



Practice

**Curriculum: Phase 1/ Semester 2/ TOB/ Session 4
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Histology Practical / Glandular epithelium

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Glandular epithelium



Objectives:

Having revised this practical you should be able to:

- explain how the majority of glands are derivatives of epithelial tissues.
- discuss the differences between exocrine and endocrine glands.
- describe the classification of glands based upon the following terms:

simple or compound ,acinar or tubular ,serous or mucous



Glandular epithelium



- recognise the following exocrine glands in photomicrographs, discussing their anatomical locations and salient histological features in relation to their function:

Unicellular glands (goblet cells) in jejunum and colon

Parotid glands

Submandibular glands

- explain the location and function of myoepithelial cells.

Glandular epithelium:

- It is a modified type of epithelial tissue specialized in production of a fluid secretions.
- They synthesize, store and secrete extracellular products that are not used by the cell itself but are of importance to other parts of organism .

Glandular epithelium

- glands always arise during development (fetal life) from covering epithelium by means of cell proliferation and invasion of subjacent connective tissue followed by further differentiation :

A) EXOCRINE GLANDS : maintain connection with the surface epithelium via the tubular ducts through which the secretory product passes to reach the surface (skin, digestive tract)

B) ENDOCRINE GLANDS: are ductless – the connection with the surface was obliterated during development and they release their secretory product (hormones) into the bloodstream.

Histologically: **Exocrine** glands composed from two parts:

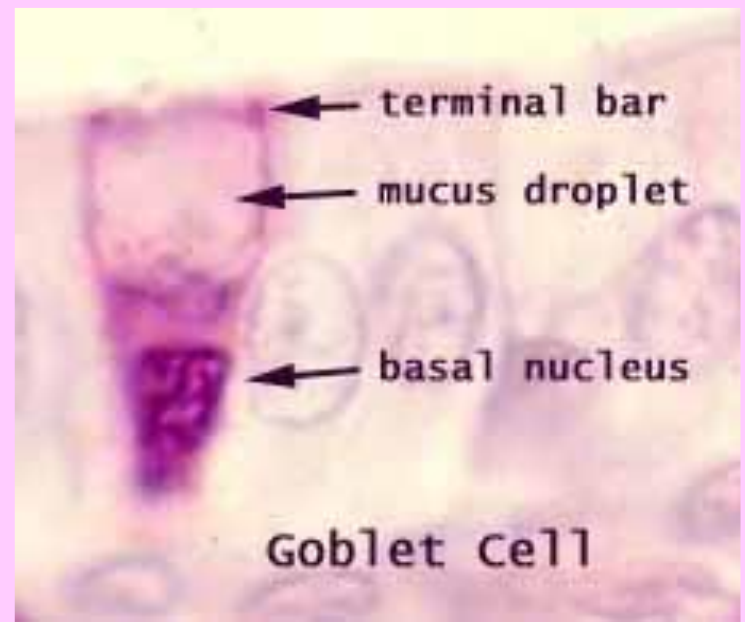
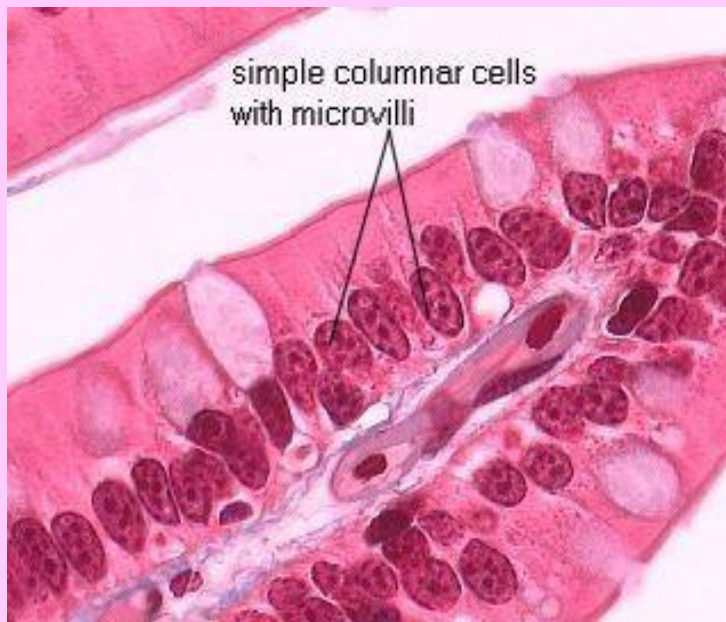
- a. secretory portion** (lat. *portio secretoria*) – contains the cells responsible for the secretory process
- b. system of ducts** (lat. *ductus glandulae*) – transport the secretion to the exterior of the gland

Classification of Glands according to the number of cells:

- Unicellular gland e.g. goblet cell
- Multicellular gland

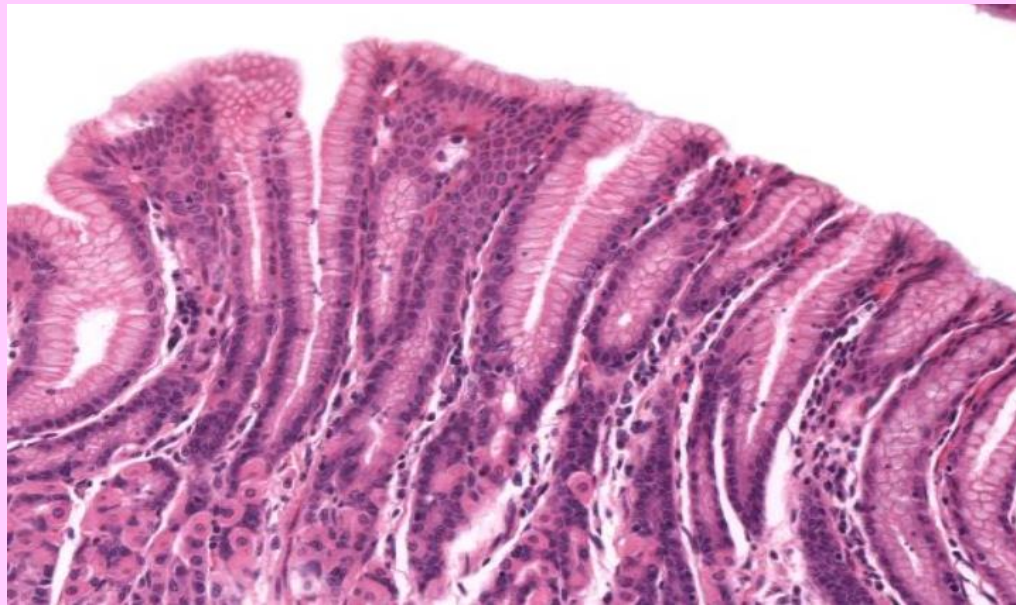
unicellular glands (Goblet cells):

In mammals, the only example of unicellular glands are goblet cells



- **The name "goblet" refers** to the cell's shape, narrow at the base and bulging apically.
Goblet cells secrete the glycoprotein mucin, which by the uptake of water is converted into a slimy substance, mucus.
- **are scattered among** the absorptive cells in the epithelium of the small intestine and colon and the respiratory tract and the reproductive female tract.
- These epithelial cells are specialized for secretion of mucus, which facilitates passage of material through the bowel.

The simplest form of a multicellular gland is :
a secretory epithelial sheath - a surface
epithelium consisting entirely of secretory cells
e.g. the epithelium lining the inner surface of the
stomach, where the mucous secretion protects
the stomach wall from the acidic contents of the
stomach).



