

# **SALIVARY GLAND**

# Salivary glands

## Major salivary glands:

- Include parotid, submandibular and sublingual glands. They produce 95% of the total salivary output.

## Minor Salivary glands:

- Located in submucosa of oral cavity (lips, cheeks, tongue and palate). 5% of the total salivary output is produced by these glands.
- Minor glands are mucous glands except von Ebner's glands of tongue.

# GENERAL STRUCTURE OF SALIVARY GLANDS

## STROMA

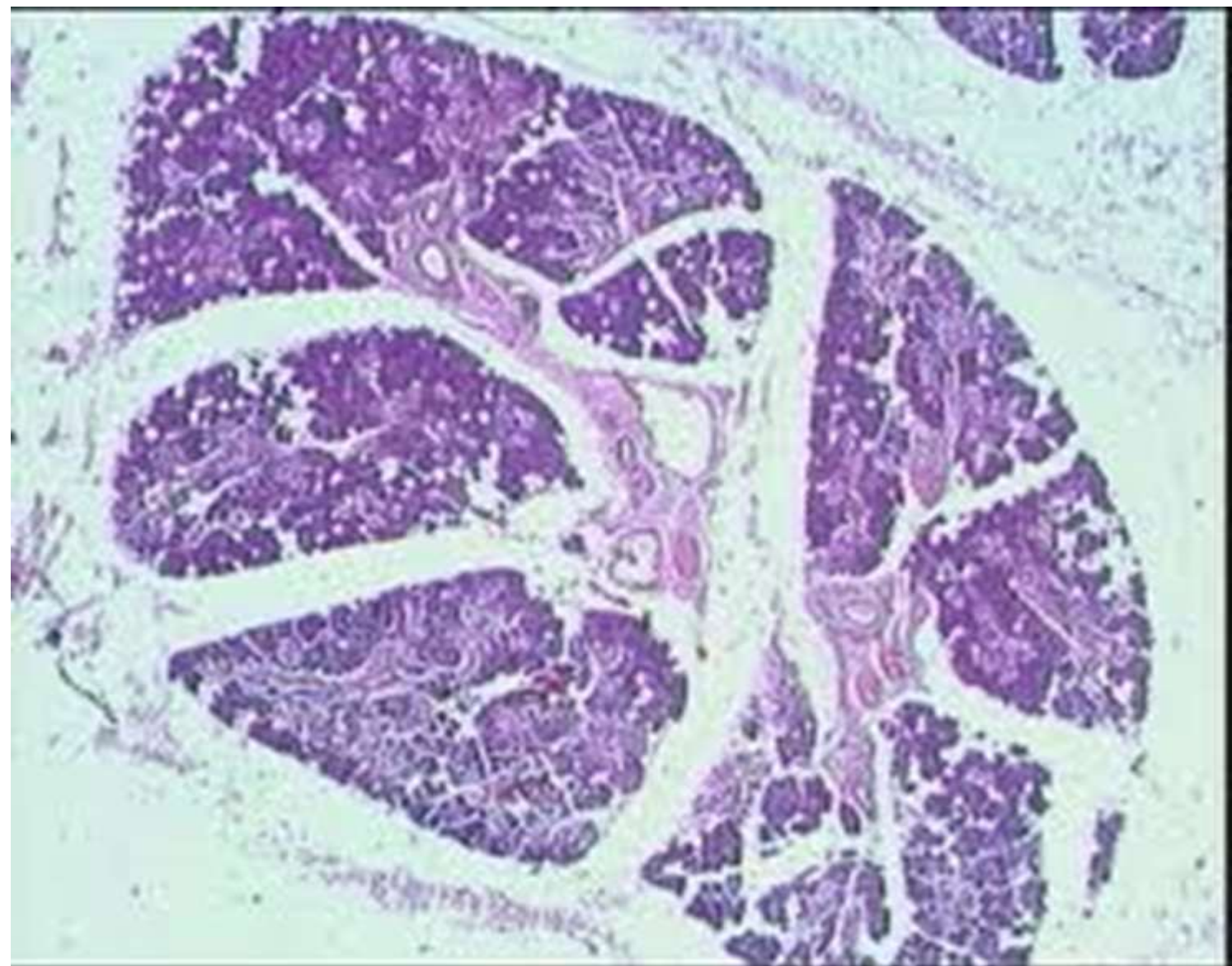
- Capsule
  - Septa
  - Blood vessels, lymphatic vessels & nerves
  - Ducts
  - Lobule

## PARENCHYMA

- Acini
- Duct system

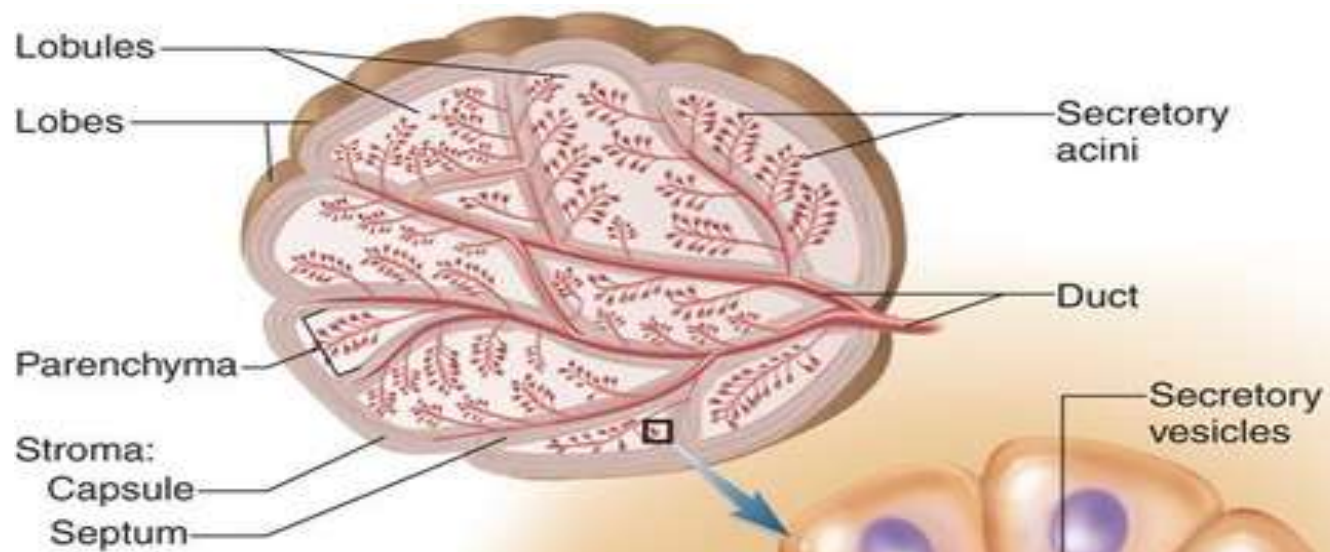
# Stroma

- Each gland is surrounded by a connective tissue capsule.
- From capsules, multiple septae are thrown inwards to divide the parenchyma into incomplete lobules.
- Within each lobule many secretory acini are surrounded by fine loose C.T.
- Blood vessels, lymphatic vessels, nerves and excretory ducts travel through septa.

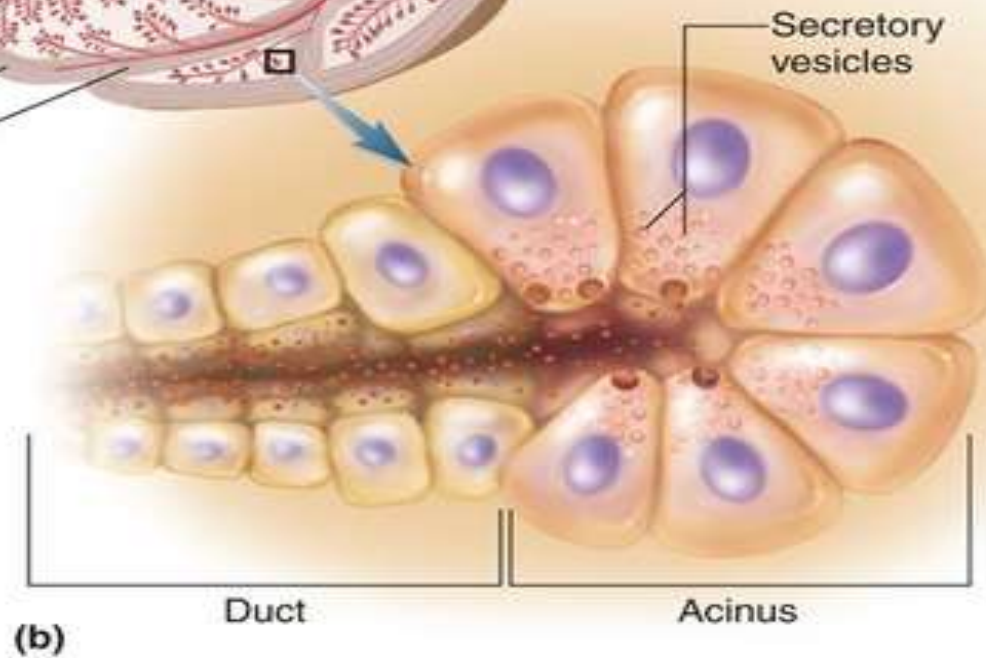


# Parenchyma

- Glands are tubuloacinar variety.
- Acini consists of secretory cells which have a lumen in center which continues into the duct.
- Serous, mucous or mix.
- Myoepithelial cells lie between plasmalemma and basal lamina of secretory cells.

