Medical Biology

Glandular Tissue

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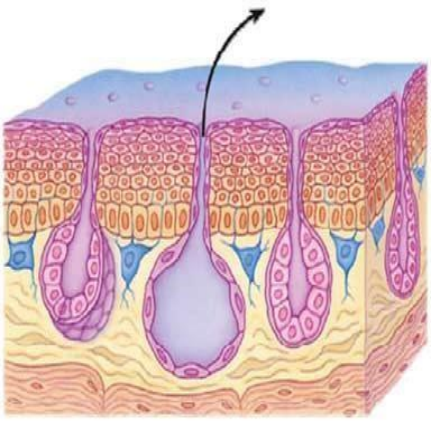
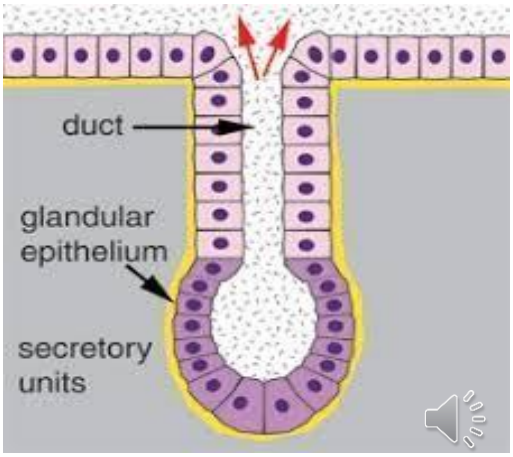
Glandular tissue

Glandular tissue is the type of epithelium that covers the glands, the main function is secretion.





Classification of glands:

1-According to their secretion, there are two major classifications of glands: exocrine glands and endocrine glands.

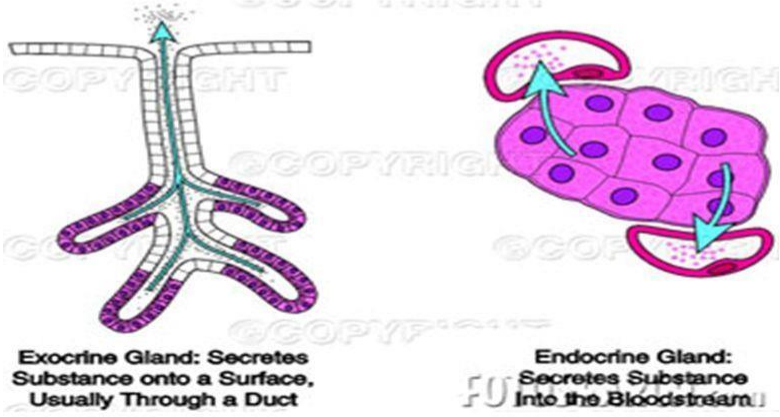
- **Exocrine glands: secrete their products into a duct that then delivers the product to the lumen of an organ or onto epithelial surface or body cavities such as sweat, oil, mucous and salivary glands.**

Endocrine glands: secrete their product into the extracellular space where it is rapidly taken up by the blood vascular system such as thyroid, pancreas and adrenal glands.

Type of glandular epithelium

Endocrine gland:

Exocrine gland:



2-According to their structure, the glands classified to:

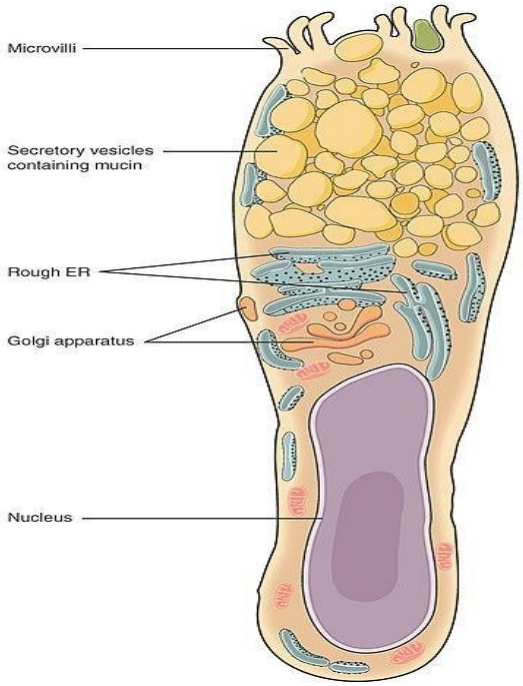
1- Unicellular glands : such as goblet cell which produce mucin, a complex glycoprotein that dissolves in water to form mucus.

