

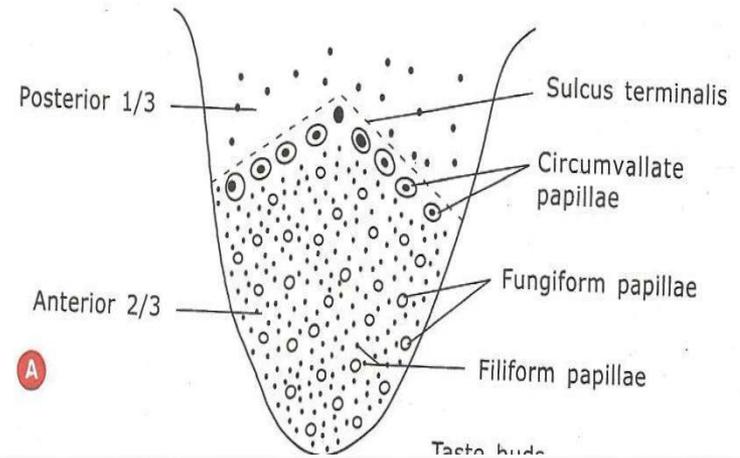
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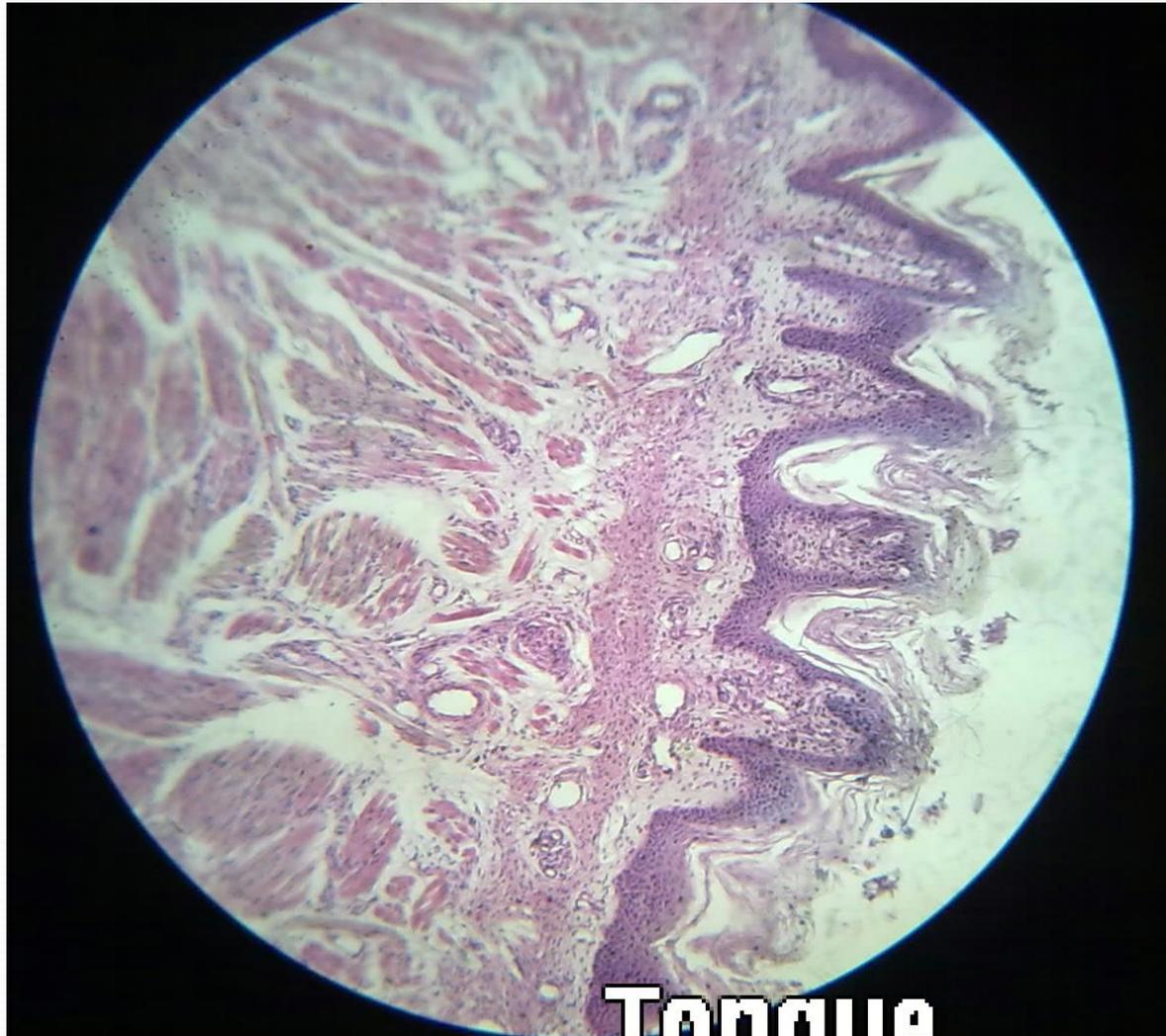
Histology of Tongue, Liver, Pancreas, Thyroid & Adrenal

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Tongue

- An accessory digestive organ.
- Composed of skeletal muscle covered with mucous membrane.
- Mucosa: Stratified squamous epithelium & lamina propria.
- Sulcus terminalis divides the dorsal aspect of tongue into anterior 2/3rd and posterior 1/3rd part.

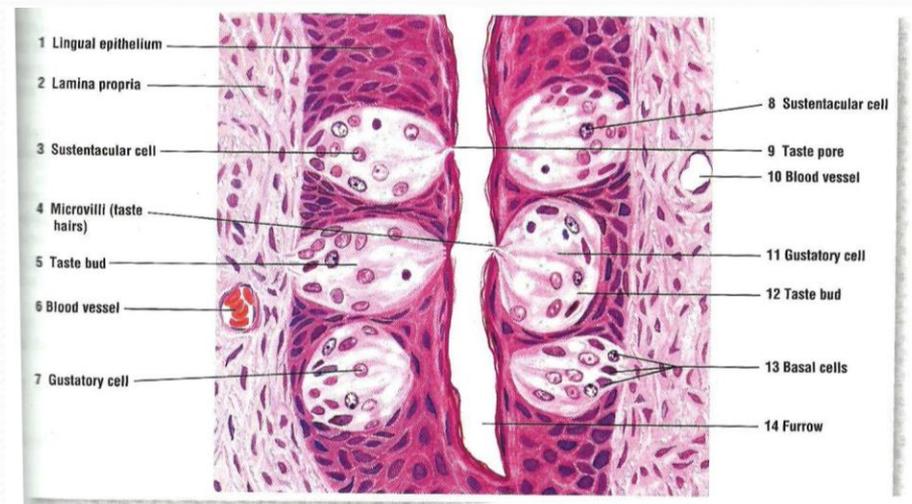
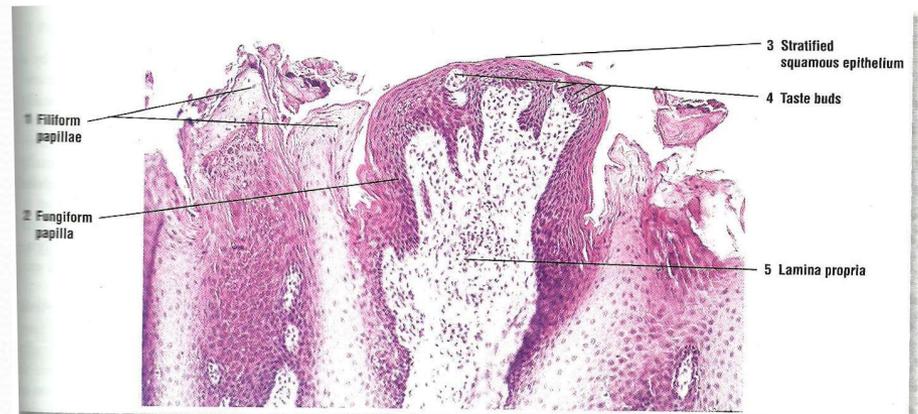




Tongue

Lingual Papilla

- **Lingual papilla:** projections of lamina propria covered with stratified squamous epithelium.
- May be keratinized.
- Many papillae contain **taste buds**.
- 4 types:
Filiform, fungiform, circumvallate and foliate.