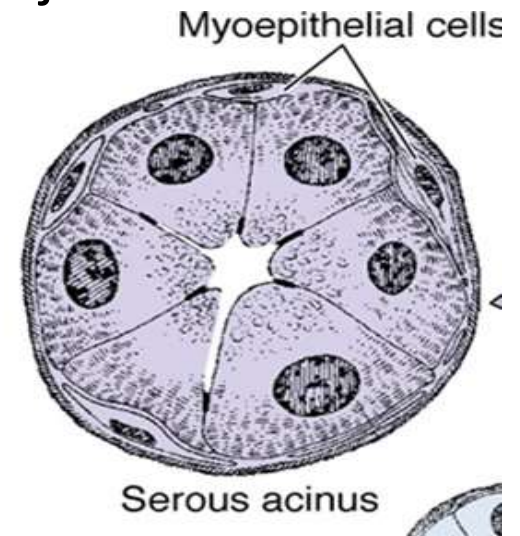


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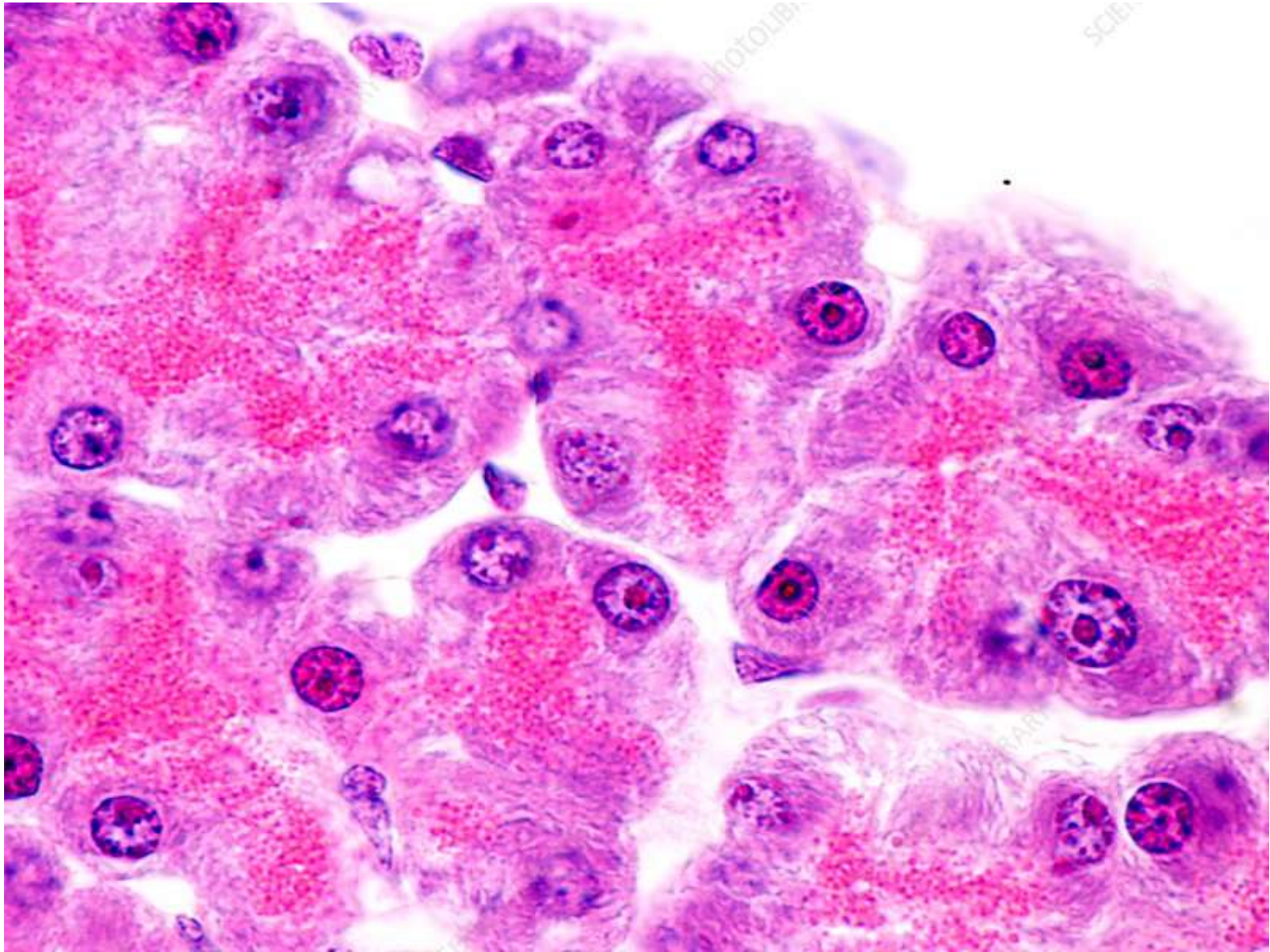


# Serous Cell

- Pyramidal cells.
- Broad end facing the basement membrane and narrow end facing lumen.
- Basal region has rounded nucleus.
- Apical region : zymogen granules , so apical region is acidophilic the basal region stains basophilic.
- Intercellular canaliculi present between the adjacent serous cells.
- Serous cell produce thin watery secretion.