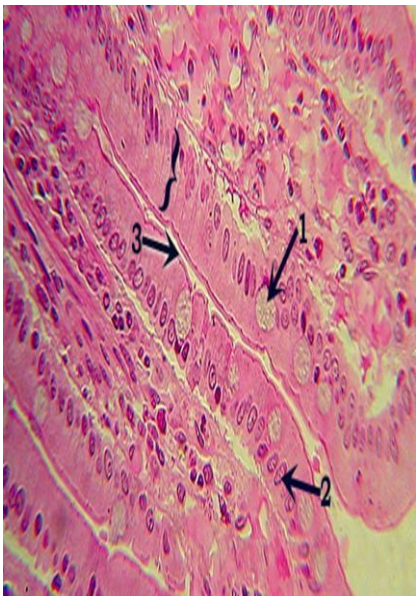
2- Multicellular glands:

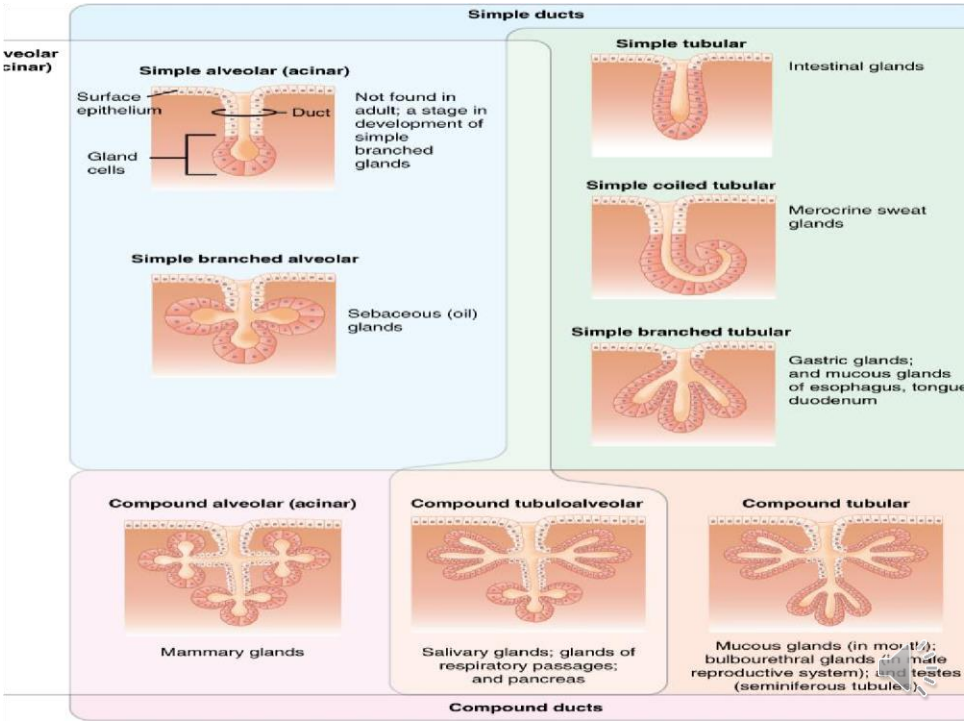
A-Simple multicellular glands

- **Simple tubular glands**
- **Simple coiled tubular glands**

- **Simple branched tubular glands**
- **Simple alveolar glands**
- **Simple branched alveolar**