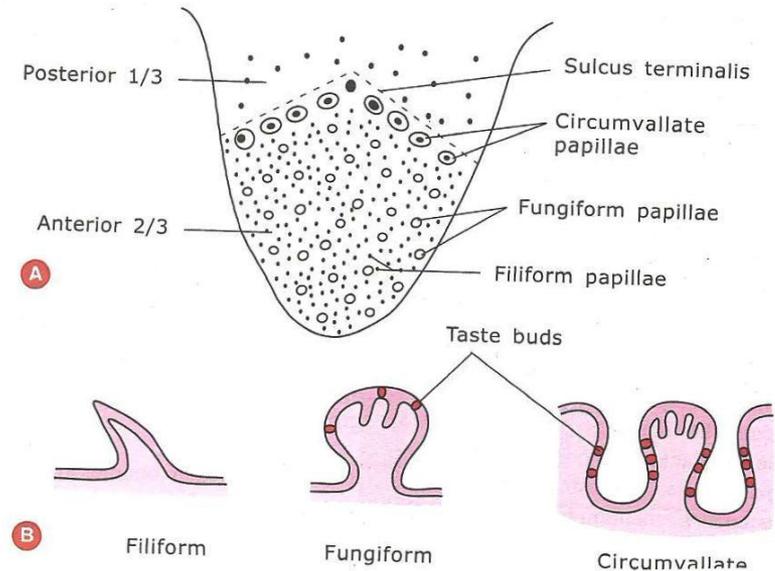


Tongue (Posterior Part)

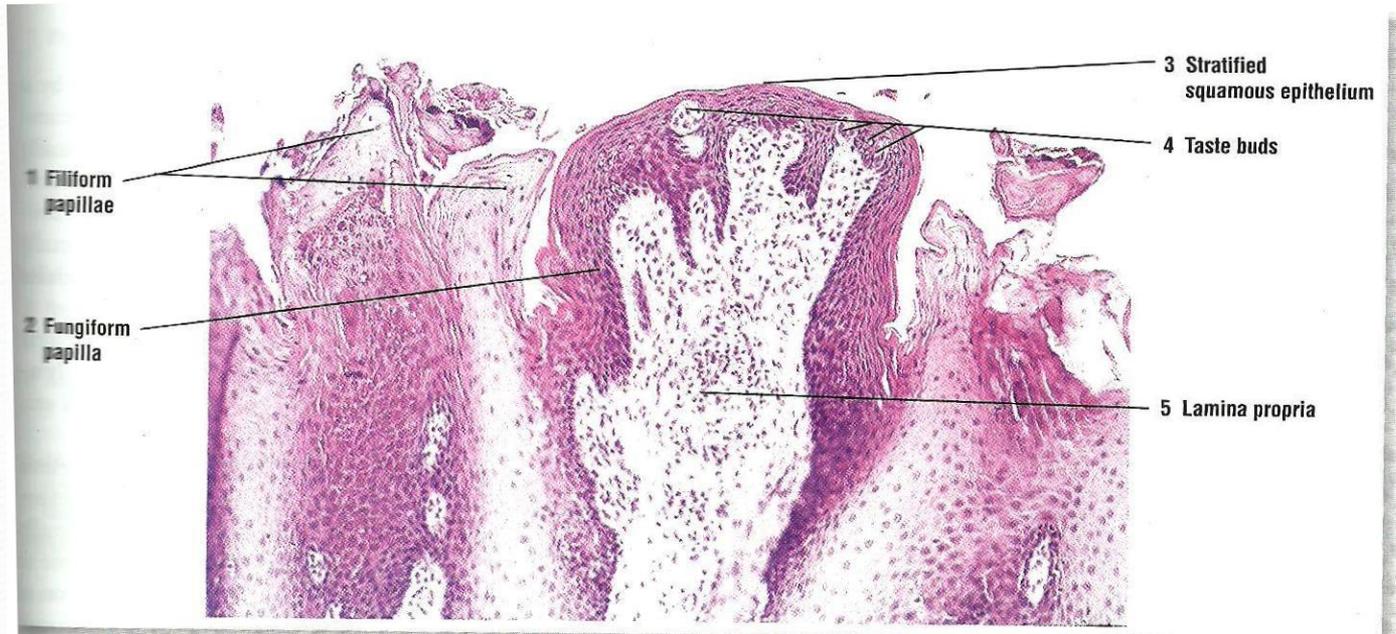


Types of Papillae

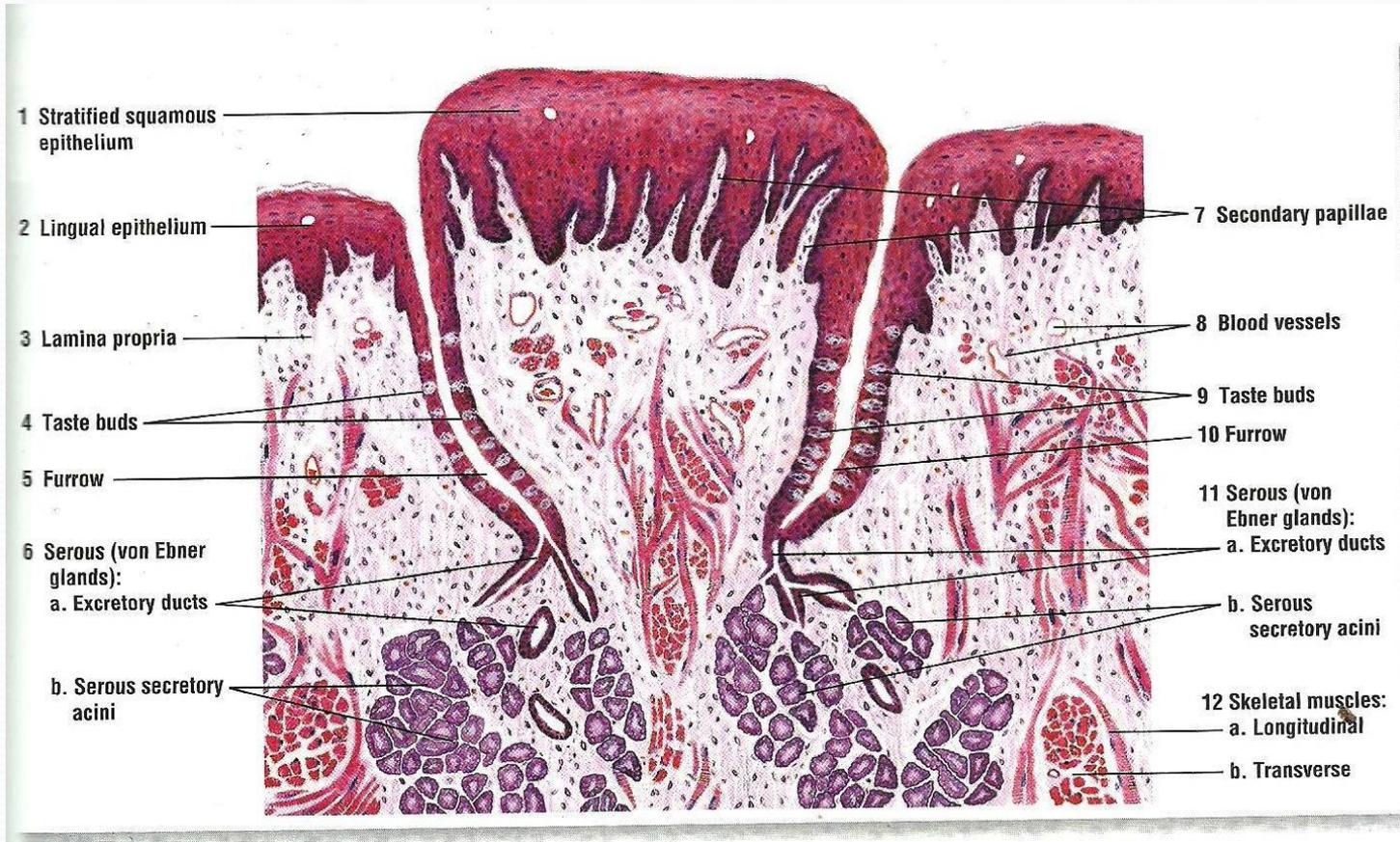
- **Filiform papilla:** most numerous, conical with keratinized tips, **no taste buds**.
- **Fungiform papilla:** mushroom shaped, highly vascularized connective tissue core, taste buds present.
- **Circumvallate papilla:** surrounded by a circular trench, openings of the ducts of **serous glands of Von Ebner**.
- **Foliate papilla:** not well developed in humans.