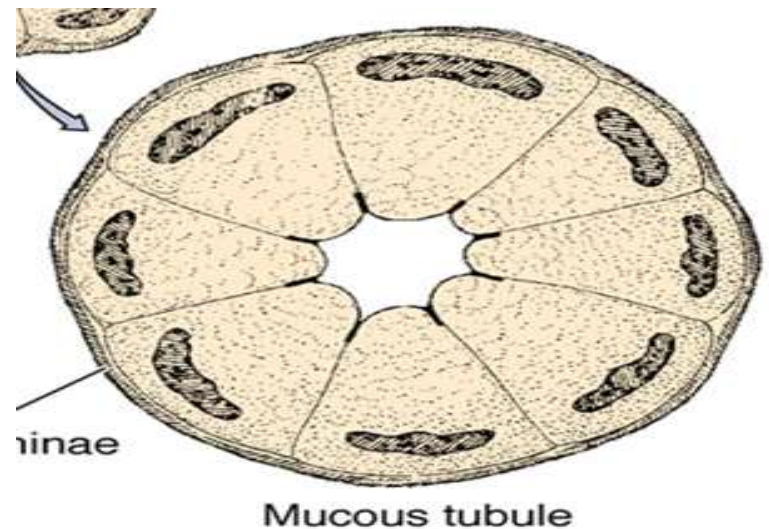


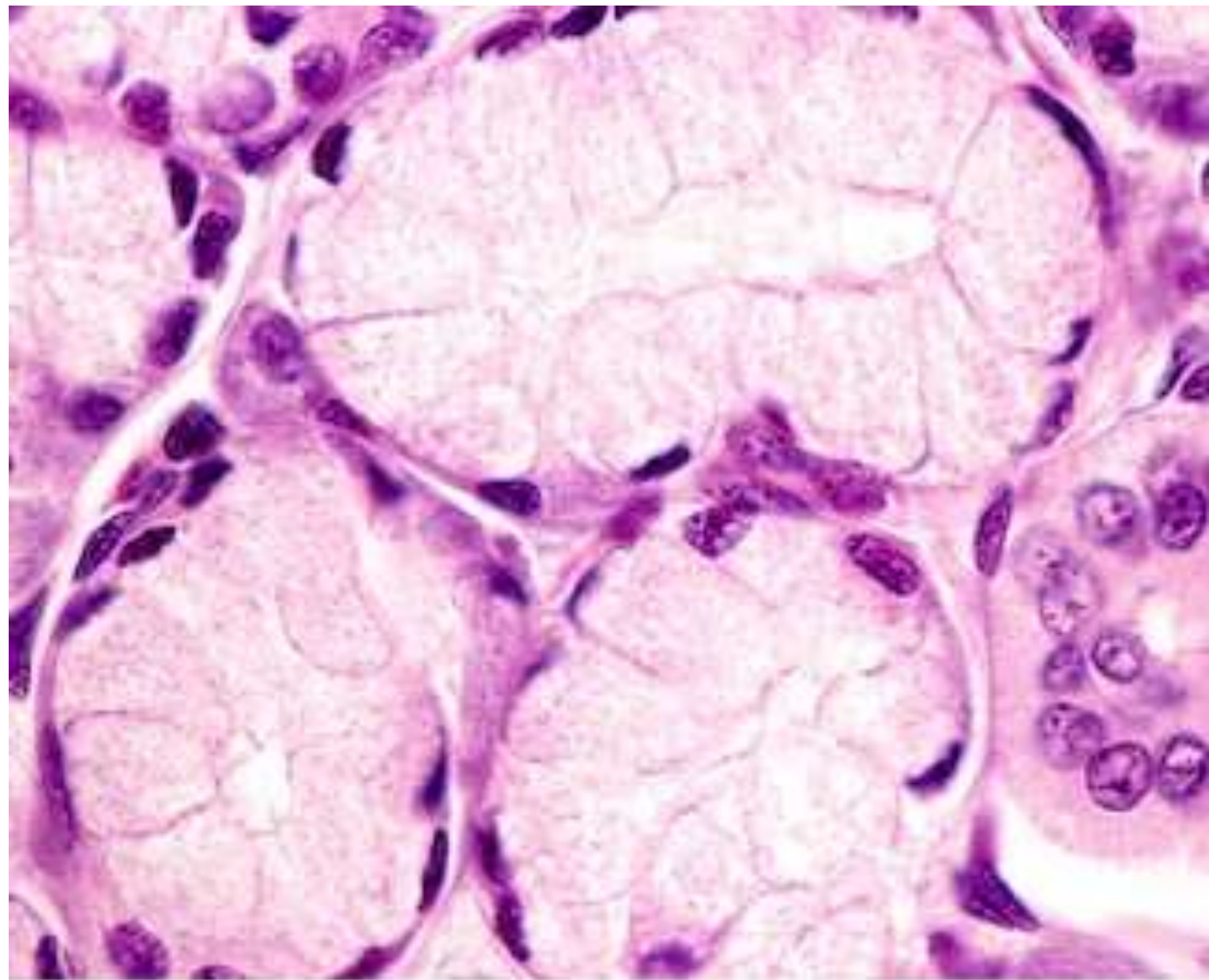




# Mucous Cell

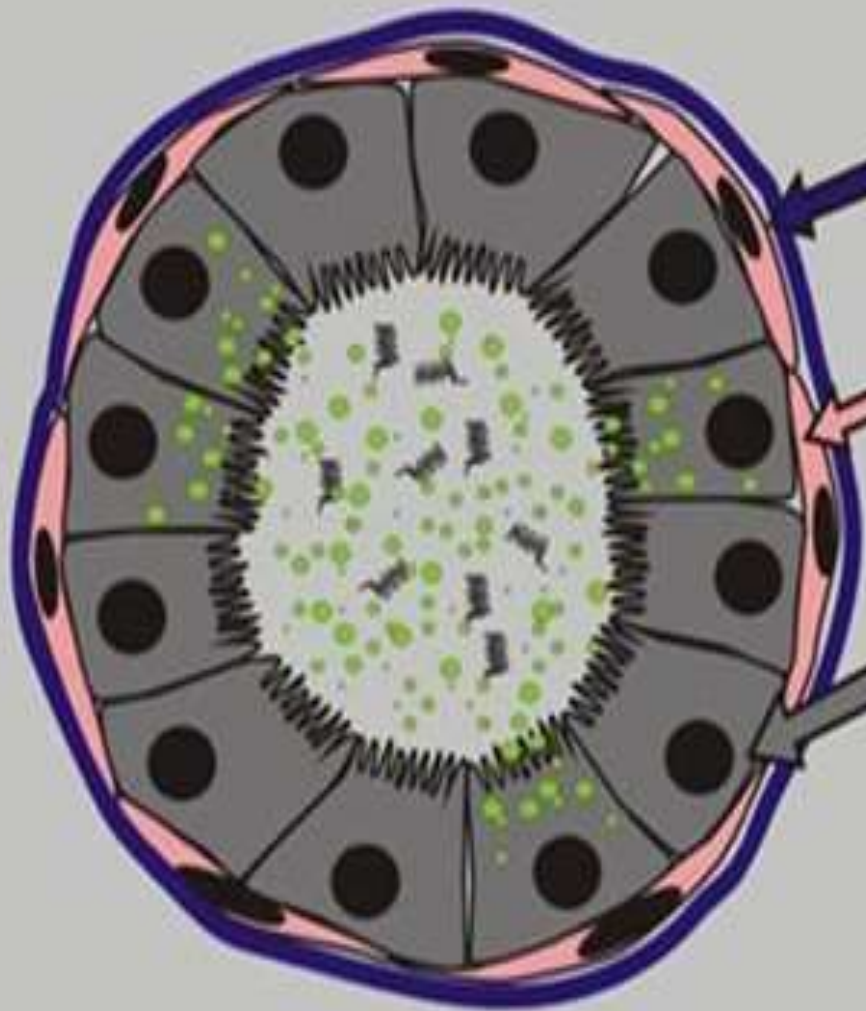
- Pyramidal or low columnar cells with basal flattened nuclei.
- Apical region has mucinogen granules.
- In H&E stained the mucous cell stain poorly and look like empty.
- Do not exhibit intercellular canaliculi.
- Cells secrete mucin which on contact with water form mucous.





# Myoepithelial Cell

- Myoepithelial cells have a stellate, multiprocessed morphology in three dimensions and form a contractile meshwork, which encloses secretory units of glands.
- Present between the basal lamina and basal plasmalemma of mucous / serous acini.
- These cells stain poorly and cannot be seen easily under LM.
- These are contractile .
- Contractions help to squeeze out secretion from alveoli



Basement  
Membrane (BM)

Myoepithelial Cell  
(MEP)

Luminal Epithelial  
Cell (LEP)

# Duct system

The salivary ducts are classified into three types:

- Intercalated ducts
- Striated ducts
- Excretory ducts.

# Intercalated ducts

- Smaller diameter
- Lined by simple cuboidal cells and nucleus is located in the center
- Myoepithelial cells are also present
- Intercalated ducts are long in parotid and submandibular glands but short in sublingual gland.

# Striated ducts

- Several intercalated ducts open into a striated duct which is lined by simple columnar epithelium.
- Centrally located nucleus
- Eosinophilic cytoplasm and shows **basal striations** (Indentations of the cytoplasmic membrane with many mitochondria present between the folds)
- Intercalated and striated ducts within lobules are called intralobular ducts.



# Excretory ducts

- The interlobular ducts join to form interlobar ducts that ultimately drain into the main duct of gland.
- The interlobular , interlobar and main duct are purely excretory ducts.
- **Interlobular ducts** is lined by simple cuboidal epithelium, **interlobar duct** is lined by pseudostratified columnar epithelium.
- The main duct is lined by stratified columnar epithelium and then change into stratified squamous nonkeratinized at its opening.