Fundic of stomach

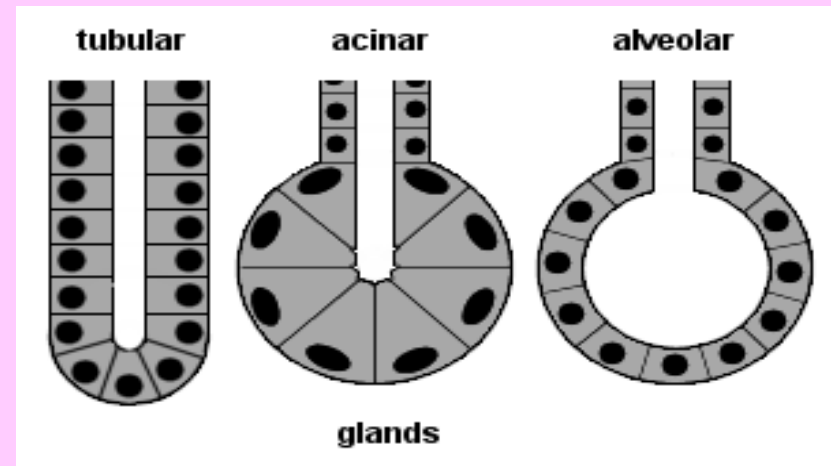
- Other multicellular glands have their secretory portion embedded in the connective tissue underlying the epithelium.
- **The secretion is either discharged directly from the secretory portion onto the epithelium or reaches the epithelium via a duct system that consists of non-secretory cells.**

Classification of the glands according to the presence of duct:

- Endocrines (without duct)
- Exocrines (have duct opens upon one of the surfaces of the body e.g. skin, gastrointestinal tract etc).
- Mixocrines

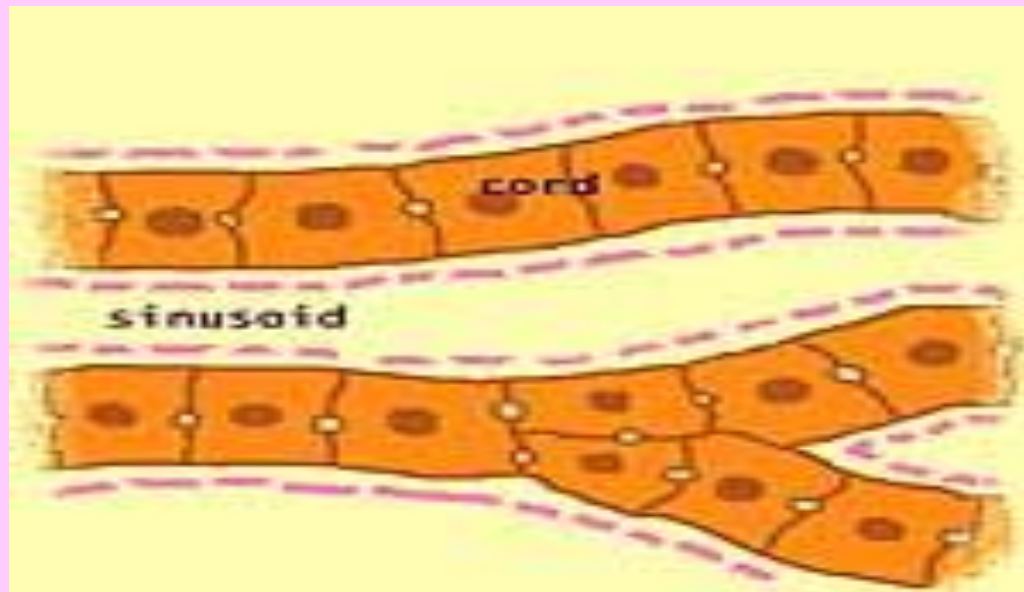
Classification according to the shape of secretory parts:

- **tubes** in *tubular glands*,
- **acini** in *acinar glands* or
- **alveoli** in *alveolar glands*
- **Combinations** exist . tubulo-acinar gland,



- An **acinus** (from Latin, *grape*) is a small ball of secretory epithelial cells containing a tiny central lumen.
- A typical **acinar cell** is shaped like a pyramid.

- **Cords** are epithelial cells arranged into sheets separated by vascular sinusoids. In section, the predominant pattern appears linear (hence, "cord"), even though the lines may twist and branch.



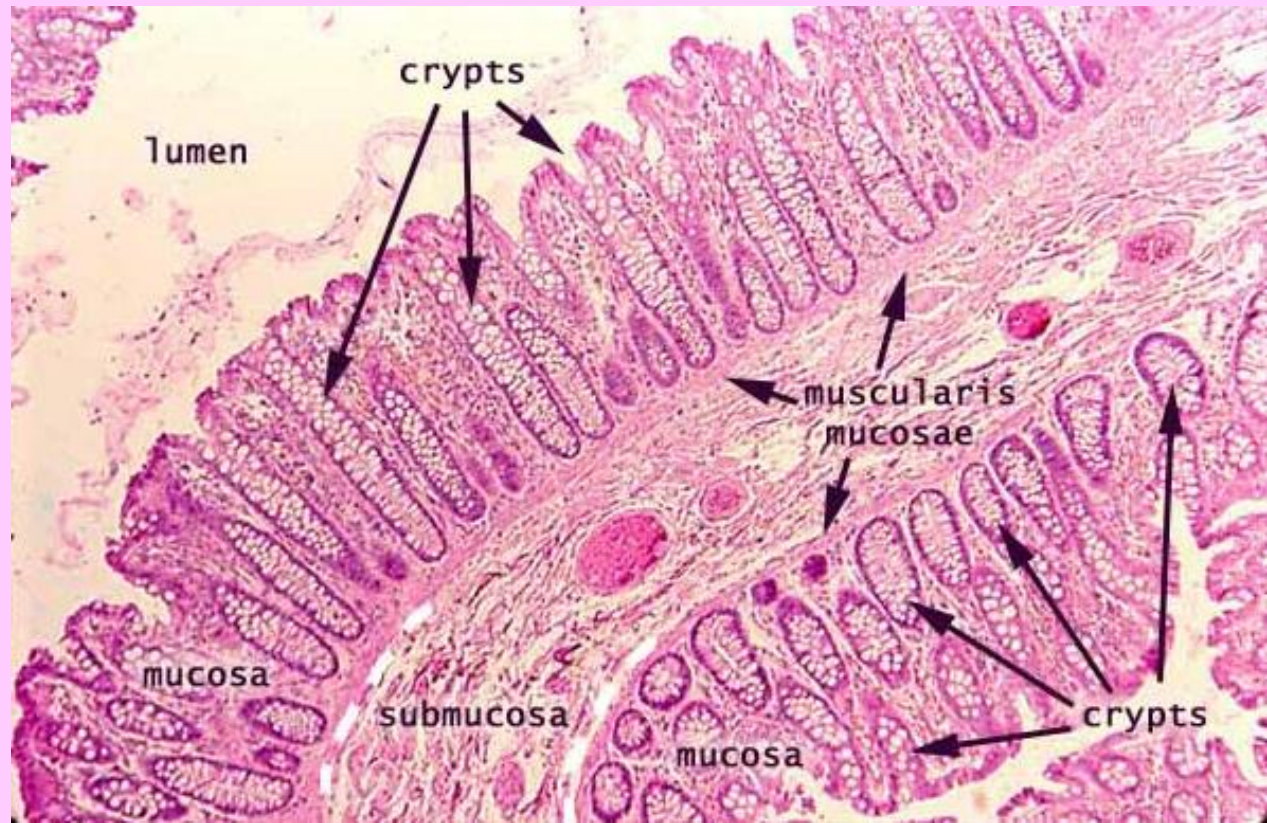
Classification exocrines according to the branching pattern of their duct:

- *Simple gland*: with an unbranched excretory duct. There is only a single secretory unit.
- *compound gland*: when the excretory duct is branched. these glands are typically fairly bulky and contain very many individual secretory units.