Filiform & Fungiform papilla

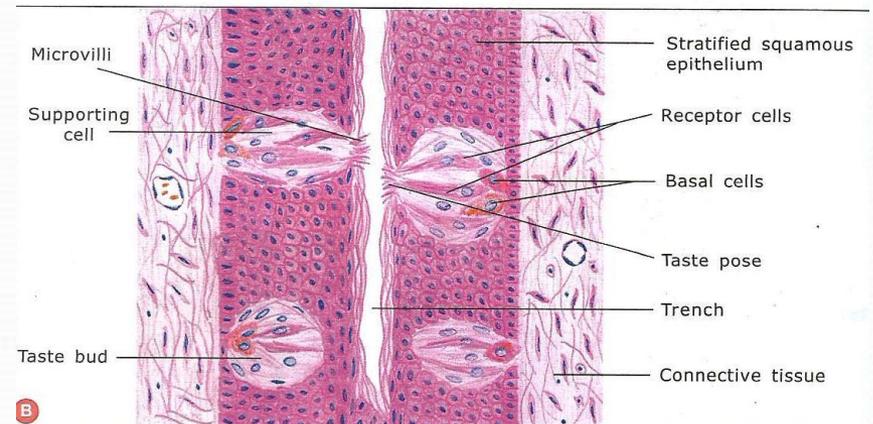
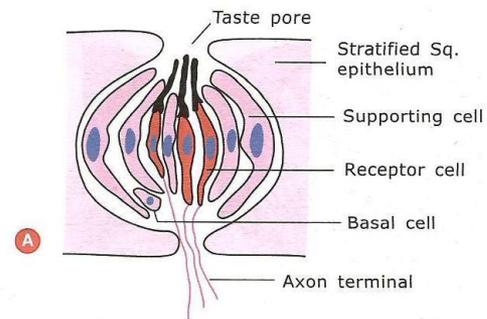


Circumvallate papilla



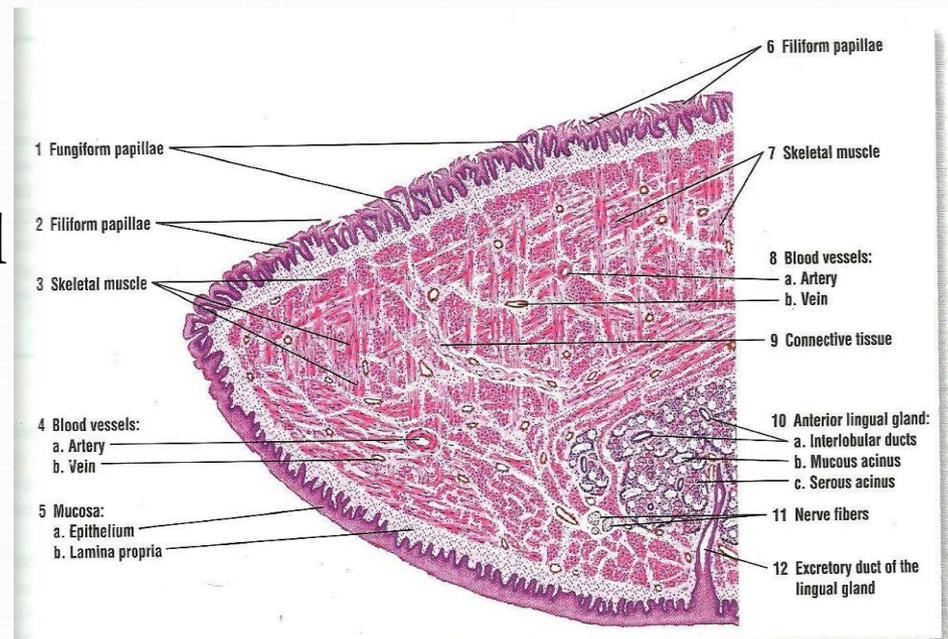
Taste Buds

- Neurosensory epithelial structures embedded in the surface epithelium of fungiform and circumvallate papilla.
- Appear as onion-like, oval, pale staining structures.
- Extends through the full thickness of epithelium.
- Opens on the surface through **taste pore**.
- **3 types:** Receptor cells, supporting cells and basal cells.



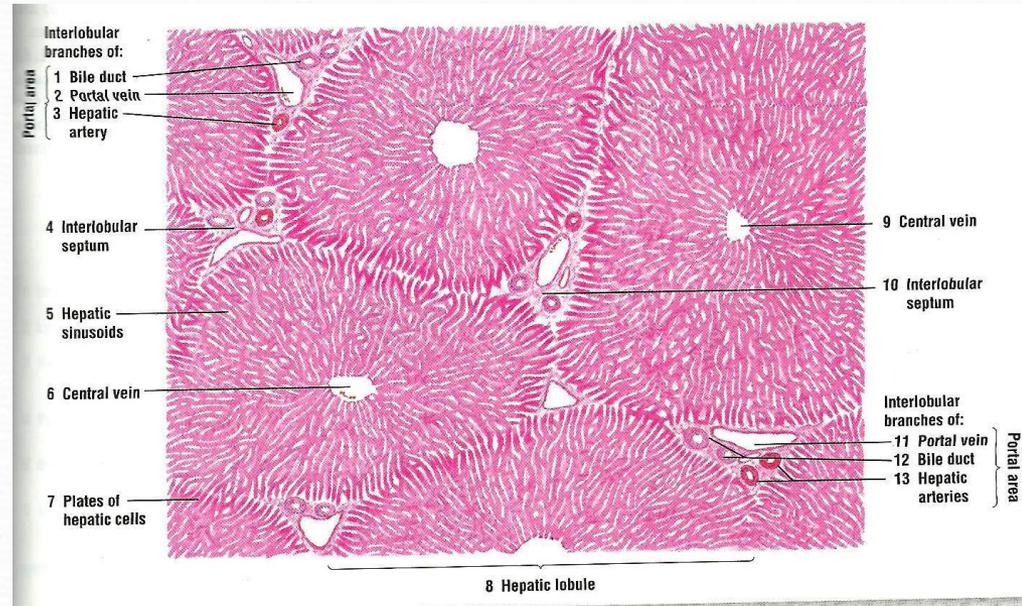
Muscles of the tongue

- Contains striated muscle.
- Muscle fibres are arranged in transverse, longitudinal and vertical bundles.
- Loose connective tissue, adipose tissue and lingual glands are present in between the muscle bundles.