# Duct System

## Intercalated Ducts:

- Simple cuboidal epithelium

## Striated Duct:

- Simple columnar epithelium & show Radial striations

## Interlobular:

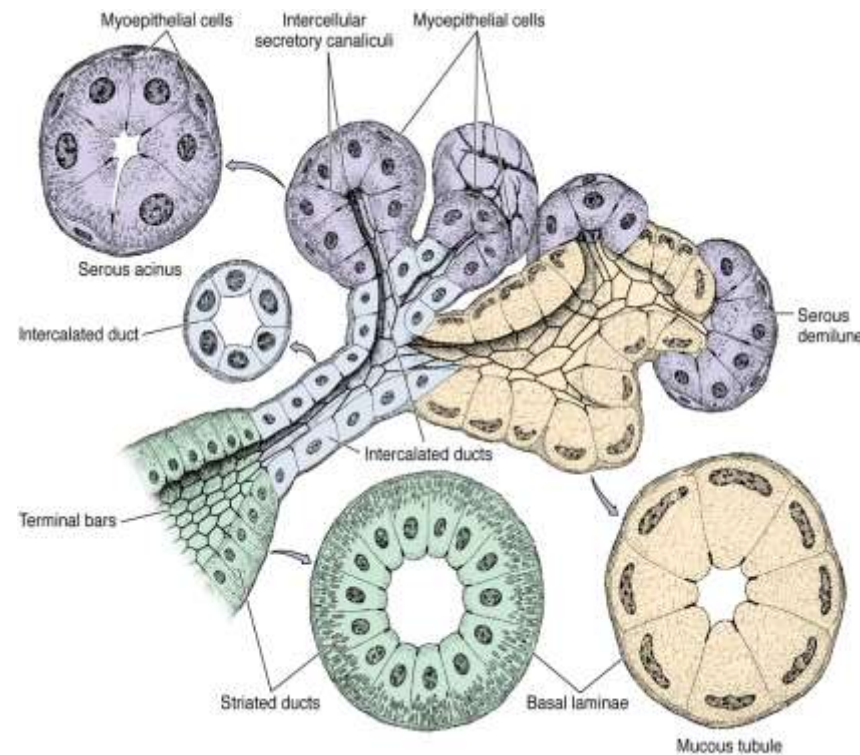
- Simple cuboidal epithelium

## Interlobar:

- Pseudostratified columnar

## MAIN DUCT

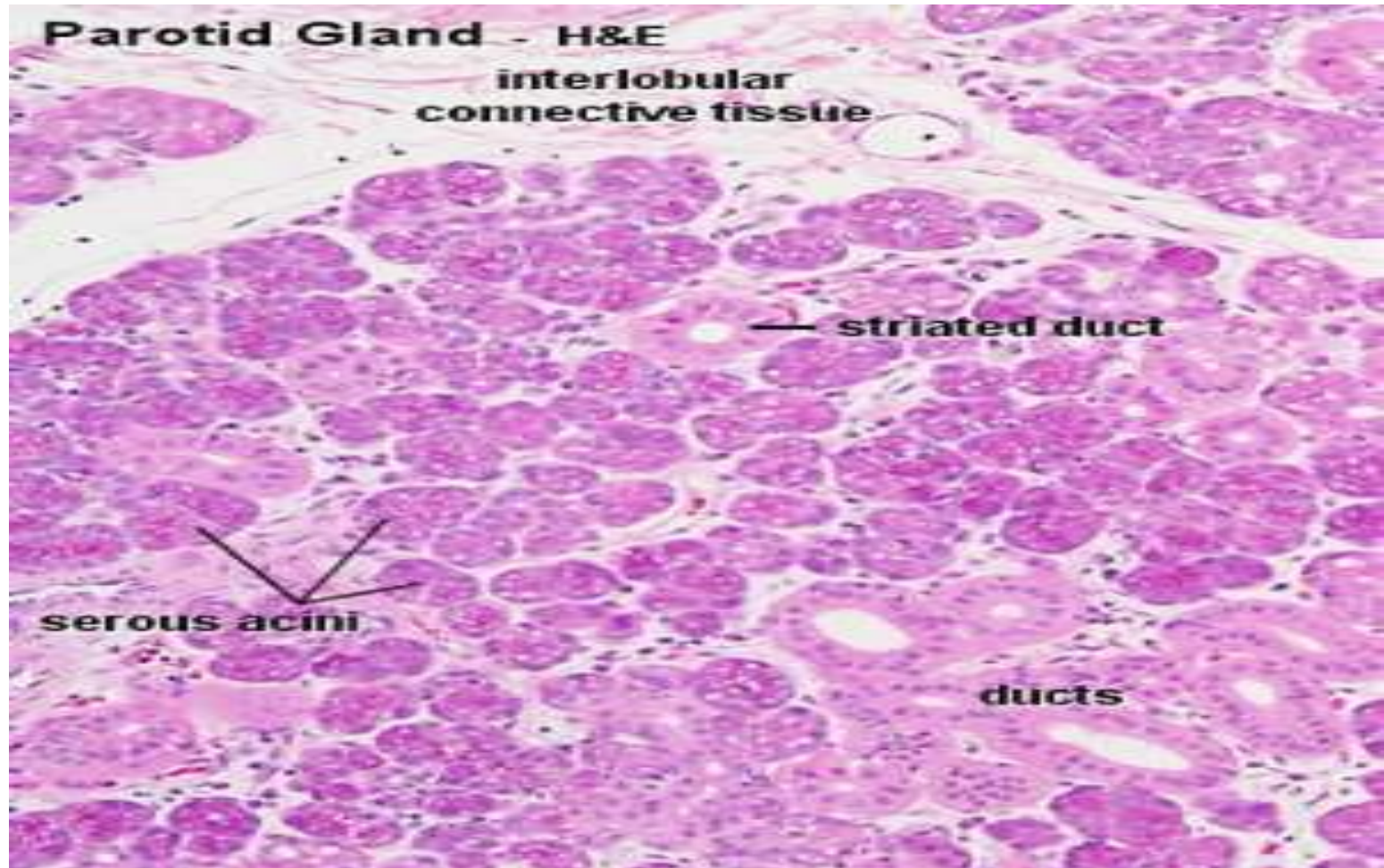
- Stratified columnar and stratified squamous non keratinized epithelium.



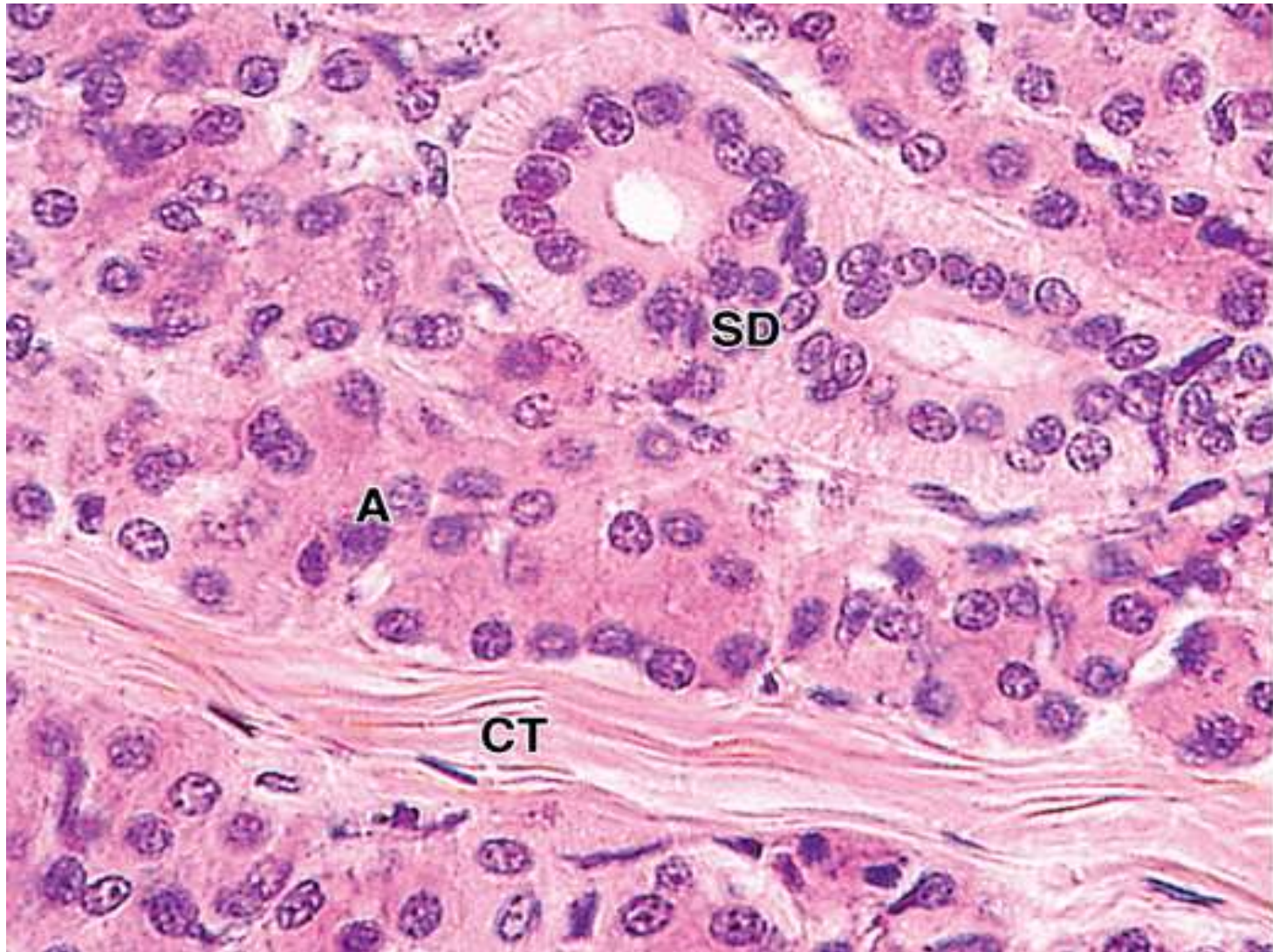
# Parotid Gland

- Largest salivary gland
- Compound tubuloacinar gland
- Purely serous
- Covered by connective tissue capsule from which several septa pass and divide the gland into lobes and lobules.
- Parenchyma consist of only serous acini.
- Secretory product is thin and watery like contains  $\alpha$  amylase which initiate the breakdown of carbohydrate.