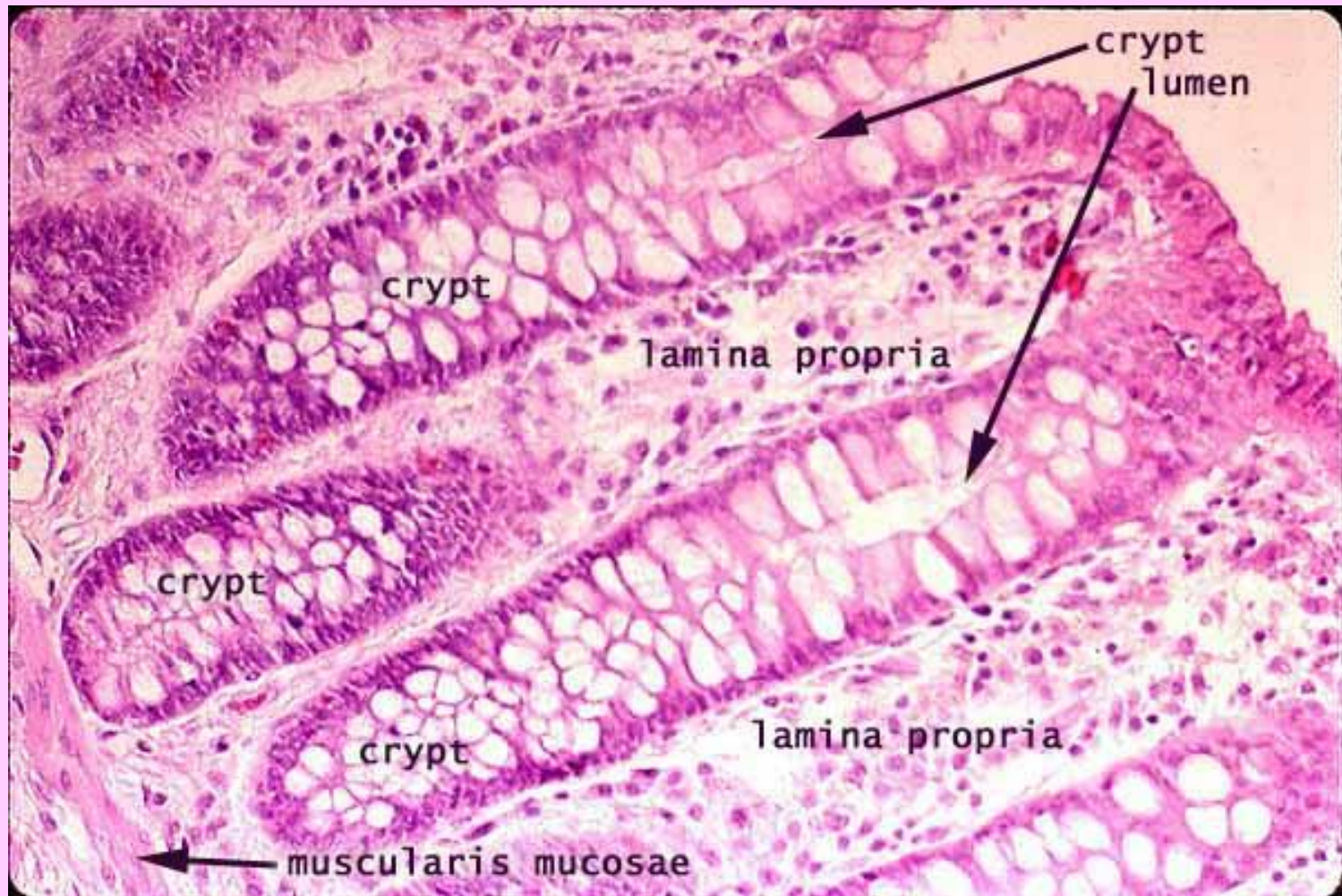
Simple tubular gland

e.g. **Intestinal Crypts** are short invaginations of mucosal epithelium. are characteristic of both [small intestine](#) and of [appendix, colon, and rectum](#).

- **Intestinal crypts** are sometimes called "intestinal glands" (they have the shape of short, straight, [simple tubular glands](#)) or **crypts of Lieberkühn**.



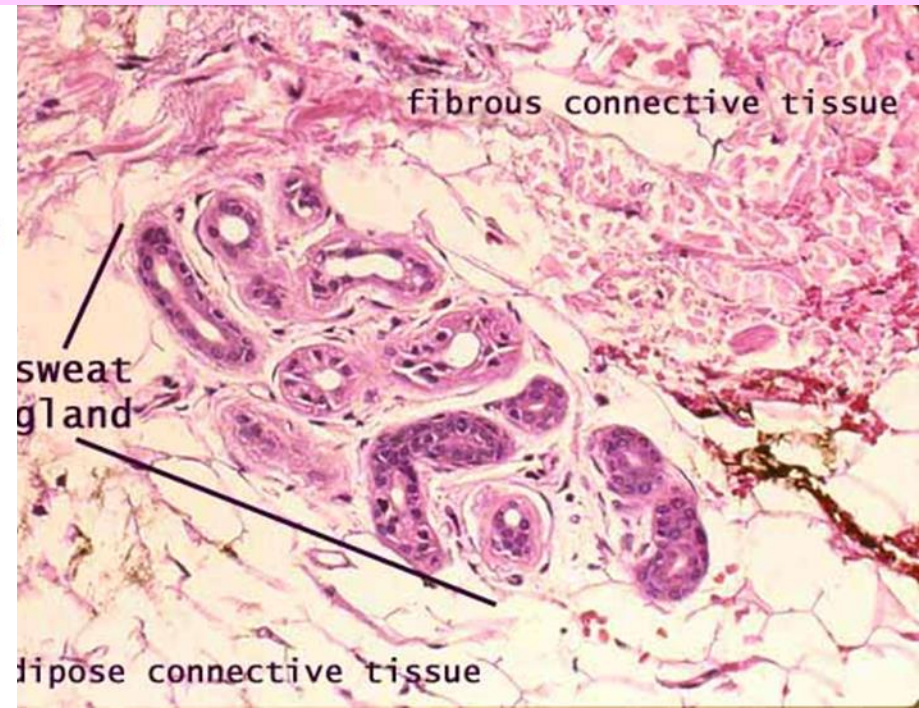
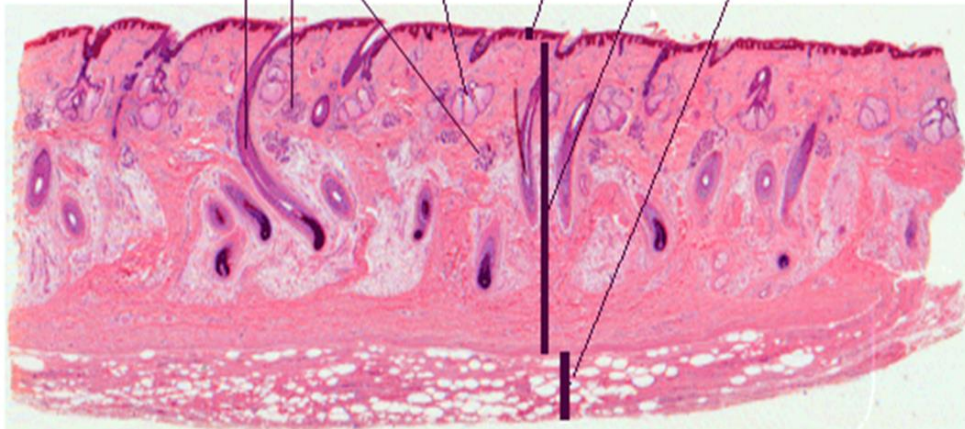
Intestinal crypts (higher magnification)



Coiled simple tubular gland: e.g. Sweat Gland in Skin

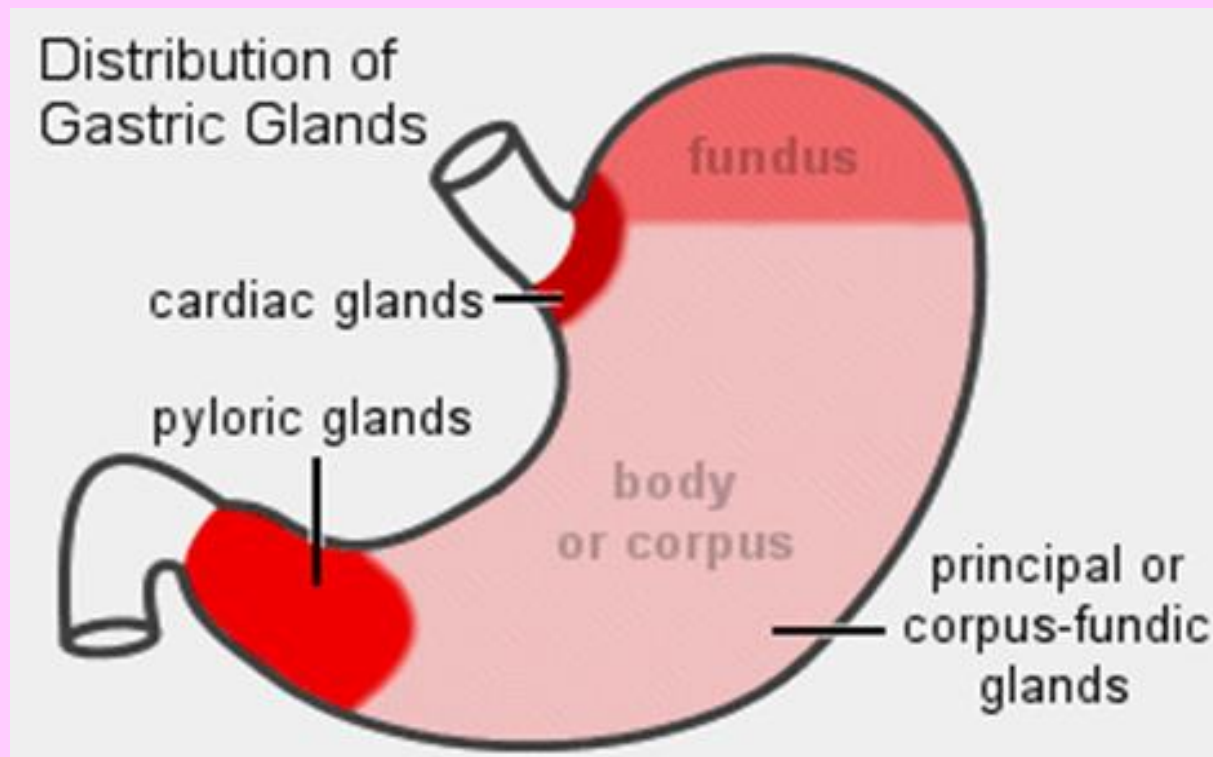
Both the duct and the secretory portion of the gland are formed from cuboidal epithelium, with round nuclei centrally placed within boxy cells.