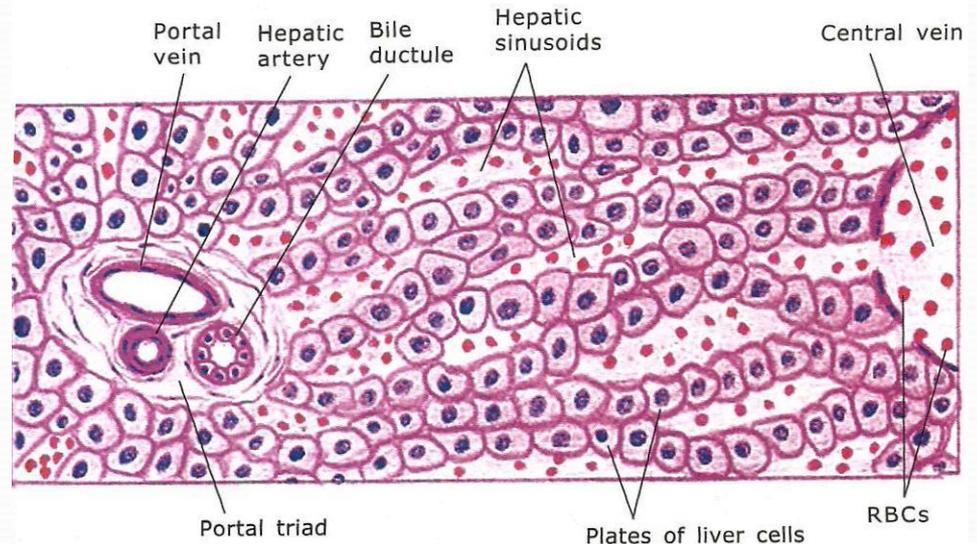
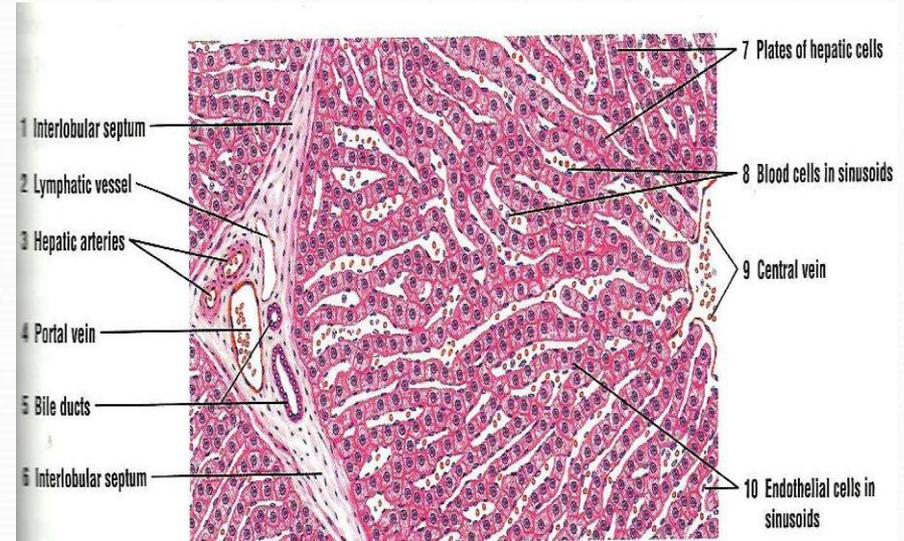
Liver

- Modified exocrine gland.
- Made up of liver cells (hepatocytes).
- **Hepatic lobules:** hexagonal areas that form the structural & functional unit of liver.
- Scanty connective tissue between lobules.
- Each lobule is made up of cords of liver cells separated by sinusoids.

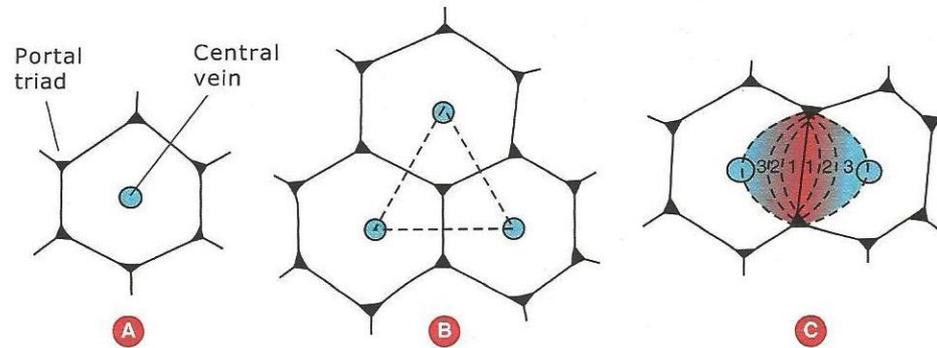


Liver

- Portal canals contain branches of portal vein, hepatic artery & interlobular bile duct (**portal triad**).
- **Central vein:** in the centre of each lobule, drains blood from lobules into hepatic veins.



Different types of liver lobules



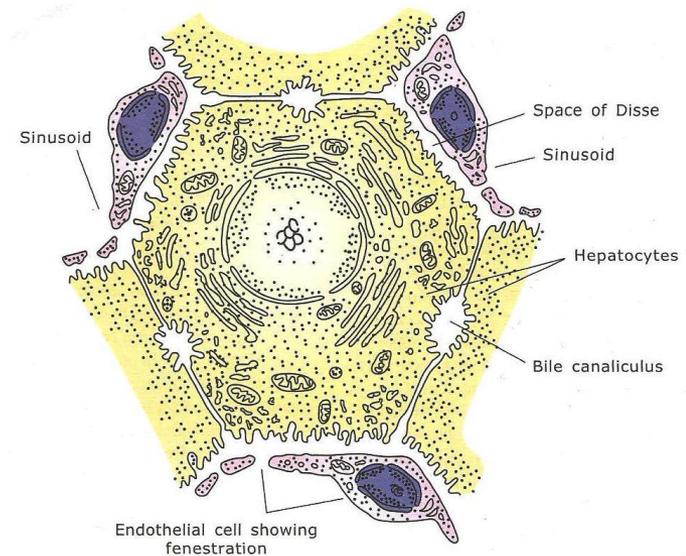
A. A Classical liver lobule

B. A Portal liver lobule

C. A liver acinus

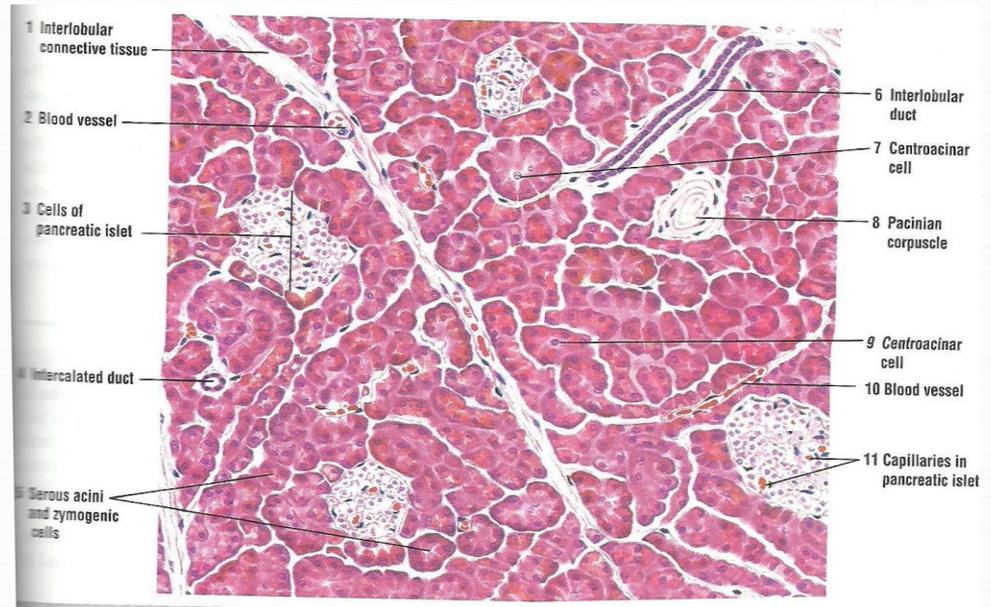
Liver

- **Glisson's capsule:** connective tissue covering of liver.
- **Bile canaliculi:** spaces present between plasma membrane of adjacent liver cells.
- **Perisinusoidal space of Disse:** separates the surface of liver cell from endothelial lining of the sinusoid.