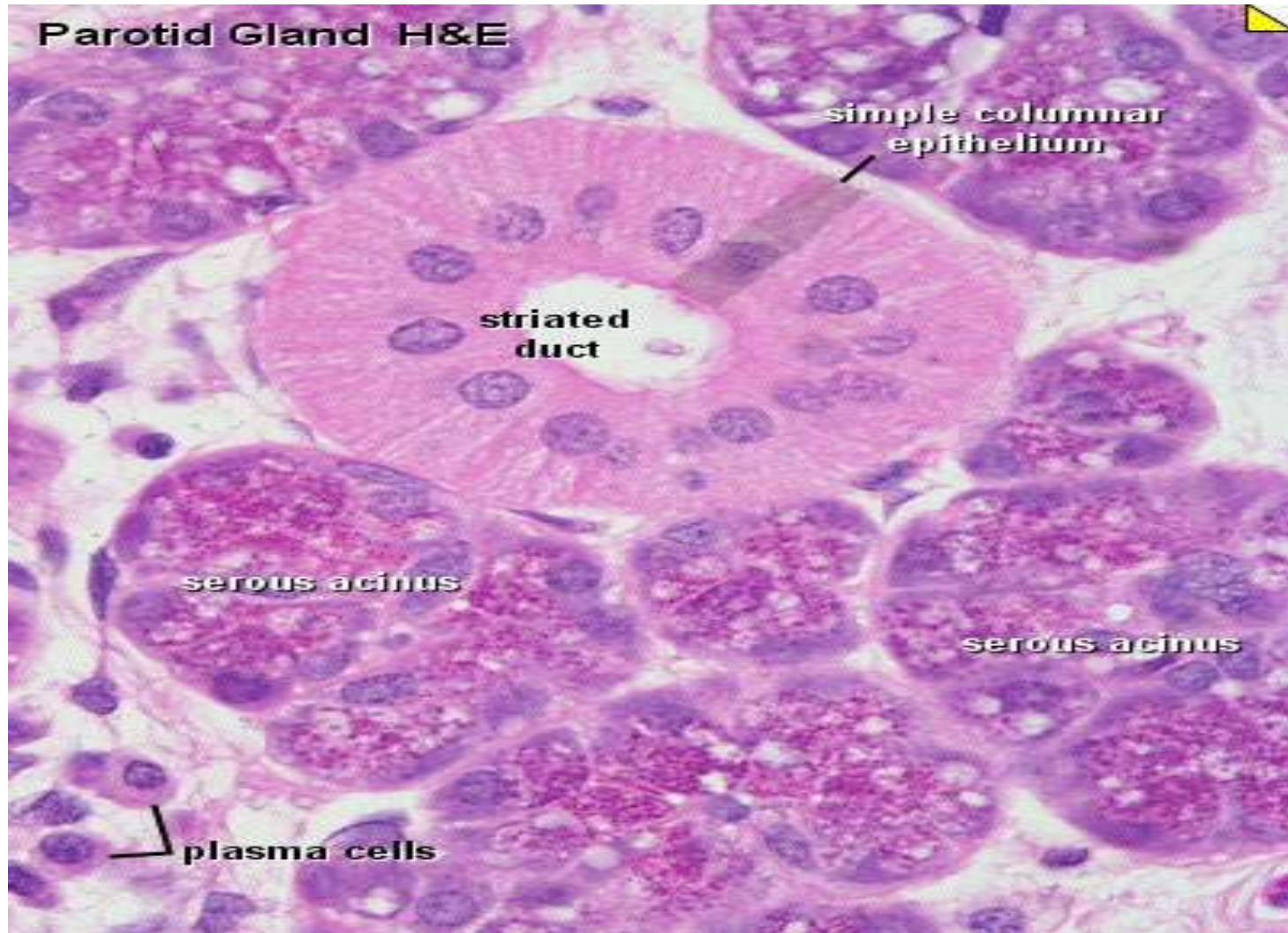
# Parotid Gland



# Parotid Gland



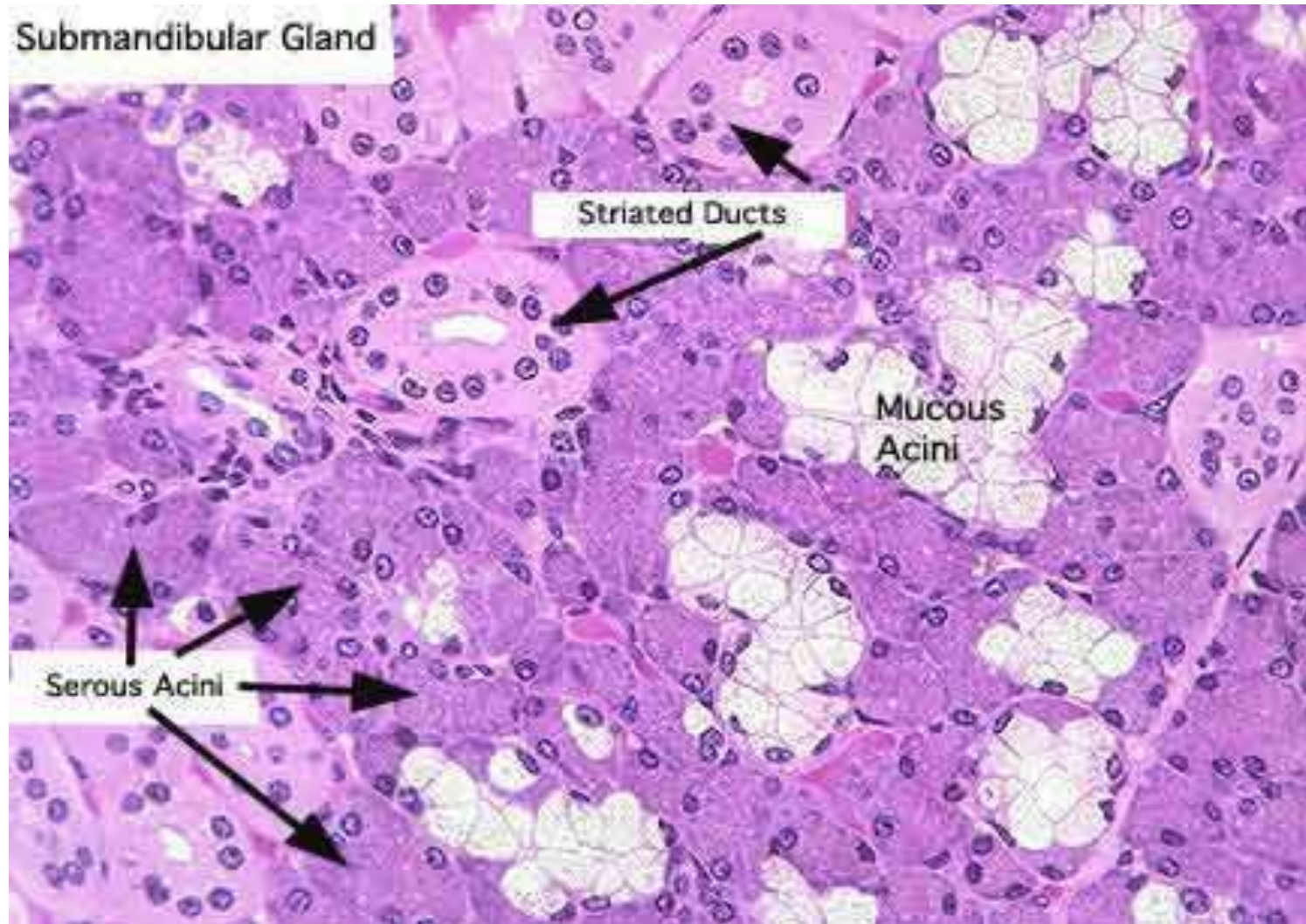
# Parotid Gland



# Submandibular Gland

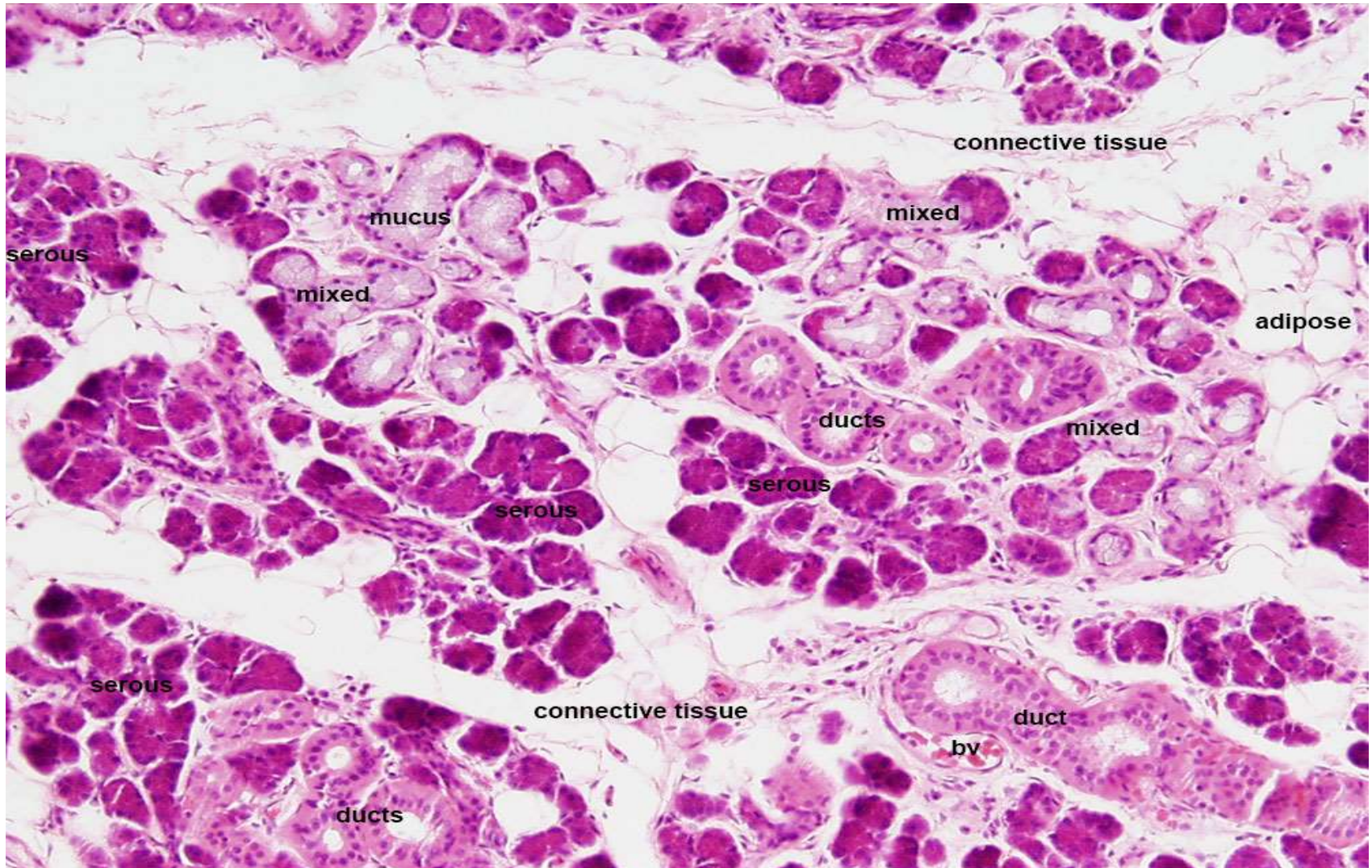
- Compound tubuloacinar gland of mixed variety.
- 90% of its parenchyma consists of **serous acini**.
- Some of mucous acini bear caps of serous acini known as ***Serous demilunes***, crescent shaped appearance .
- Connective tissue capsule is well developed and send septa that divide into lobes and lobules.
- The secretory product is mucin, lysozyme and  $\alpha$  amylase.