Sebaceous glands
Sweat glands
Hair follicle
Epidermis
Dermis
Hypodermis



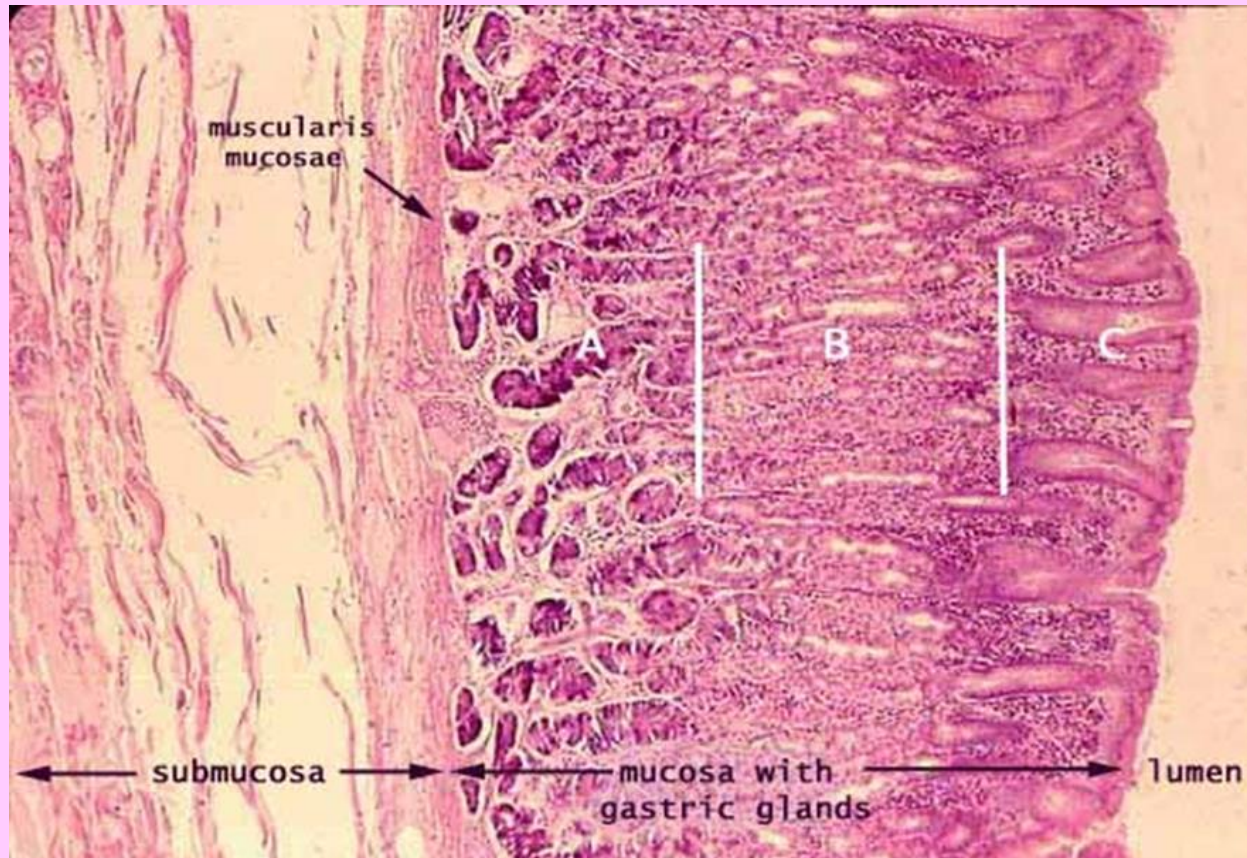
Stomach

The most conspicuous tissue feature of the stomach is the thick glandular mucosa, packed with gastric glands which secrete digestive enzymes and acid.