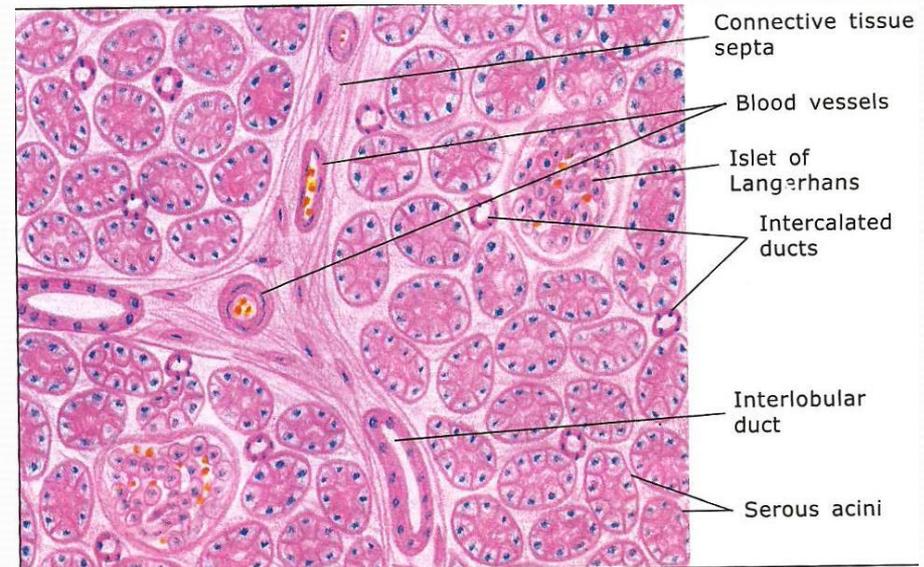
Pancreas

- Mixed gland i.e. consists of an exocrine & endocrine portion.
- Exocrine part: secretes pancreatic juice.
- Endocrine part: secretes hormones.



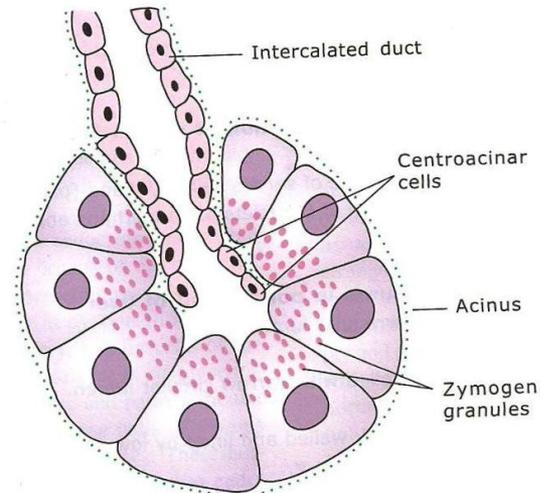
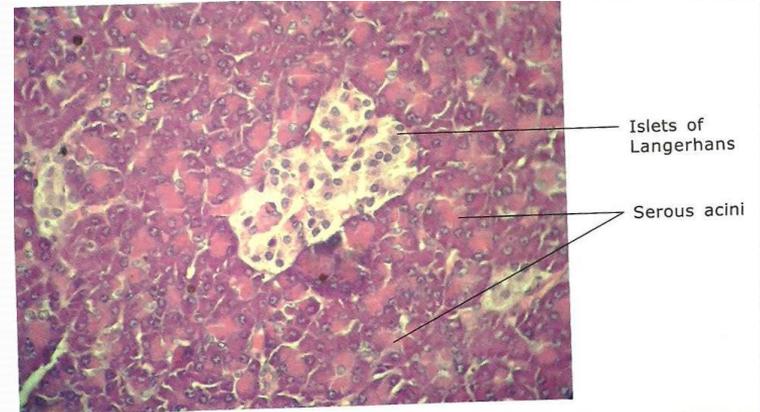
Histology of Exocrine Pancreas

- Covered with a capsule.
- Septas arise from capsule which divide the gland into many small lobules.
- Interlobular connective tissue contains large ducts, blood vessels & nerve fibres.
- Interlobular connective tissue surrounds the acini, small ducts & islets of Langerhans.



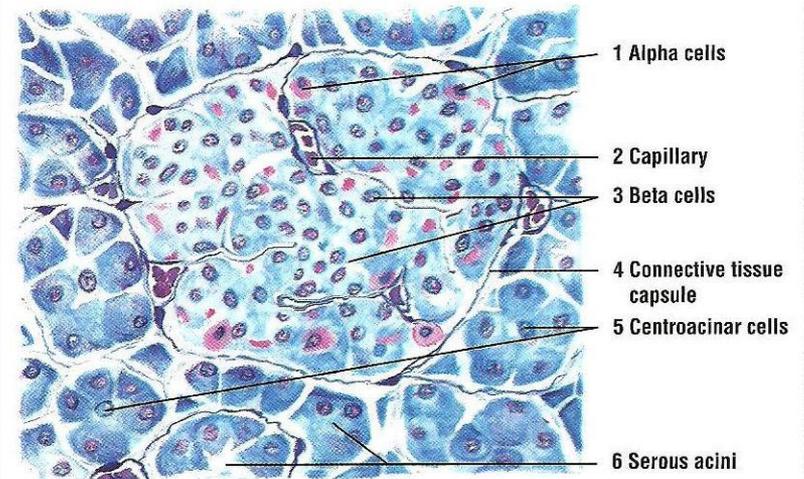
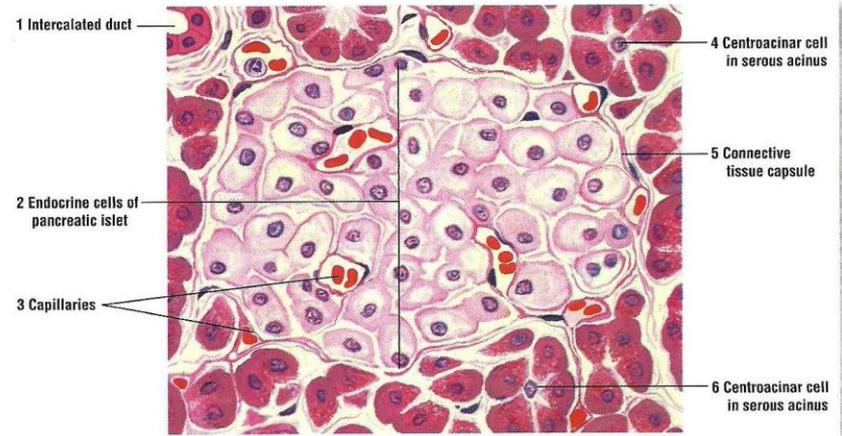
Pancreatic Acini

- Serous in nature.
- Lined by pyramidal cells and have small lumen.
- **Acinar cells:** supranuclear region is filled with zymogen granules. Infranuclear region is intensely basophilic.
- **Extensive duct system:** intralobular, interlobular & main duct.
- Acinar lumen may show pale staining cells of intercalated duct (**centroacinar cells**).