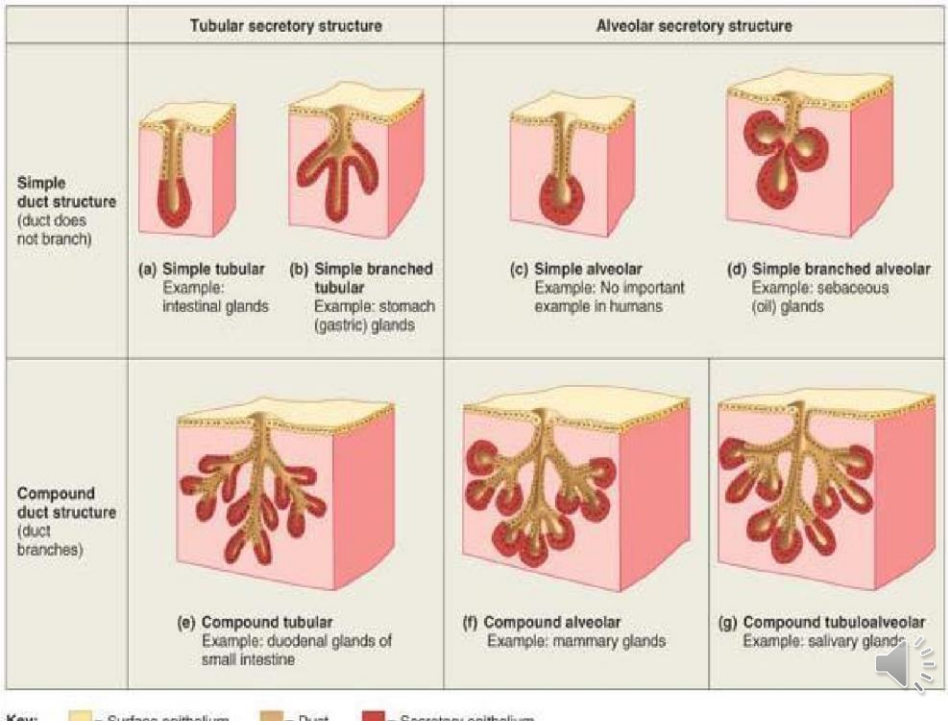






B- Compound multicellular glands

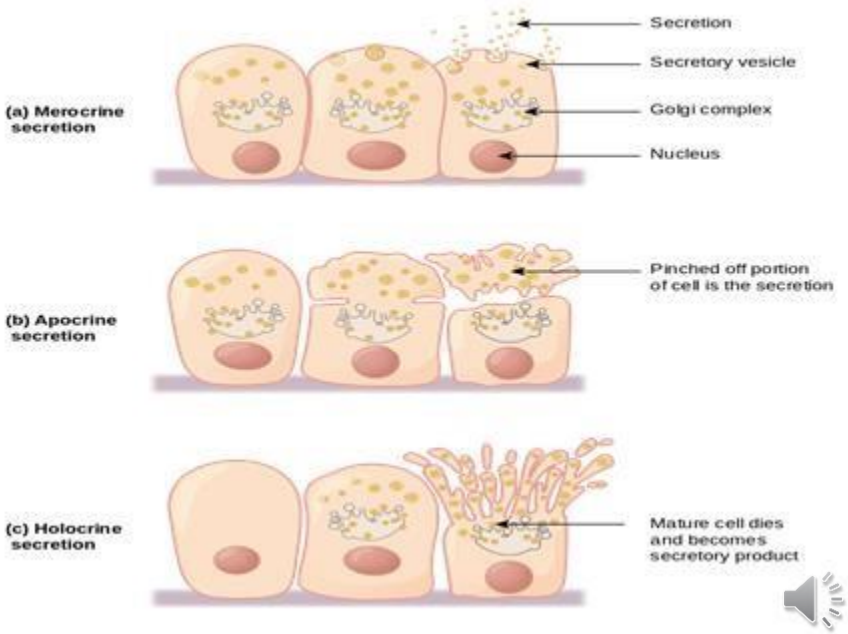
- **Compound tubular glands**
- **Compound alveolar glands**
- **Compound tubuloalveolar glands**



3-According to the mode of secretion, the glands are:

(a) Merocrine glands: Secretions products are secreted by exocytosis, but the secrotary cells are not altered. Example: pancreas, sweat, and salivary glands

(b) Apocrine glands: Secretions off through the plasma membrane producing membrane-bound vesicles in the lumen. The apical portion of the secretory cell of the gland pinches off and enters the lumen. It loses part of its cytoplasm in their secretions, example: mammary glands.