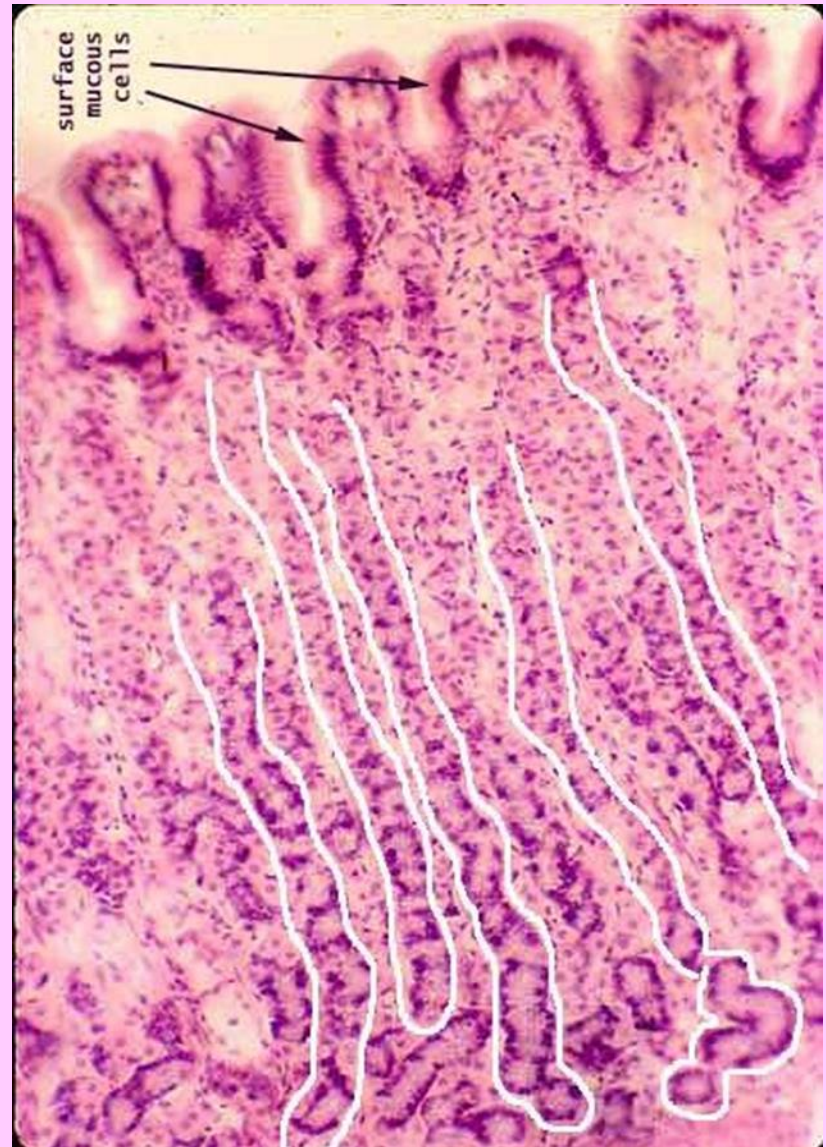


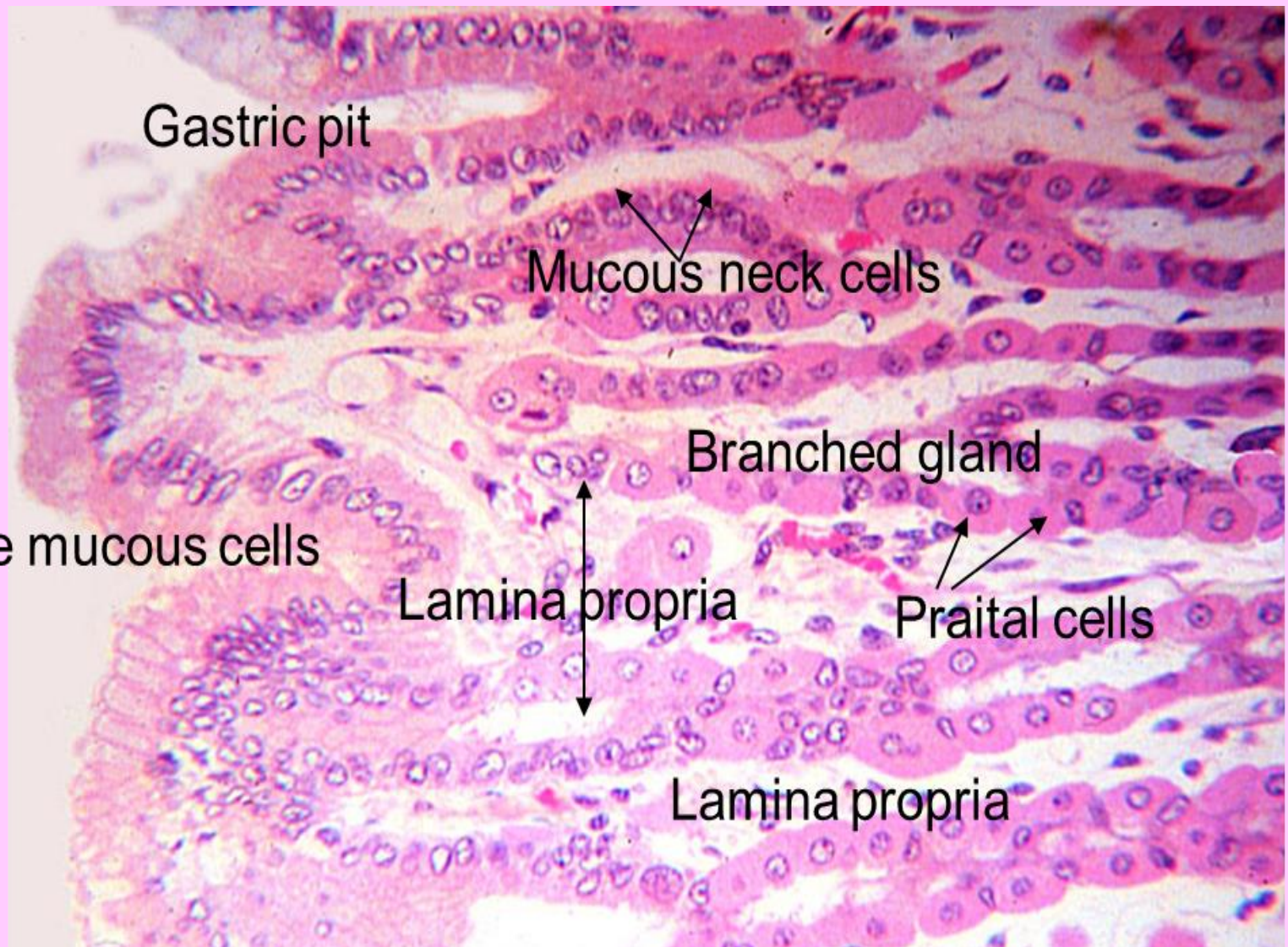
Gastric Glands

Gastric glands are the tubular mucosal glands of the stomach. These glands consist predominantly of parietal cells which secrete acid and serous chief cells which secrete gastric

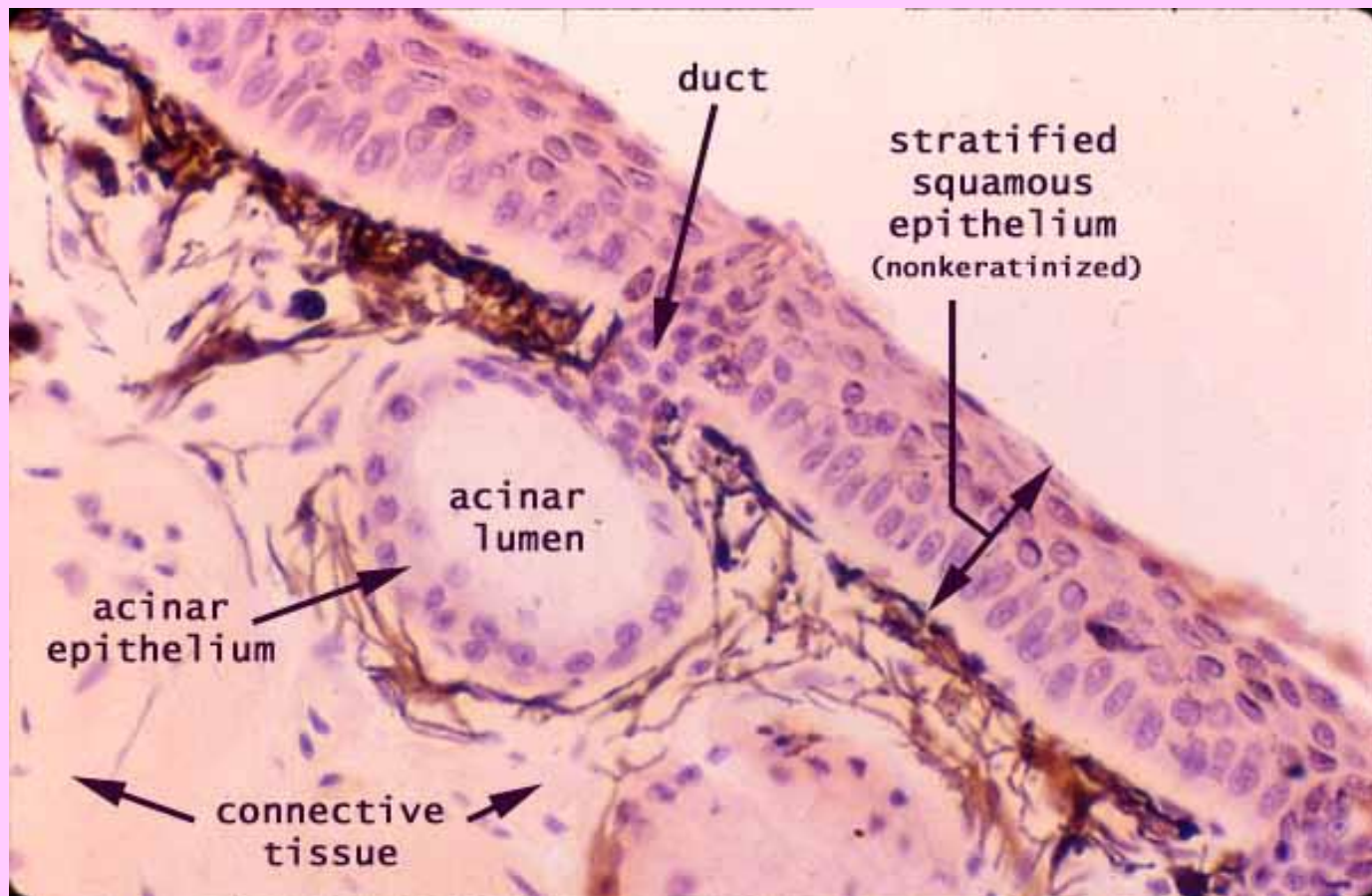


fundic stomach (H&E)