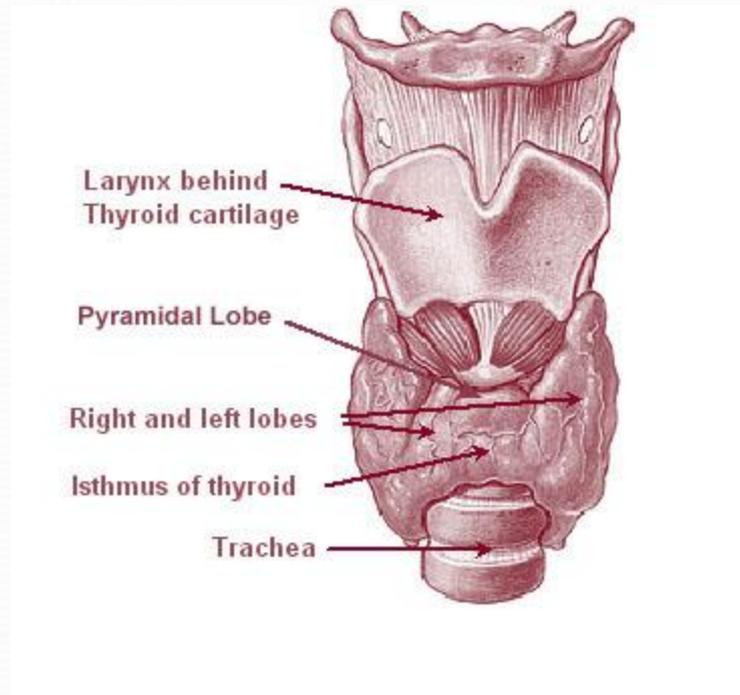


Histology of Endocrine Pancreas

- In the form of “islands”:
Islets of Langerhans
(lightly stained with H&E).
- Scattered among the acini of exocrine part.
- Cells of islets are arranged as anastomosing plates.
- Islets contain 3 types of cells: Alpha, Beta & Delta which are seen with special stains.

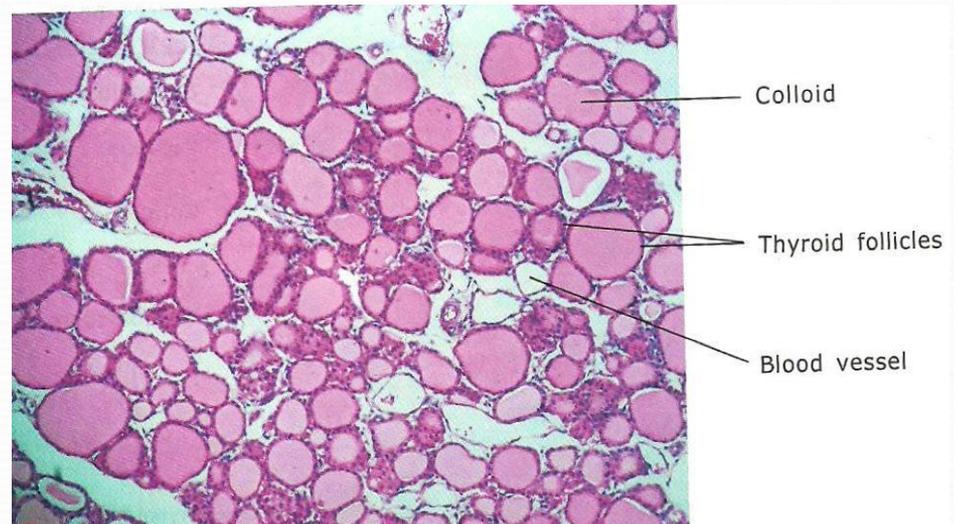


THYROID GLAND



Microscopic structure

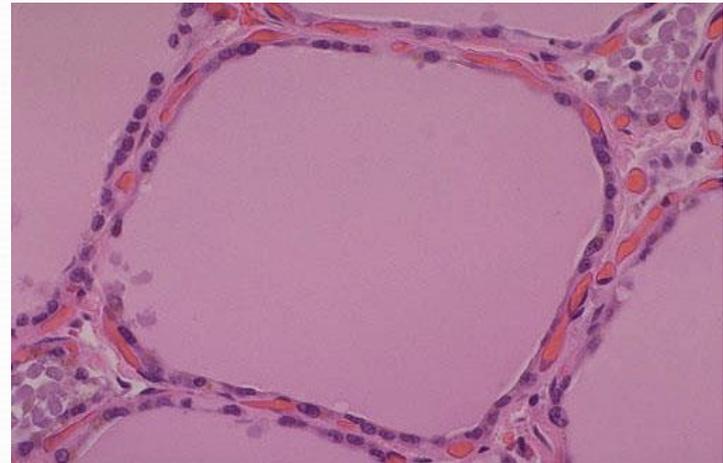
- The gland is surrounded by a thin fibrous **capsule**.
- Septa from the capsule extend into the gland & divide it into **lobules**.
- Lobules are made up of spherical masses called **follicles**.
- Follicle has a cavity filled with homogenous material called **colloid**.
- Follicular cells are normally cuboidal in shape.
- Secrete 2 hormones: tri-iodothyronine (T_3) & tetra-iodothyronine (T_4) or thyroxine.

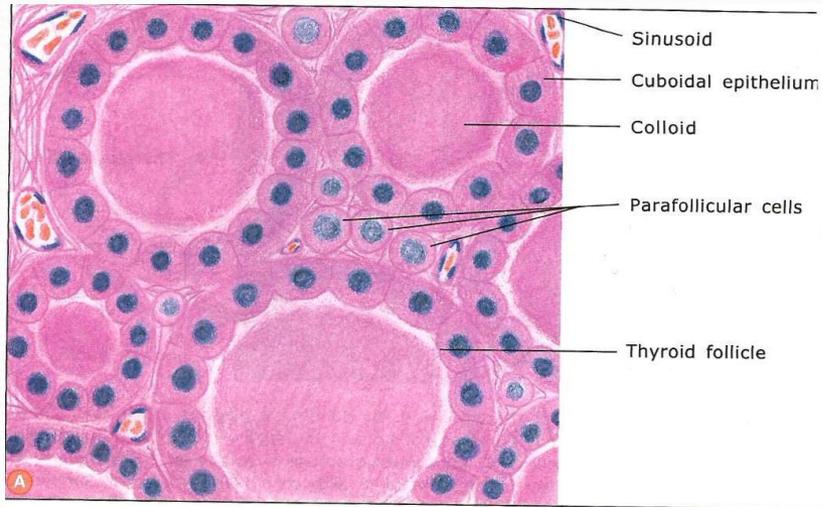


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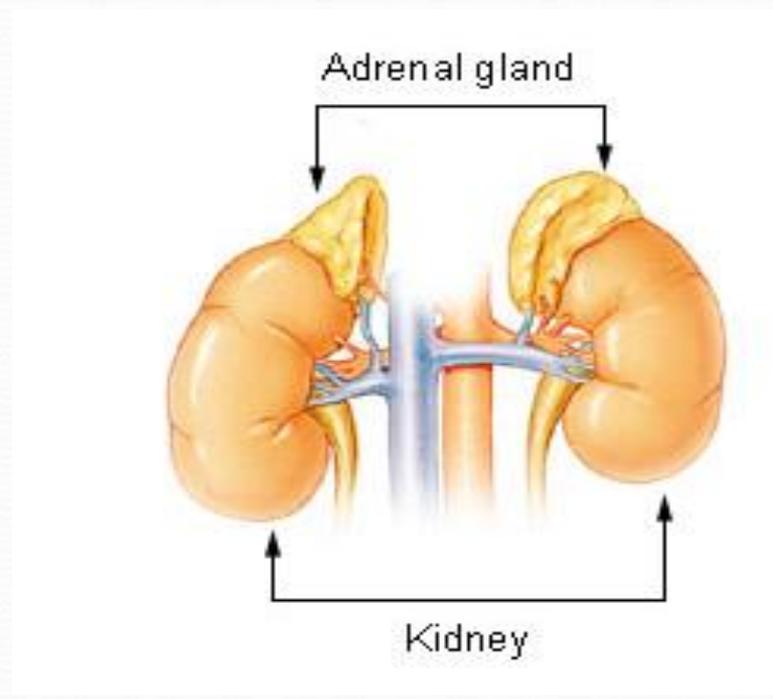
Parafollicular cells (C-cells):

- Embedded within a follicle or lie between follicles.
- Singly or in groups.
- Cells are polyhedral with oval eccentric nucleus and cytoplasm contains secretory granules.
- Light staining cells.
- Secrete hormone calcitonin.