# Submandibular Gland

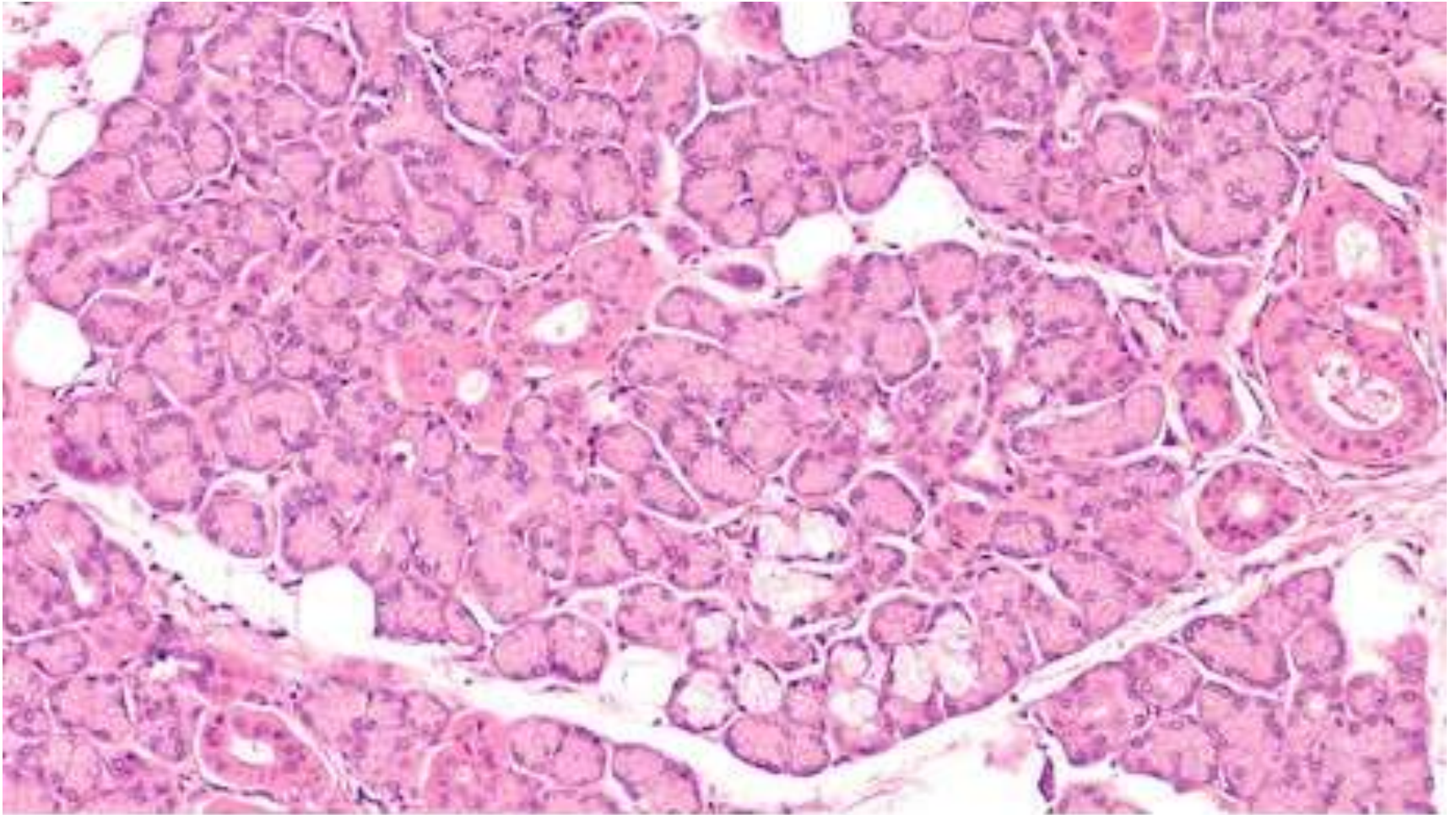




# Submandibular Gland



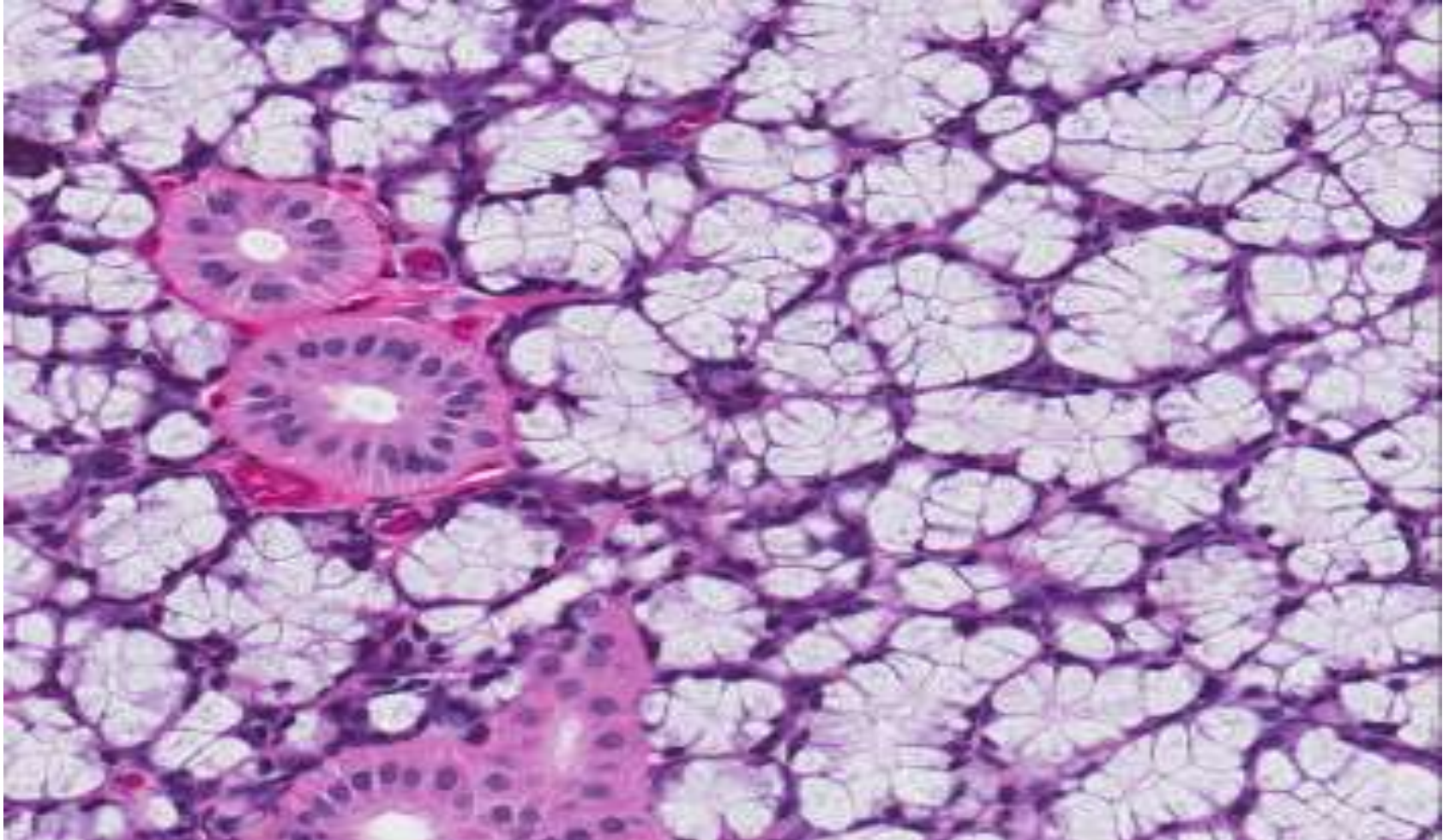
# Submandibular Gland



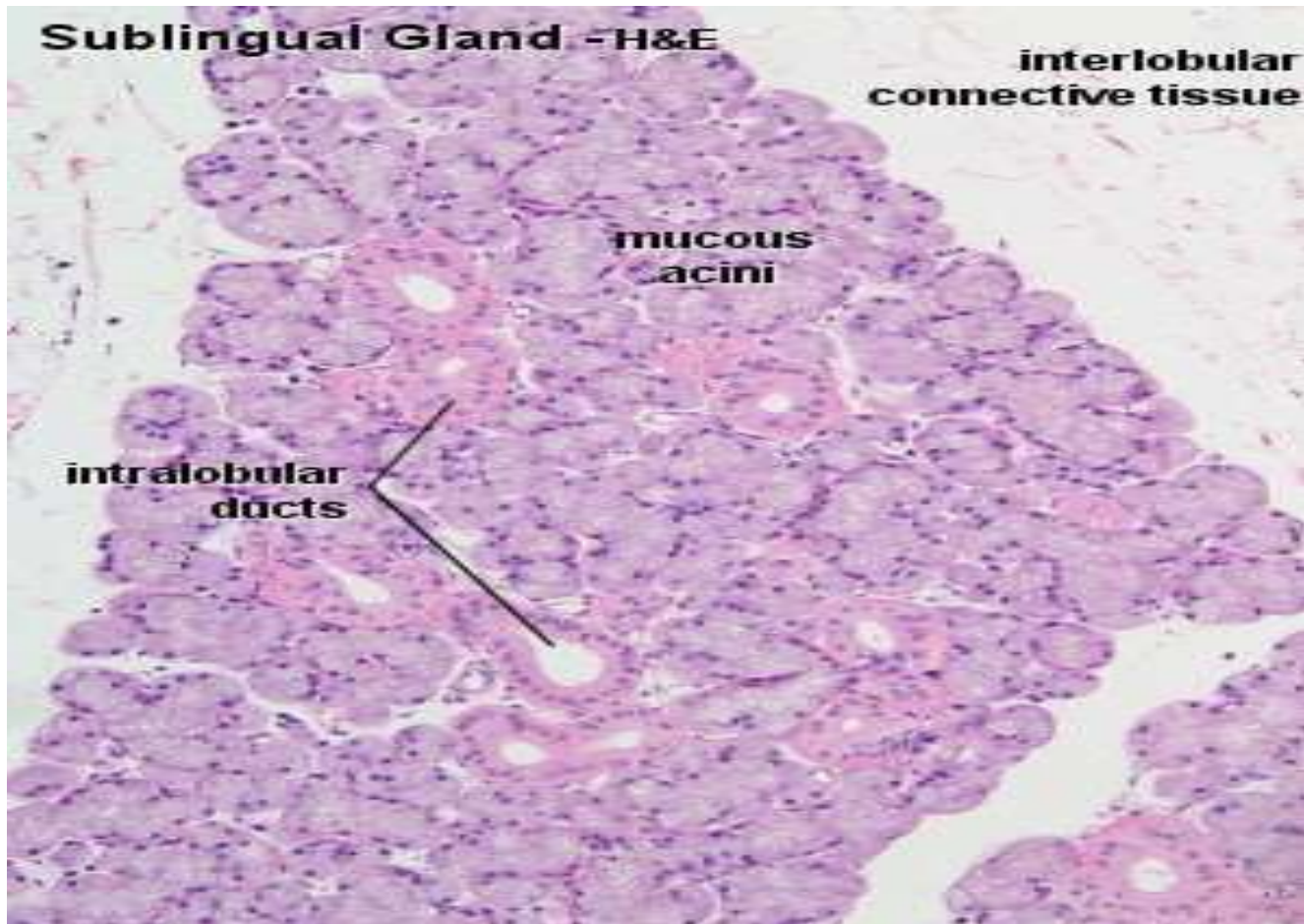
# Sublingual Gland

- Compound tubuloacinar gland of mixed variety but secretion is predominantly mucous in nature.
- Parenchyma consists of mainly **mucous acini**.
- Serous demilunes also present.
- Intercalated and striated ducts are short and difficult to identify.
- Sublingual gland produces only 5% of total salivary output.
- The secretory product is mucin, and  $\alpha$  amylase.

# Sublingual Gland



# Sublingual Gland



# Pancreas

- A mixed exocrine and endocrine gland.
- Major part is made up of exocrine gland.
- A thin connective tissue sends in septa that divide into lobules.
- Blood vessels, nerves and ducts travel in the connective tissue septa.

# Exocrine Pancreas

- Is purely serous gland of compound tubuloacinar.
- The secretory units of exocrine pancreas consist of serous cell.
- The basal region of cell stain basophilic and the apical region contains zymogen granules which stain acidophilic.
- The centroacinar cells are found close to the apical part of serous cells and represent the initial segment of intercalated duct.

# Duct System

Consist of

❖ Intercalated ducts

❖ Intralobular ducts

❖ Interlobular ducts

❖ Main ducts

➤ The intercalated ducts begins within the center of the acinus, are seen as pale staining ,low cuboidal cells are called centroacinar cells.



- Several intercalated ducts form intralobular ducts which converge to form interlobular ducts that run in the interlobular connective tissue.
- Both the intralobular and interlobular ducts are lined by a simple low columnar epithelium.
- Main pancreatic duct is lined by stratified columnar epithelium.