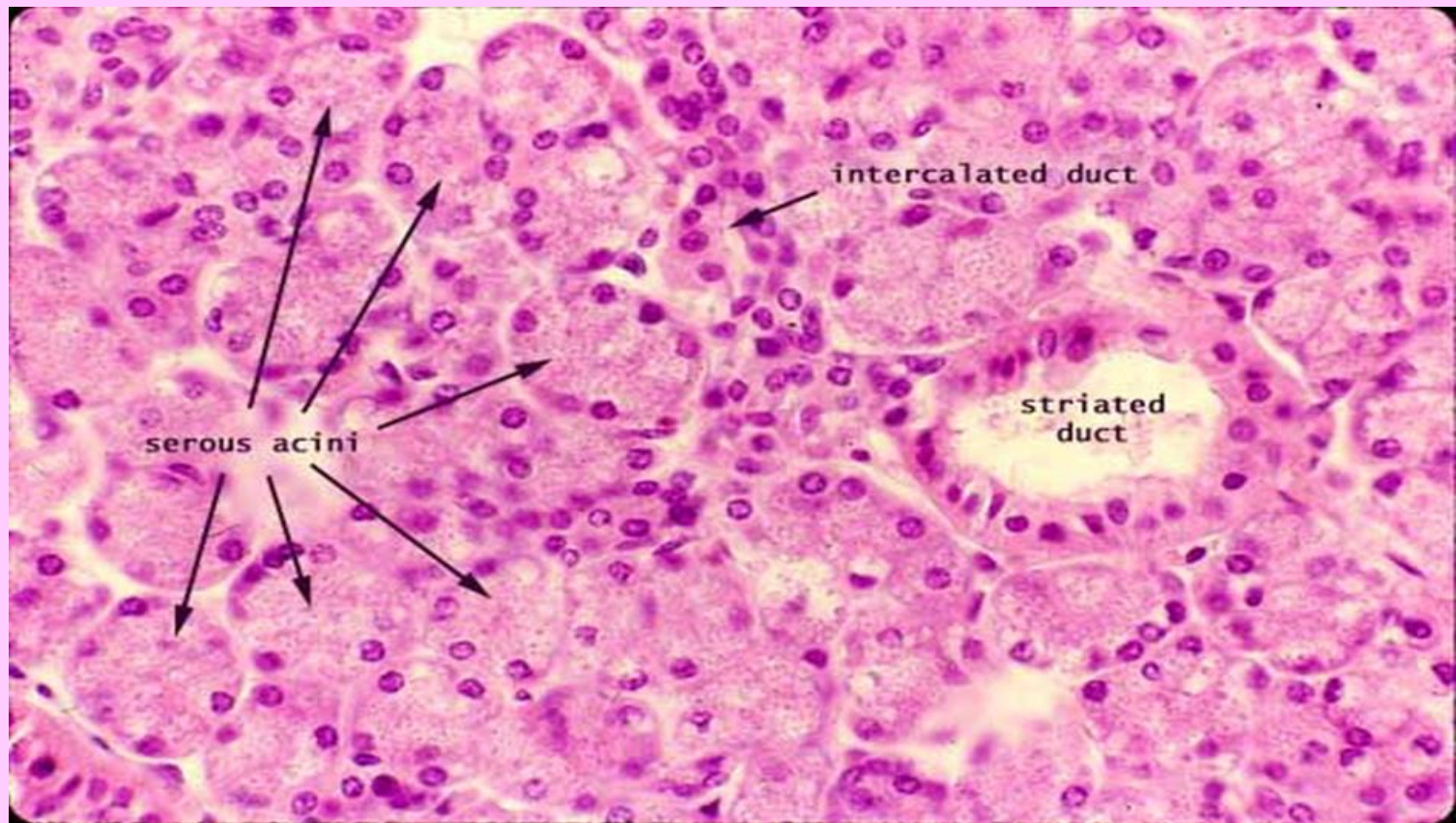
Simple alveolar gland



Frog Skin

Parotid Salivary Gland

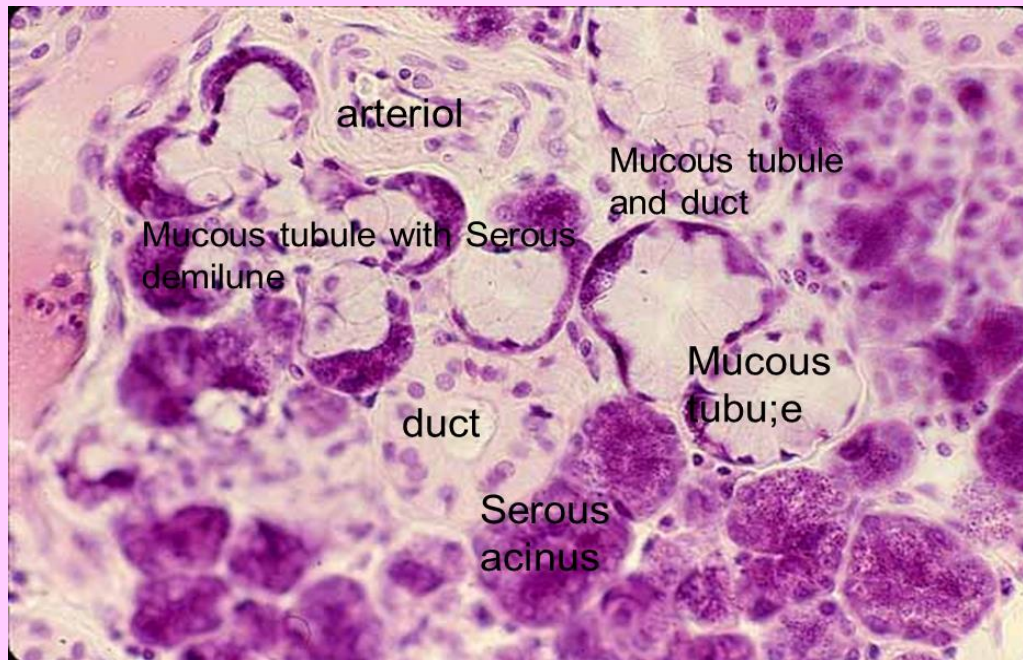
The parotid salivary gland is a compound, acinar, serous gland. Unlike all other salivary glands, the parotid includes no mucous cells.