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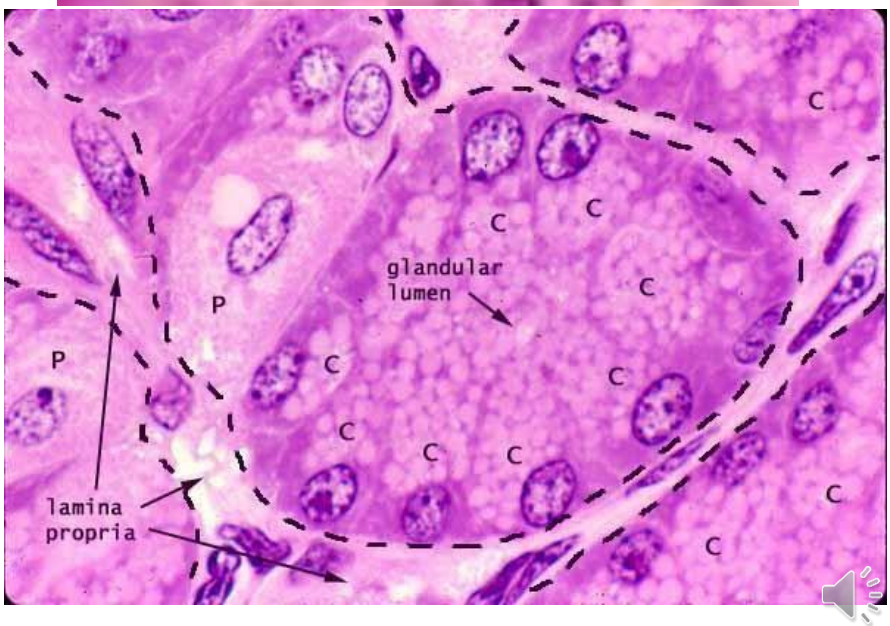
(c) Holocrine glands: Secretions are produced in the cytoplasm of the cell and released by the rupture of the plasma membrane, which destroys the cell and results in the secretion of the product into the lumen. Examples of holocrine glands include the sebaceous glands.

4-According to the nature of secretion, the glands classified as following:

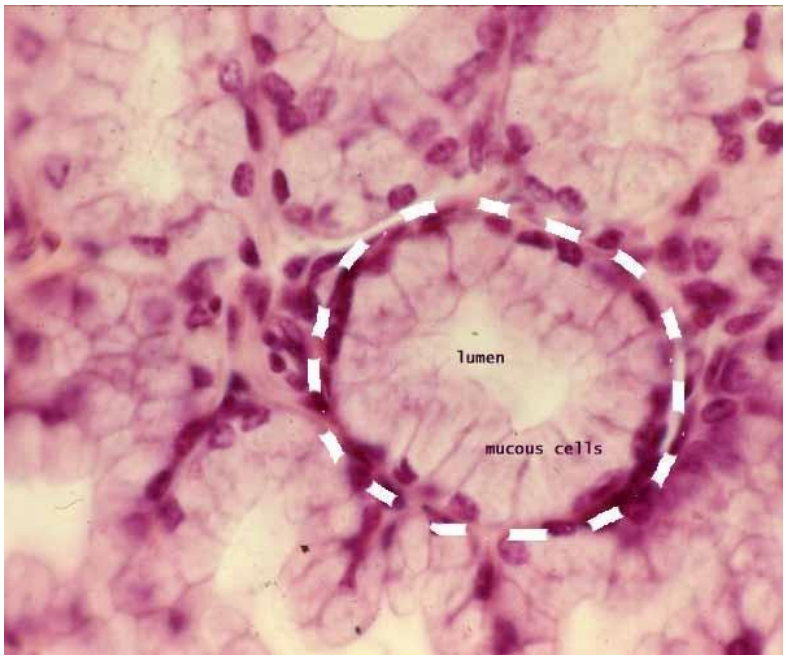
1- Serous cell glands:

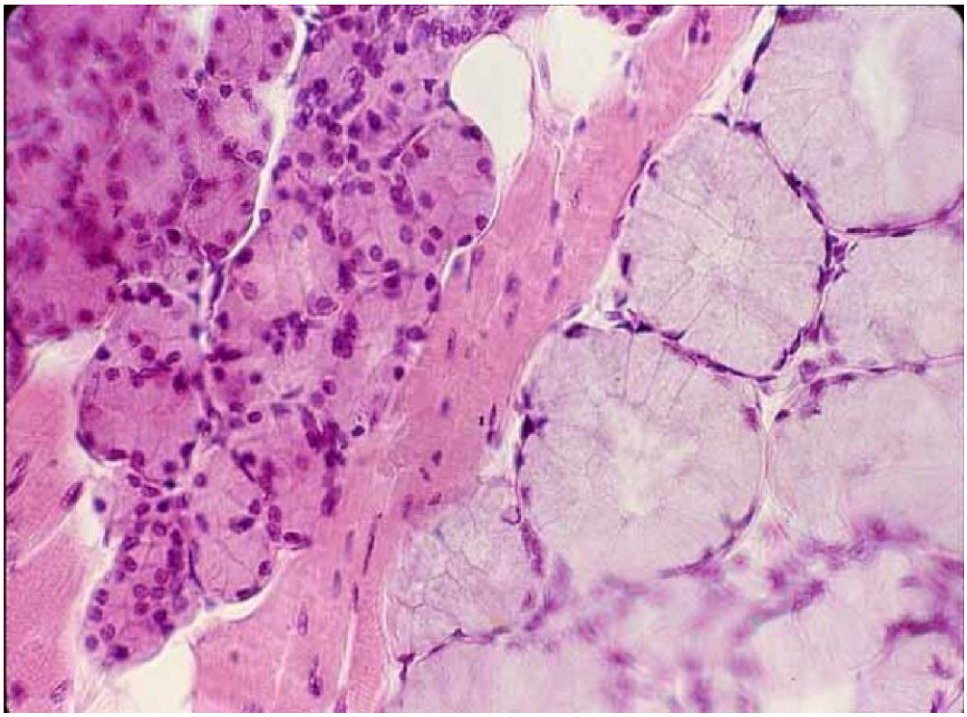
- **Serous alveoli are polyhedral or pyramidal cells arranged around a small visible lumen with central, rounded nuclei.**
- **produce watery solution rich in enzymes, the basal region, serous cells display an intense basophilia, which results from large accumulations of rough endoplasmic reticulum (rER) and free ribosomes.**
- **while in the apical region, serous cells contain prominent Golgi apparatus and numerous rounded, protein-rich, membrane-bound vesicles called secretory granules, these cells that produce digestive enzymes which called zymogen granules.**
- **E.g: parotid glands and pancreas.**



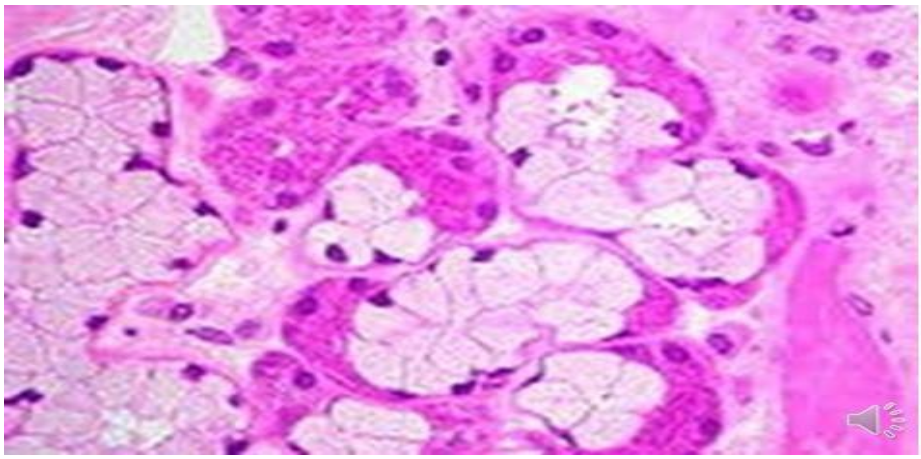
2- Mucous cell glands:

- **Mucous alveoli larger than serous alveoli, the mucous cells are pyramid shape with flattened nuclei which located in the cell base and larger lumens.**
- **mucous cell produce mucous poor in enzymes e.g. goblet cells and minor salivary glands.**





3- Seromucous glands (Mixed): It mixed of mucous alveoli surrounded by one or more groups of serous, it produce both types of secretions e.g: submandibular and salivary glands.



