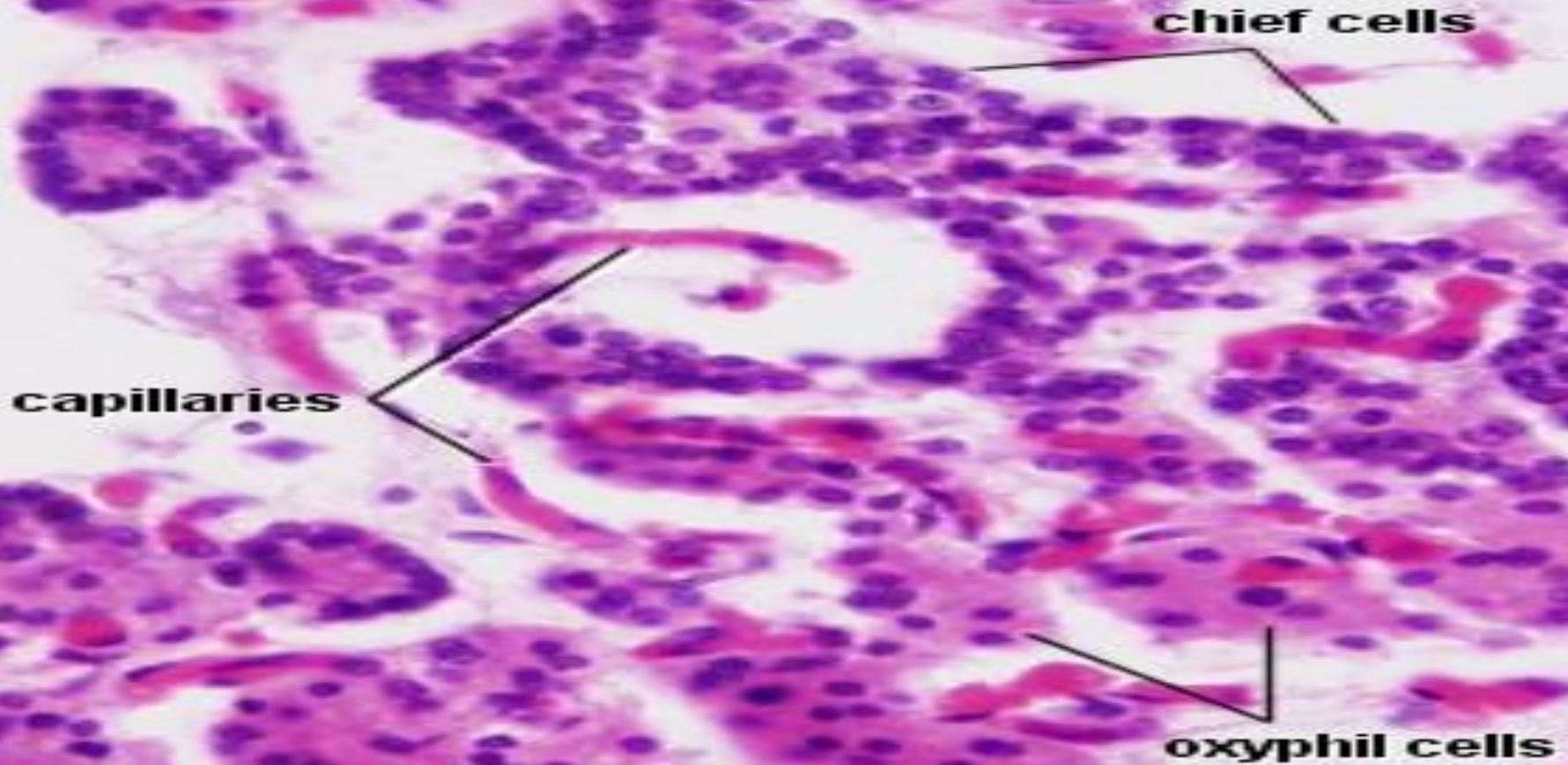
Parathyroid glands consists of two types of cells:

principle (chief) cells are the major cell type, arranged in irregular cords, have dark, spherical, centrally nuclei and they secrete parathyroid hormone (PTH) which acts on bone, kidney and intestines to increase calcium levels in blood and interstitial fluid to optimal levels.

Oxyphil cells are less numerous, arranged in small clumps, bigger cells than the chief cells, have more reddish stain and have uncertain function.