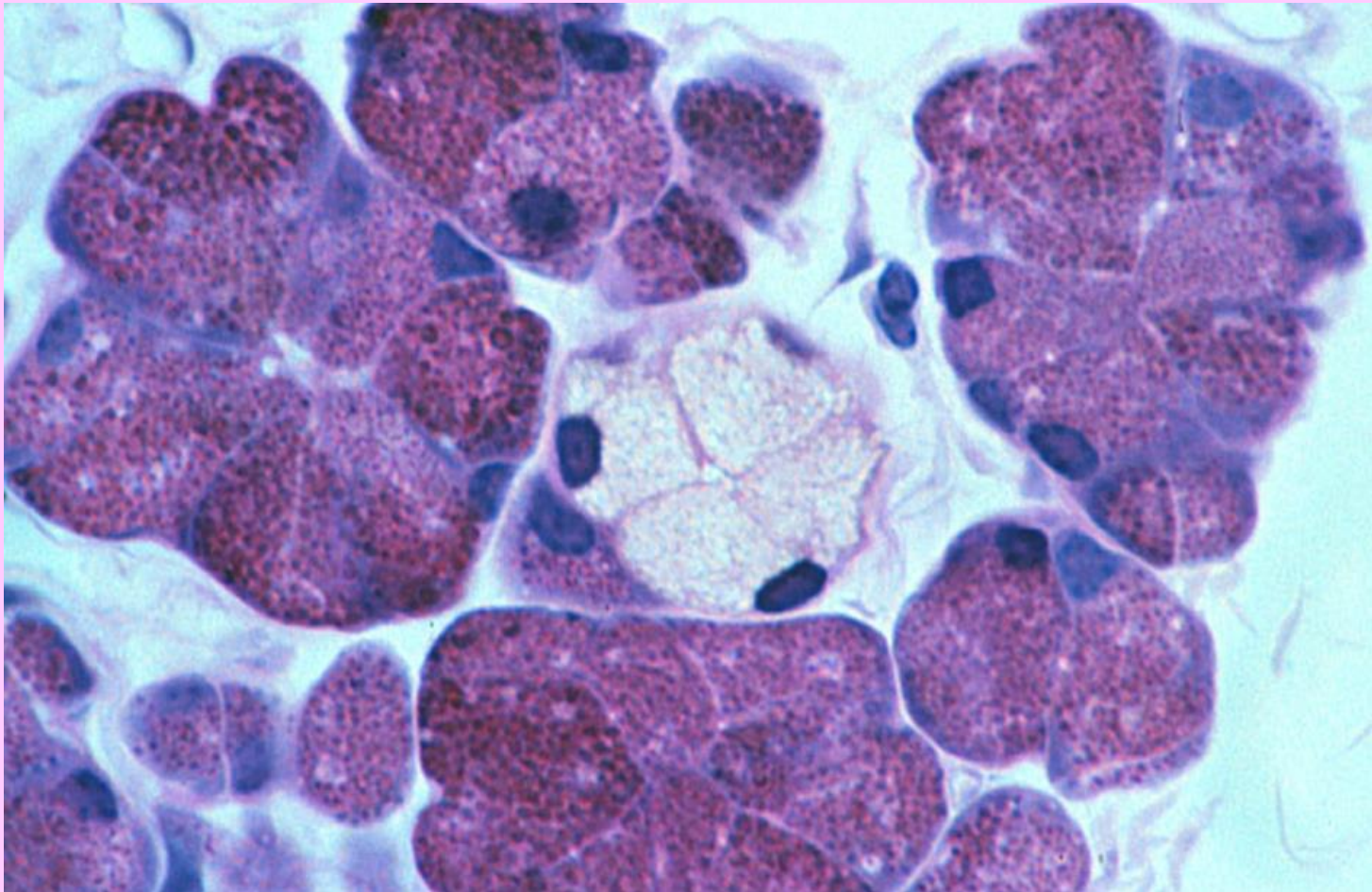
Mixed salivary gland

This image of minor, mixed salivary glands contrasts the appearance of serous cells and mucous cells. In routine preparations such as this one, serous cells often appear darker appearance than mucous cells.

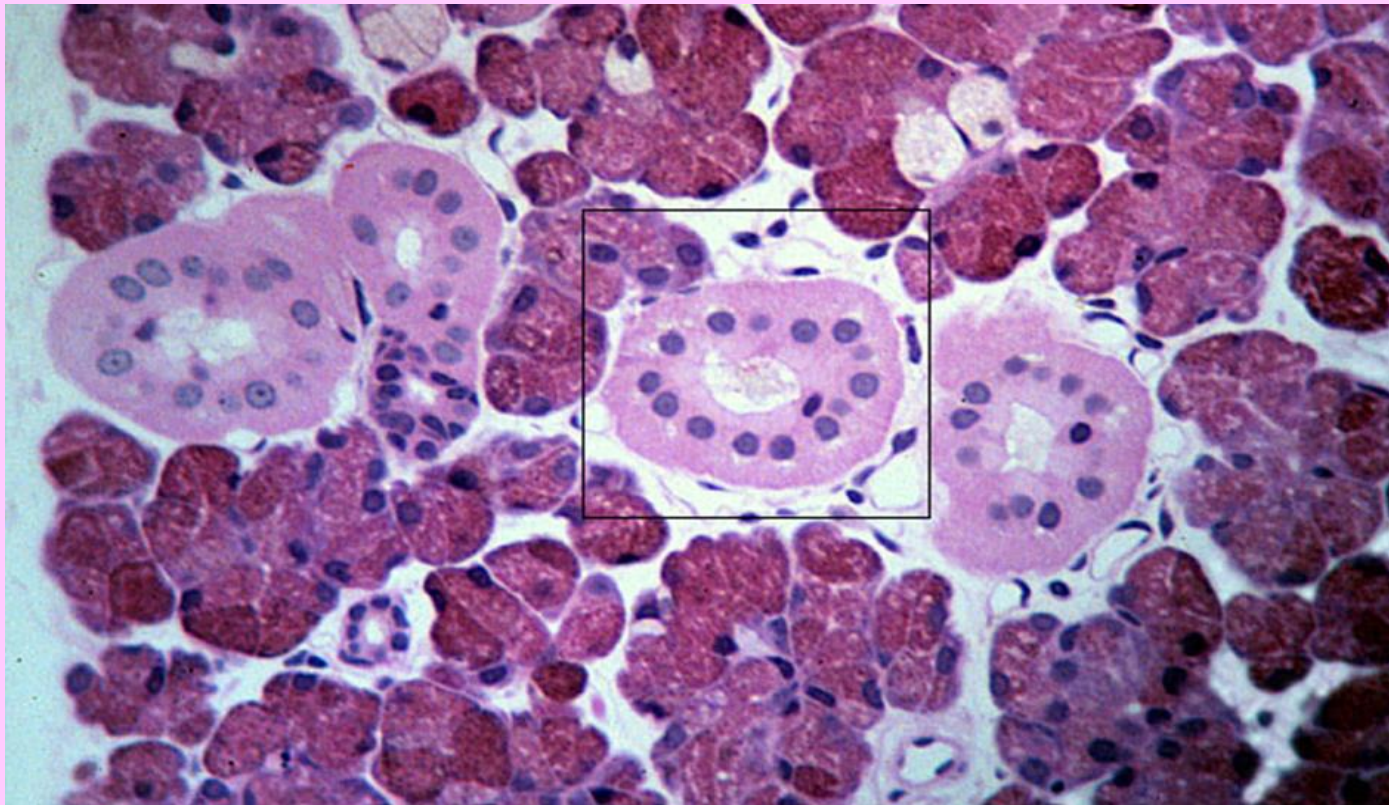
Serous cells are usually arranged into acini. Mucous cells are usually arranged into tubules. Occasionally, individual serous cells will occur at the ends of a mucous tubules. In section, these have a crescent-moon appearance. Several of these ***serous demilunes*** appear in the above illustration.



mixed serous/mucous gland, submandibular gland
(H&E)

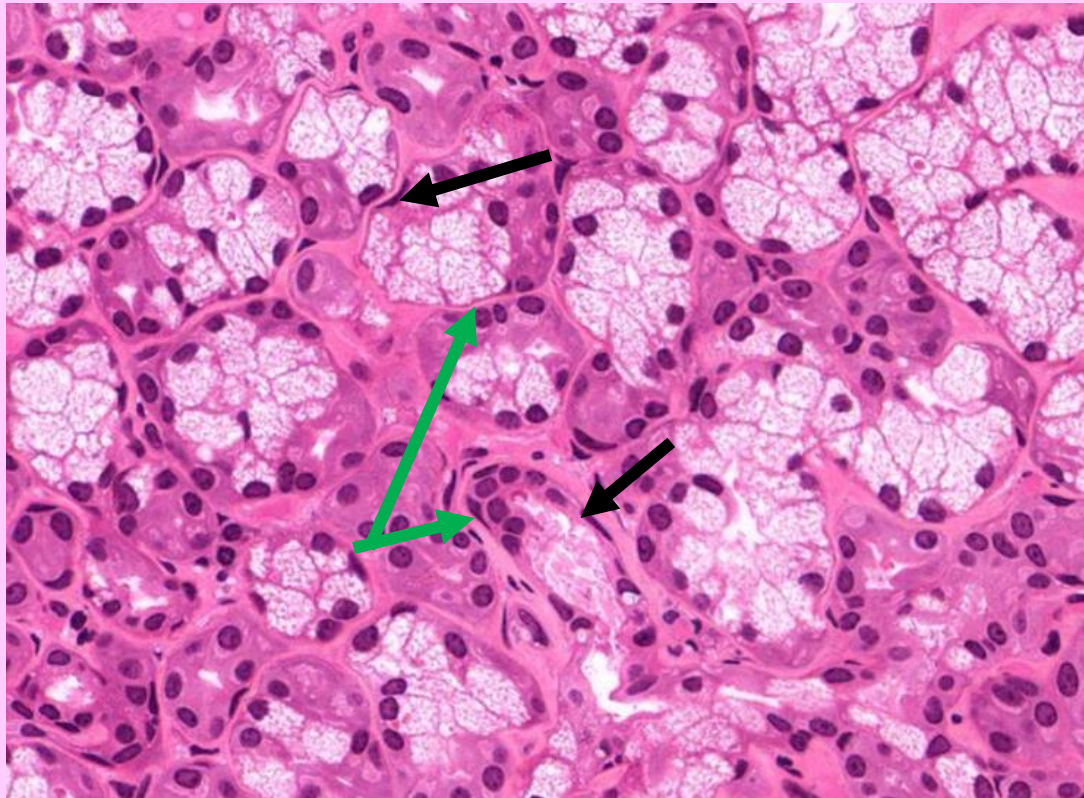


mixed serous/mucous gland: basal striations,
submandibular gland (H&E)




Myoepithelial cells:

- also called *basket cells*, are myoid (smooth muscle-like) contractile cells that assist in the secretion of certain glands (e.g., sweat, salivary, lacrimal, mammary).