Adrenal Gland (Suprarenal Gland)

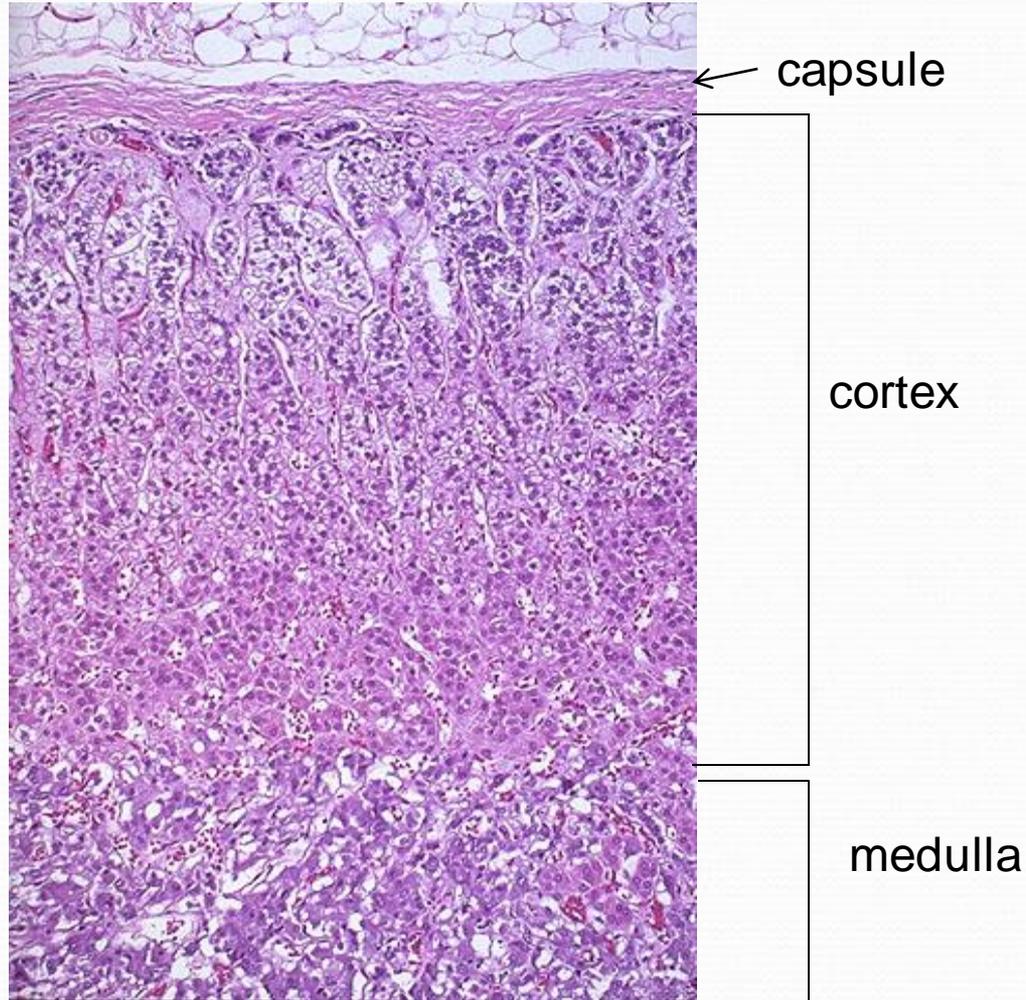


Microscopic structure (low power)

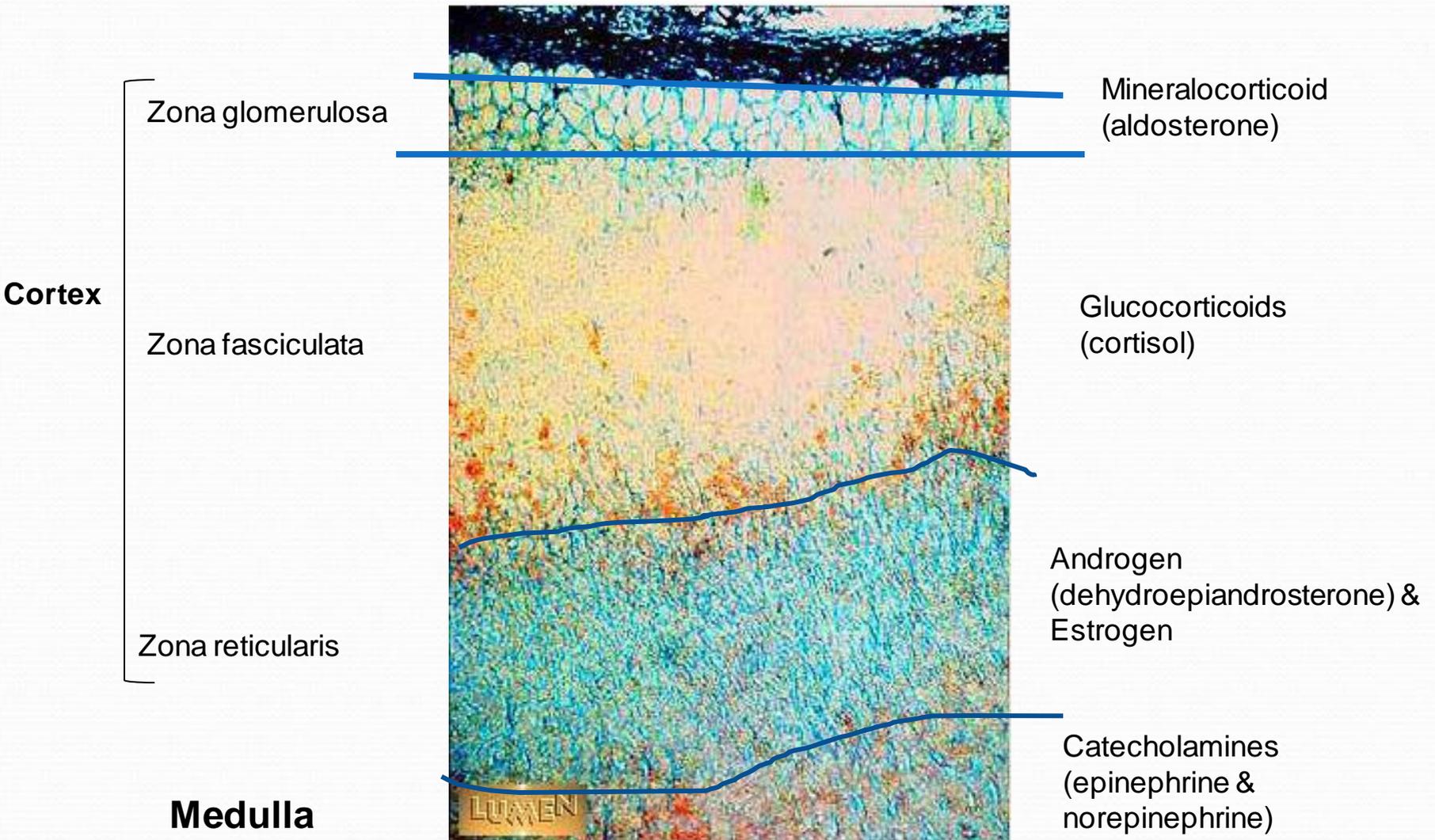
- The gland is covered by connective tissue capsule.

- Capsule sends septa inside the gland.