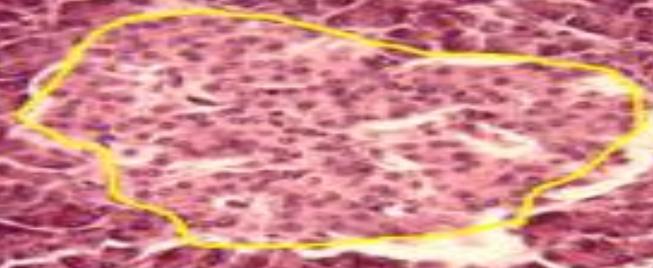
Parathyroid Gland H&E



Mixed Endocrine / Exocrine Gland Pancreas

The pancreas is **15cm** long, lies behind the stomach, with one end lying in the curve of the duodenum, has **both endocrine and exocrine** components, secretes **digestive enzymes** into the duodenum and **hormones** into the bloodstream

Slide 80 Pancreas

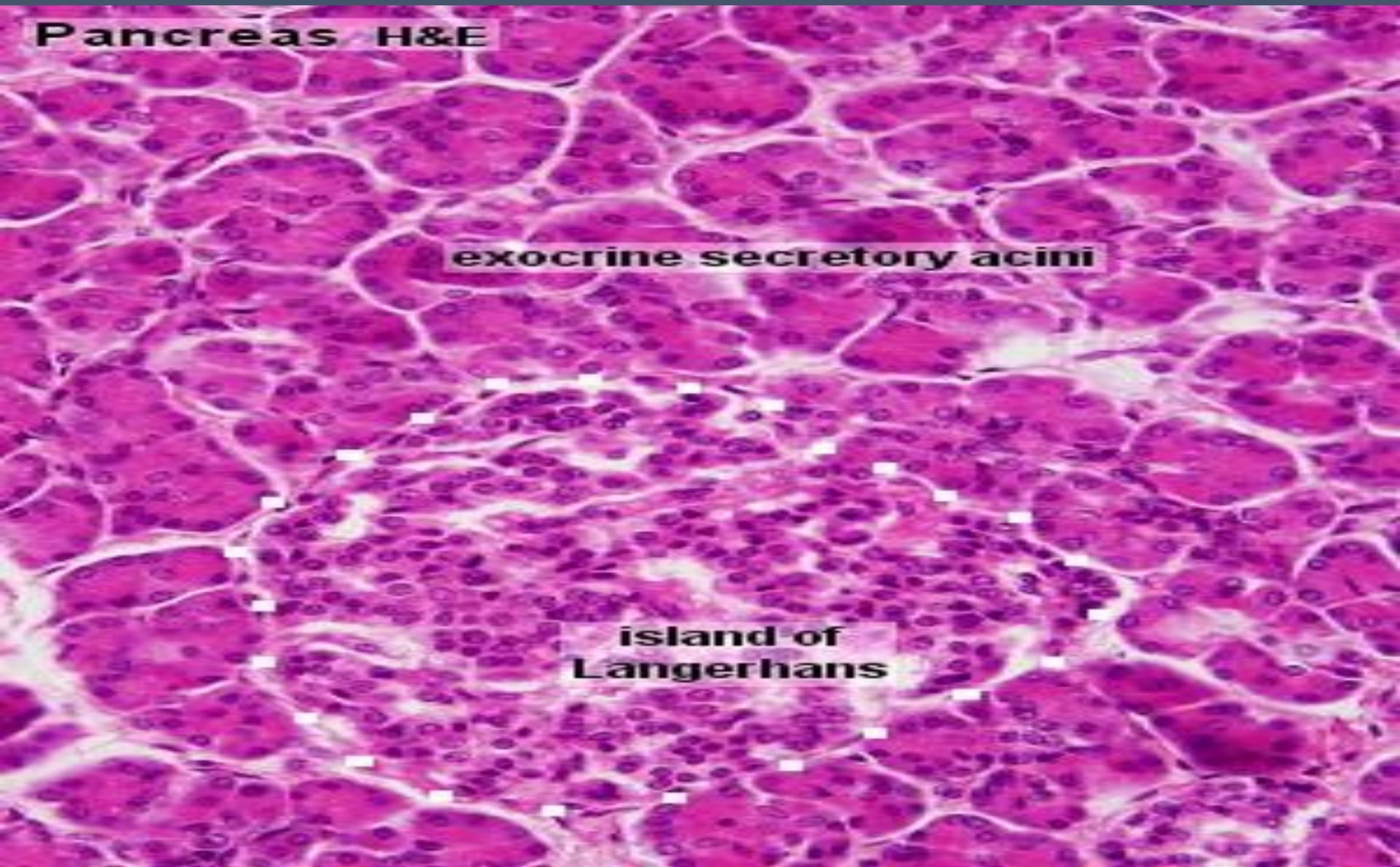


Islet of Langerhans

Pancreas H&E

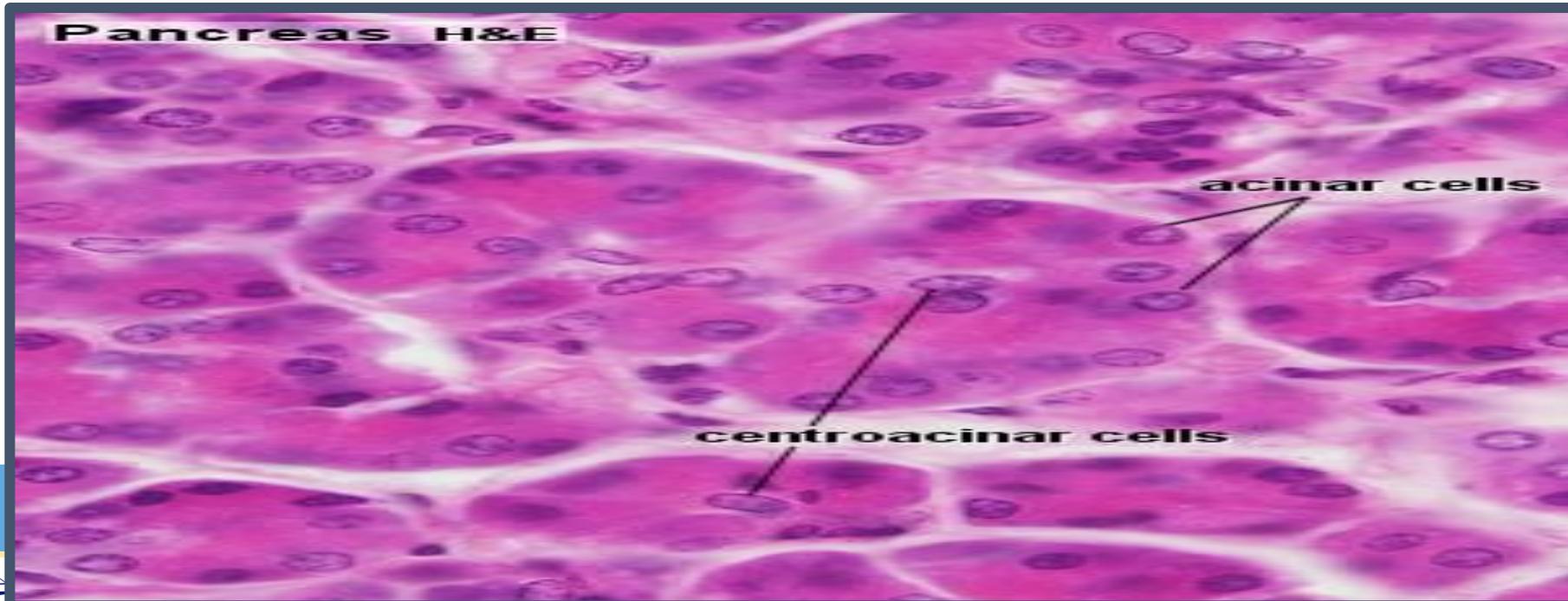
exocrine secretory acini

**island of
Langerhans**



The exocrine components of pancreas:

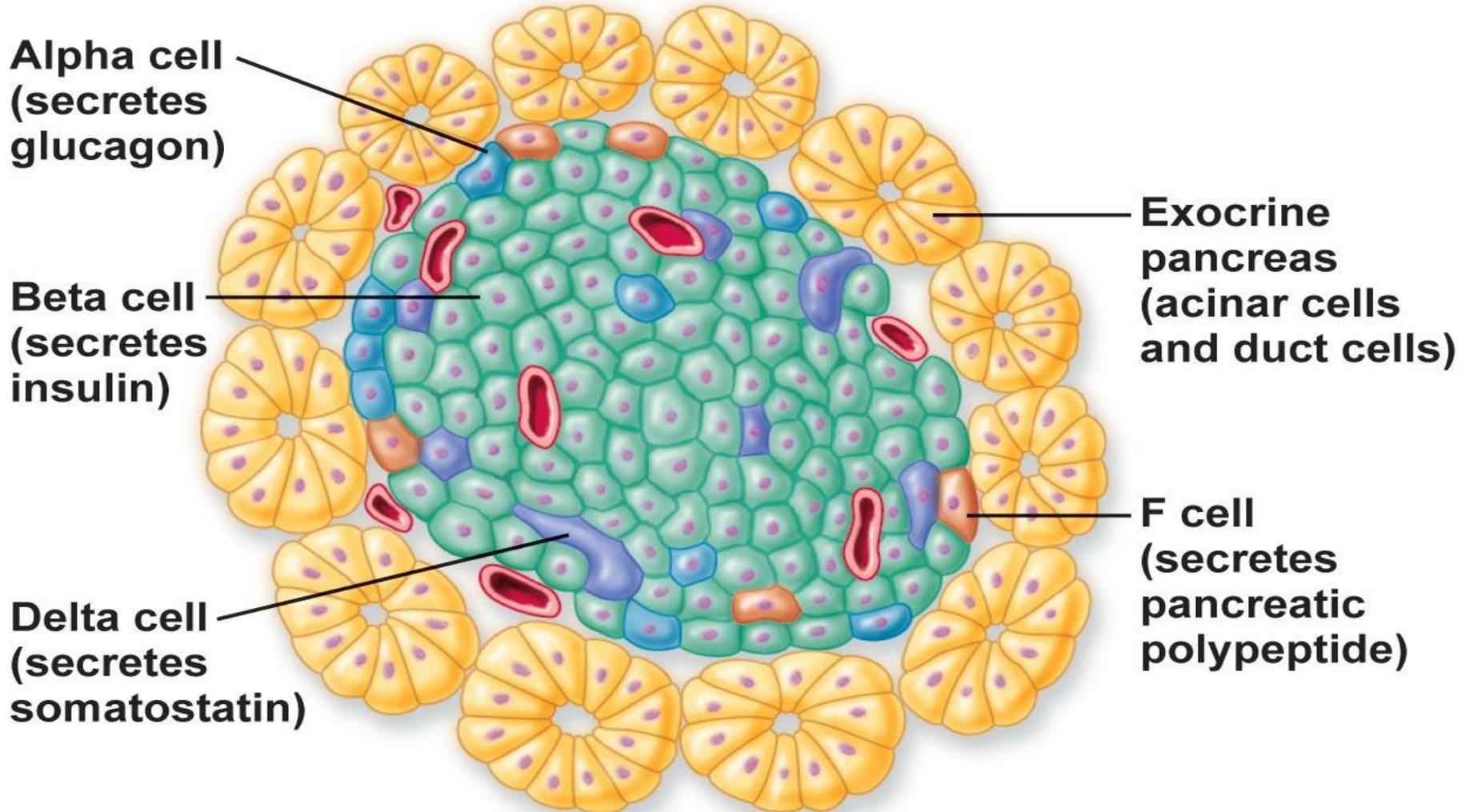
- Closely packed secretory acini which have basally positioned nuclei.
- The acinar cells bases are purple due to their high rER, and the acidophilic apical portions are filled with pink zymogenic granules containing digestive enzymes and proenzymes.
- Characterized by the centroacinar cells.



The endocrine components of pancreas: Clumps of secretory cells (islets of Langerhans), which are round, pale regions within the exocrine tissue.



Islets of Langerhans



Islets of Langerhans

Endocrine secretions of the pancreas

Cell	Hormone	Function
α cell	Glucagon	Increases blood glucose levels
β cell	Insulin	Decreases blood glucose levels
δ cell	<u>Somatostatin</u>	Inhibits contraction of GI tract and gall bladder smooth muscles
G cell	<u>Gastrin</u>	Stimulates production of <u>HCl</u> by parietal cells of stomach
PP cell	Pancreatic polypeptide	Inhibits exocrine secretions of pancreas