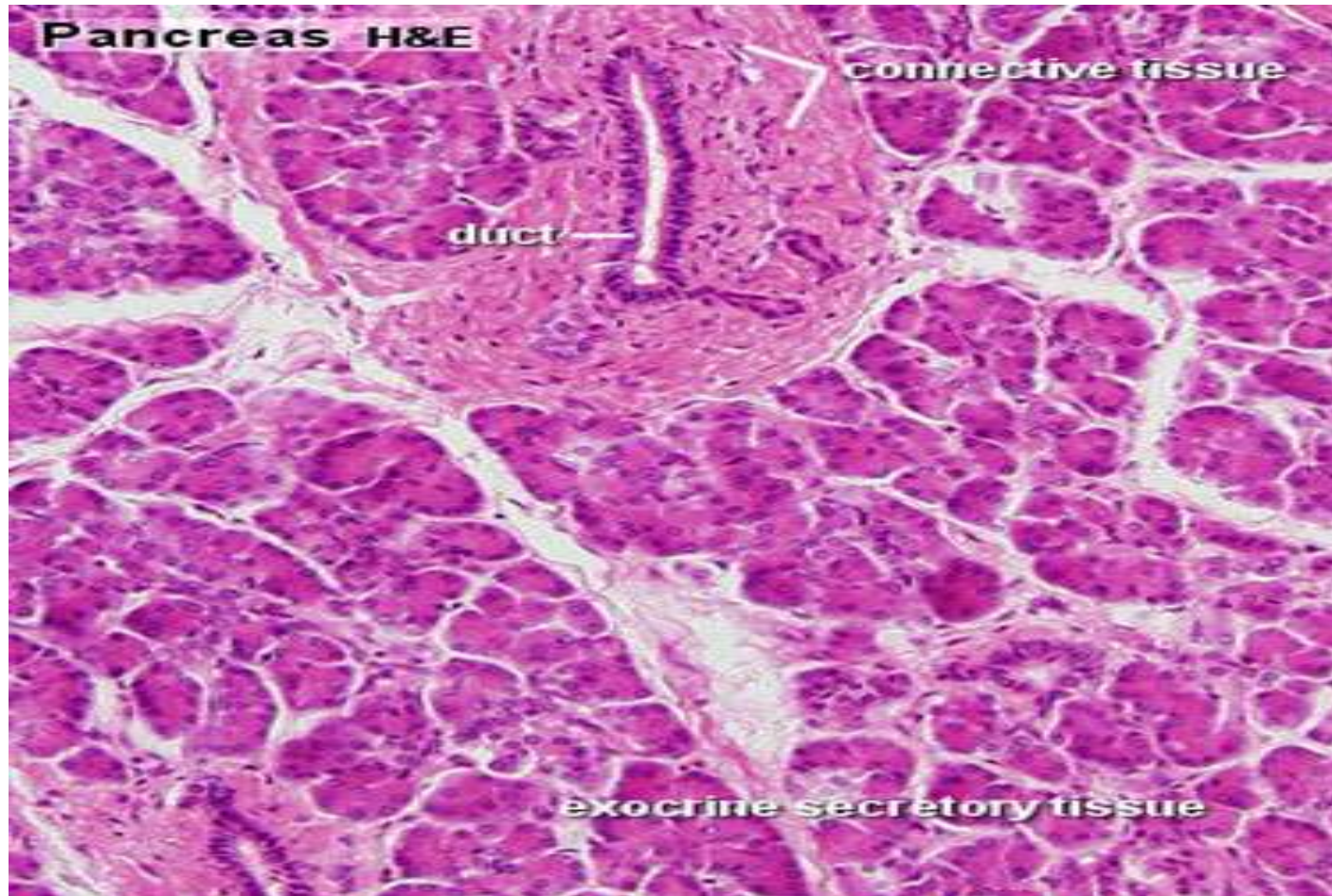
# Endocrine Pancreas

- It consist of small, spherical cluster of cells called Islets of Langerhans or pancreatic islets.
- The islets of langerhans are present randomly among the serous acini of pancreas.
- A thin layer of connective tissue surrounds each pancreatic islet, separating it from the exocrine part.

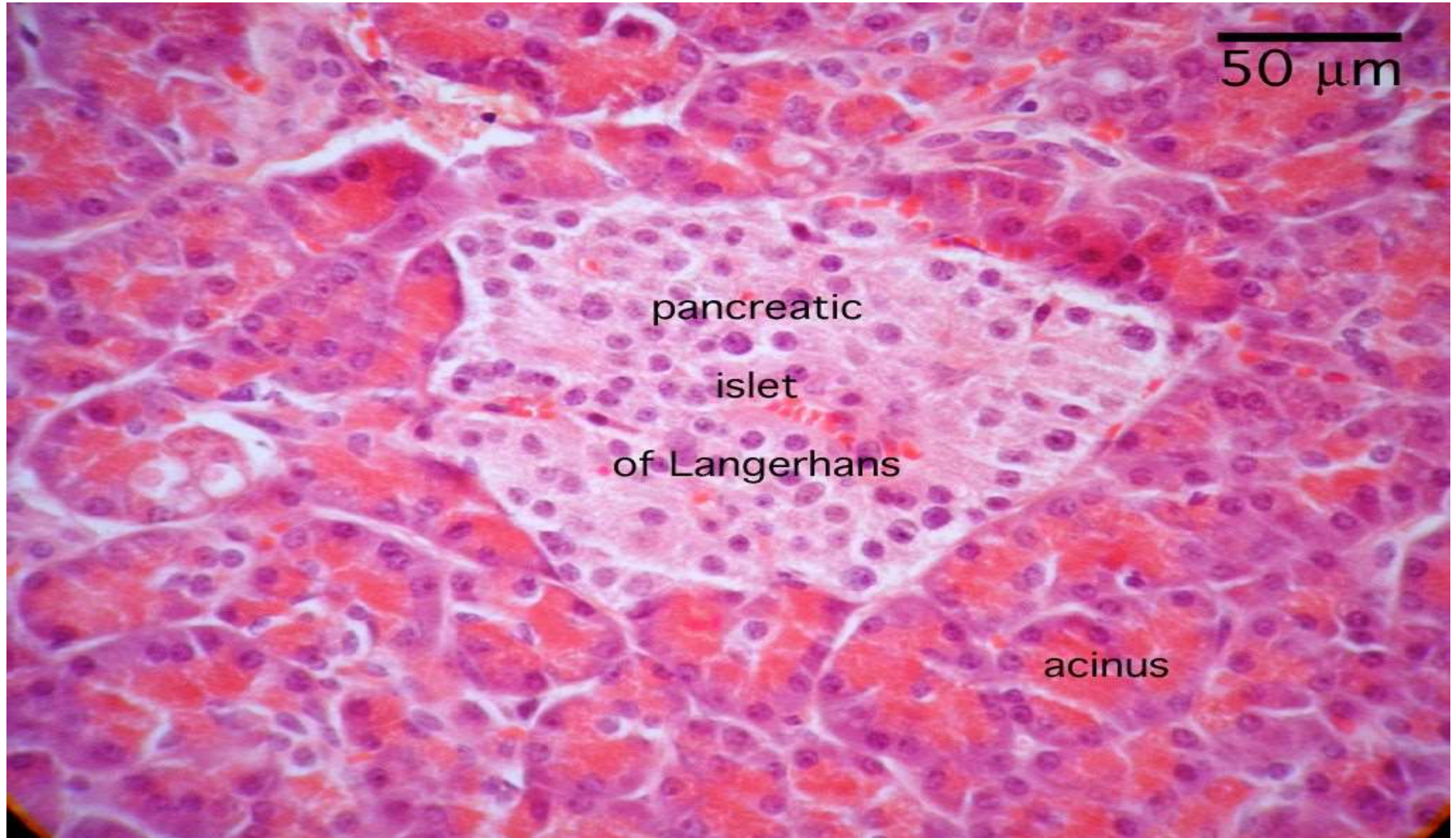
- The islet cells are arranged in short , irregular cords separated by a network of fenestrated capillaries.
- In H&E stain, the cells of islet appear lightly eosinophilic.
- The pancreatic islet cells are classified into three major types.
  - ❖ A cells
  - ❖ B cells
  - ❖ D cells.

- The A cells produce glucagon
- The B cells are predominant, making up about 70% of the islet mass ; they produce Insulin.
- The D cells produce somatostatin.

# Exocrine Pancreas



# Islet of Langerhans



# Pancreas