Serous cells	Mucous cells
Polyhedral or pyramidal shape	Pyramidal shape
rounded nucleus with center location	Flattened nucleus with basal location
Small lumen	Large lumen
Secreted serous material that rich with enzymes	Secreted mucous material that poor with enzymes
Ex: parotid glands	Ex: goblet cells

Salivary glands

Salivary glands are exocrine glands with ducts, that produce saliva.

Saliva contains many important substances, including electrolytes, mucus, antibacterial compounds and various enzymes. Some defense proteins like immunoglobulin, amylase, cystatins, prolin-rich protein, mucins, peroxidases, statherin and others are primarily responsible for innate immunity.

Functions of saliva :

- **lubrication**
- **physical protection**
- **Cleansing**
- **tooth integrity**
- **water balance**
- **maintenance of pH**
- **Antimicrobial action(lysoenzyme)**
- **facilitate remineralization of teeth**
- **Contain Immunoglubulins and secrotary IgA**
- **taste**

Types of salivary glands:

A- major salivary glands which includes three pairs of glands

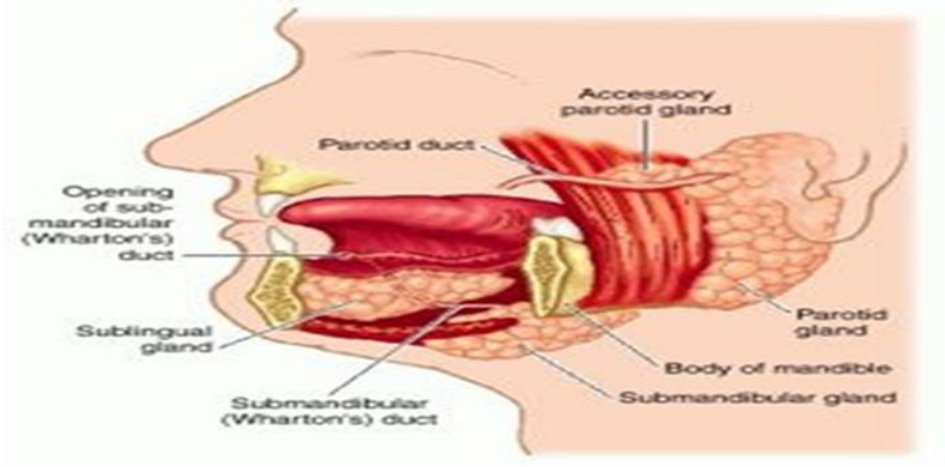
- **parotid glands are located between the ear and the jaw.**
- **The submandibular (submaxillary) glands are located under the jaw.**
- **The sublingual glands are located on the floor of the mouth under the tongue.**

• The major salivary glands produce about 90% of saliva.

B- Minor salivary glands includes the glands in the tongue, palate, lips, and cheeks. These glands produce about 10% of saliva

Daily secretion of saliva ranges between 500 – 700ml.