- 2 parts:
 - ✓ Cortex
 - ✓ Medulla



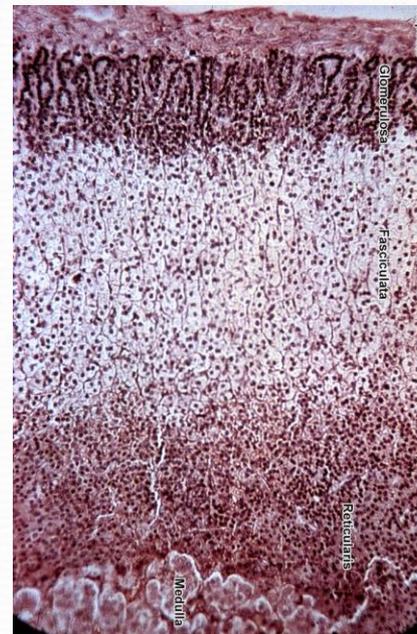
Microscopic structure (low power)

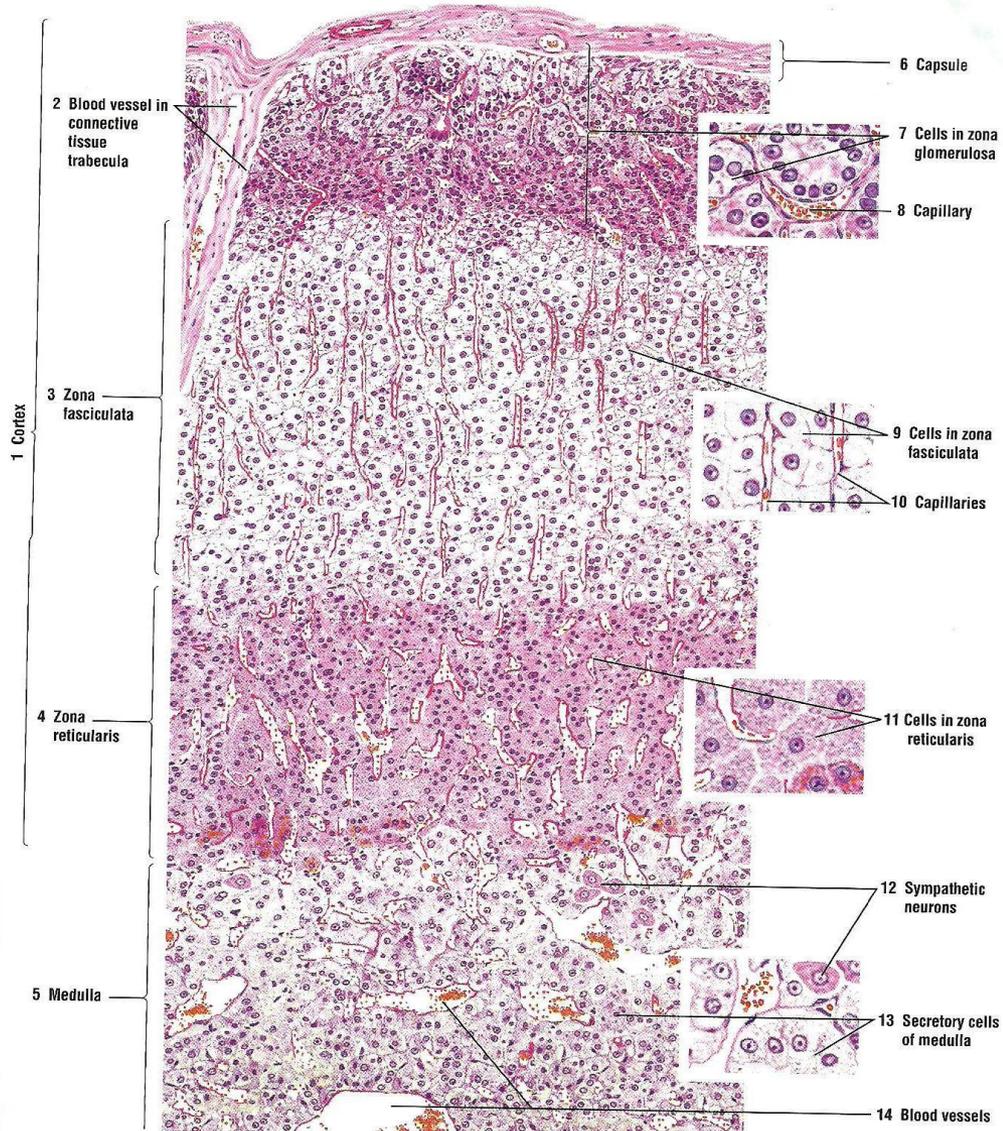


Adrenal Cortex

3 layers:

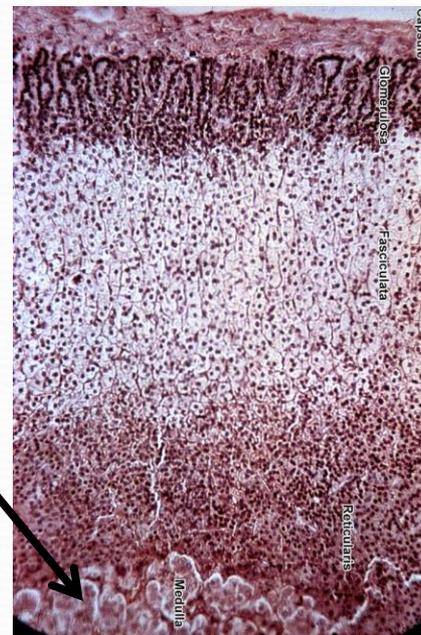
- **Zona Glomerulosa:** cells are arranged as rounded clusters separated by thin connective tissue. Cells are columnar with dark staining nuclei and acidophilic cytoplasm.
- **Zona Fasciculata:** thick zone, large pale staining polyhedral cells arranged into parallel columns 1-2 cell thick.
- **Zona Reticularis:** small rounded deep staining cells arranged in branching & anastomosing cords.





Adrenal Medulla

- Cells are large, epitheloid & arranged in groups.
- Cells are closely related to sinusoidal capillaries.
- Cytoplasm is light basophilic with H&E stain.
- **Chromaffin reaction:** Tissue fixation with potassium dichromate shows fine brown granules in the cells of medulla.



Capsule

Cortex

Medulla

References

1. diFiore's Atlas of Histology with functional Correlations, 12th Edition.
2. Textbook of Human Histology. Inderbir Singh, 1st Edition.
3. Textbook of Histology. GP Pal, 3rd Edition.

MCQ

Q1. The most numerous lingual papilla in humans are:

- a. Filiform
- b. Fungiform
- c. Circumvallate
- d. Foliate

MCQ

Q2. Parafollicular cells is a specific feature of:

- a. Pituitary
- b. Thyroid
- c. Parathyroid
- d. Suprarenal

MCQ

Q3. The epithelial lining of thyroid follicles in resting phase is:

- a. Squamous
- b. Cuboidal
- c. Columnar
- d. Transitional

MCQ

Q4. Increased amount of lipid droplets are found in cells of which zone of adrenal gland?

- a. Zona glomerulosa
- b. Zona fasciculata
- c. Zona reticularis
- d. All of the above

MCQ

Q5. Chromaffin reaction is depicted by which endocrine gland?

- a. Pituitary
- b. Thyroid
- c. Parathyroid
- d. Suprarenal

MCQ

Q6. Portal triad consist of all except:

- a. Branches of portal vein
- b. Branches of hepatic artery
- c. Central vein
- d. Bile duct

MCQ

Q7. Space of Disse is present:

- a. Between sinusoidal epithelium and hepatocytes
- b. Between portal triad and hepatocytes
- c. Around central vein
- d. Between two adjacent plates of hepatocytes

MCQ

Q8. Centroacinar cells are a characteristic feature of:

- a. Liver
- b. Pancreas
- c. Tongue
- d. Thyroid

MCQ

Q9. Endocrine unit of pancreas is:

- a. Pancreatic acini
- b. Islets of Langerhans
- c. Von Ebner glands
- d. Centroacinar cells