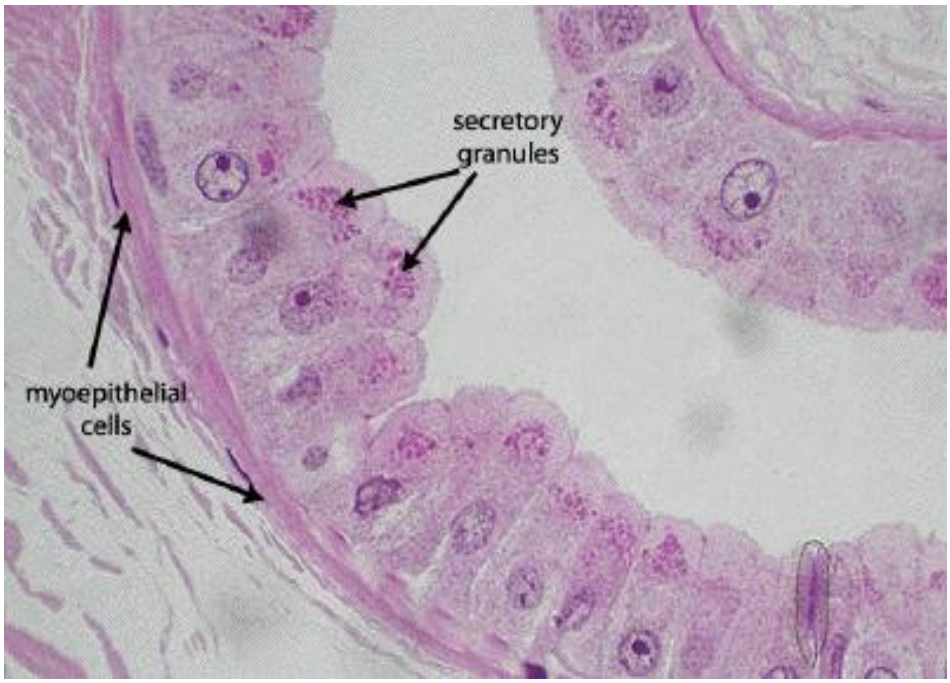
- **The production of saliva is stimulated by sympathetic nervous system and parasympathetic. Healthy human saliva is neutral or slightly alkaline.**

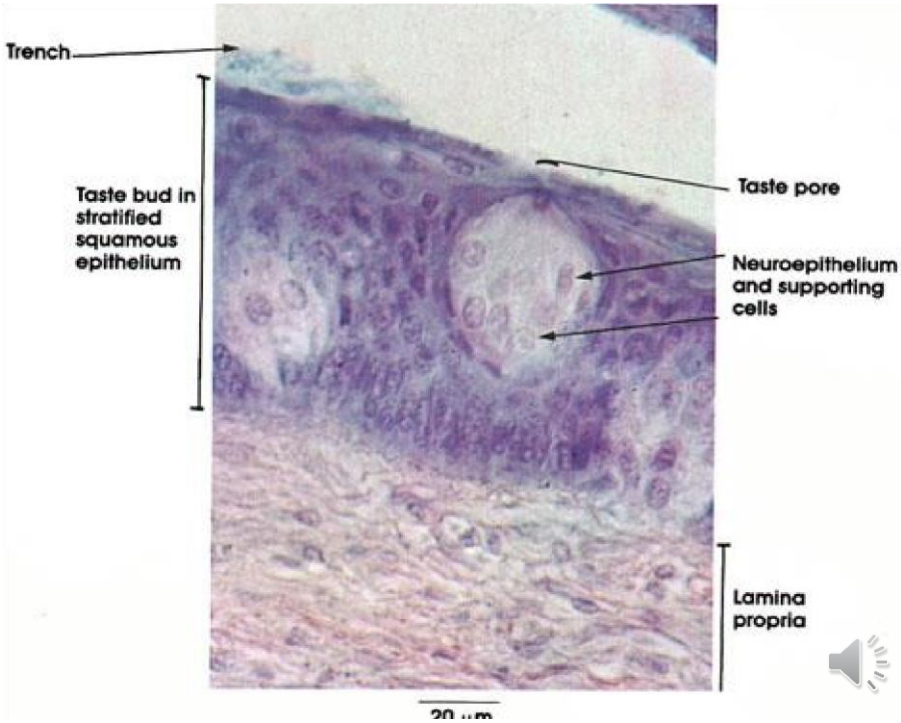


In addition to the glandular epithelia, there are other epithelial cells:

- **Myoepithelial cells: a thin layer above the basement membrane but generally beneath the luminal cells. They contain myosin and actin microfilaments for contract and expel the secretions of glands. They are found in the sweat glands, mammary glands, lacrimal glands and salivary glands.**

- **Neuroepithelial cells:. they consider as stem cells of the nervous system. These neural stem cells then differentiate further into multiple types of cells, like neurons, astrocyte and other glial cells or serve as sensory cells for external stimuli as in the taste buds in the tongue.**




Trench
Taste bud in stratified squamous epithelium
Taste pore
Neuroepithelium and supporting cells
Lamina propria
20 μm