Serous demilunes

Myoepithelium cells


□ Although myoepithelial cells resemble smooth muscle cells and contain a similar contractile apparatus, they are considered as true epithelial cells for the following reasons :

1) their major IFs are cytokeratins (5 and 14)

2) they form cadherin-mediated junctions
(desmosomes and hemidesmosomes)

3) they are located between the luminal epithelium and the basement membrane, which like other epithelial cells are separated from underlying connective tissue by (vide infra).

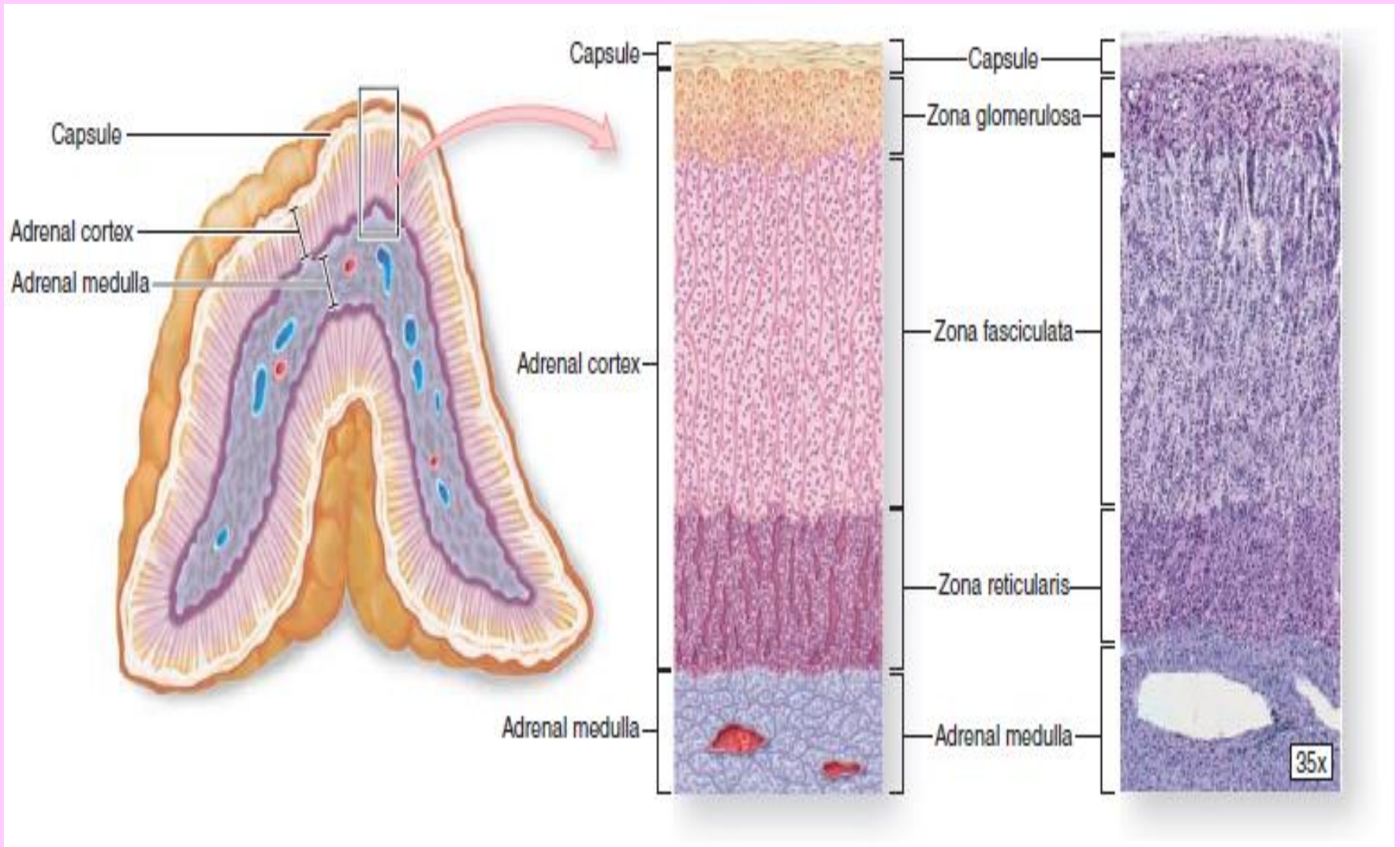
Major morphological features of endocrine glands:

1. Missing of the duct system
2. Rich vascularization as well as innervation
3. Special histological structure

According to histological structure - 3 main types of endocrine glands:

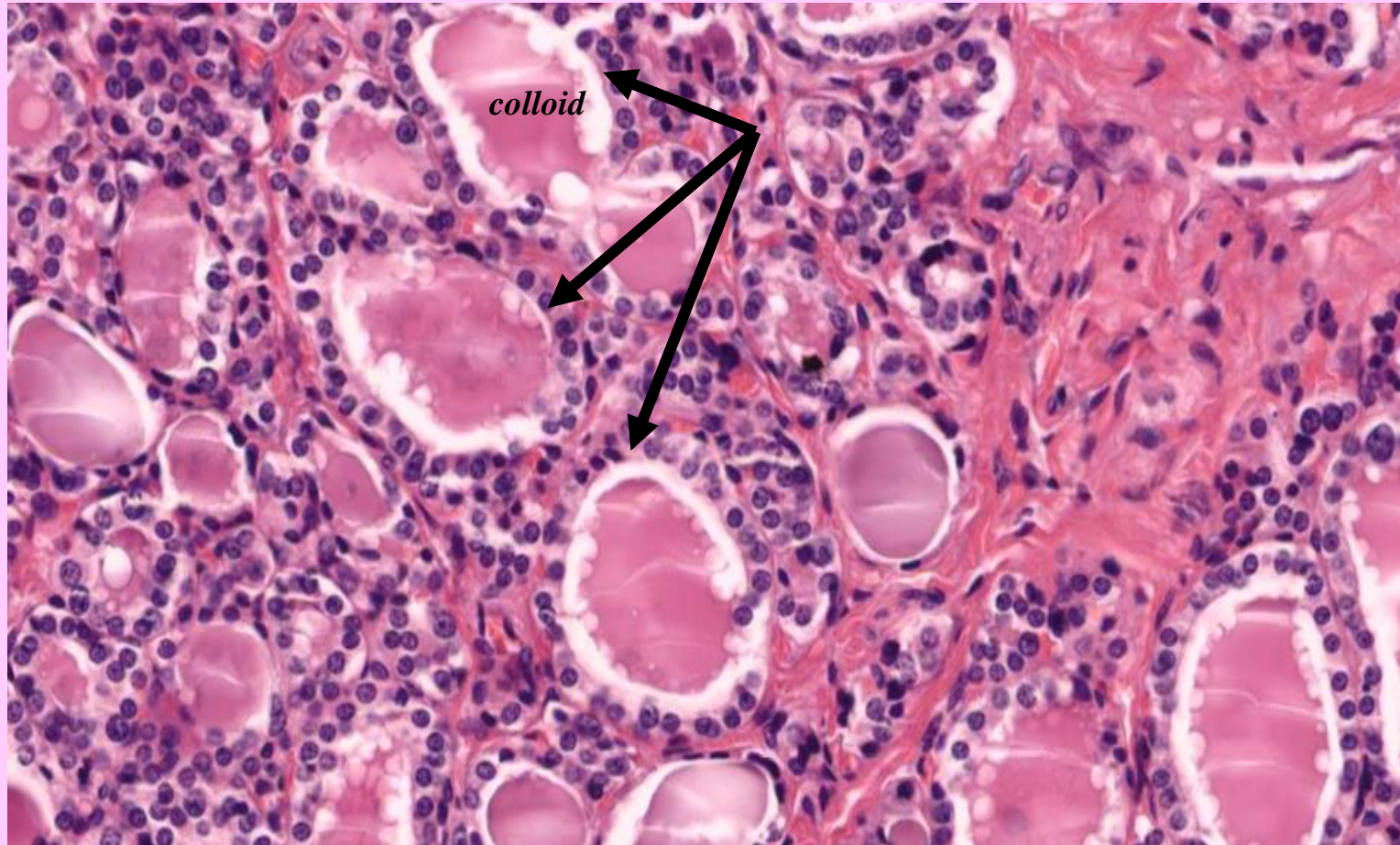
- (1) Trabecular
- (2) Follicular
- (3) Disseminated

1. Trabecular type – made from the cords of the cells – *e.g.* adenohypophysis, parathyroid gland, adrenal glands

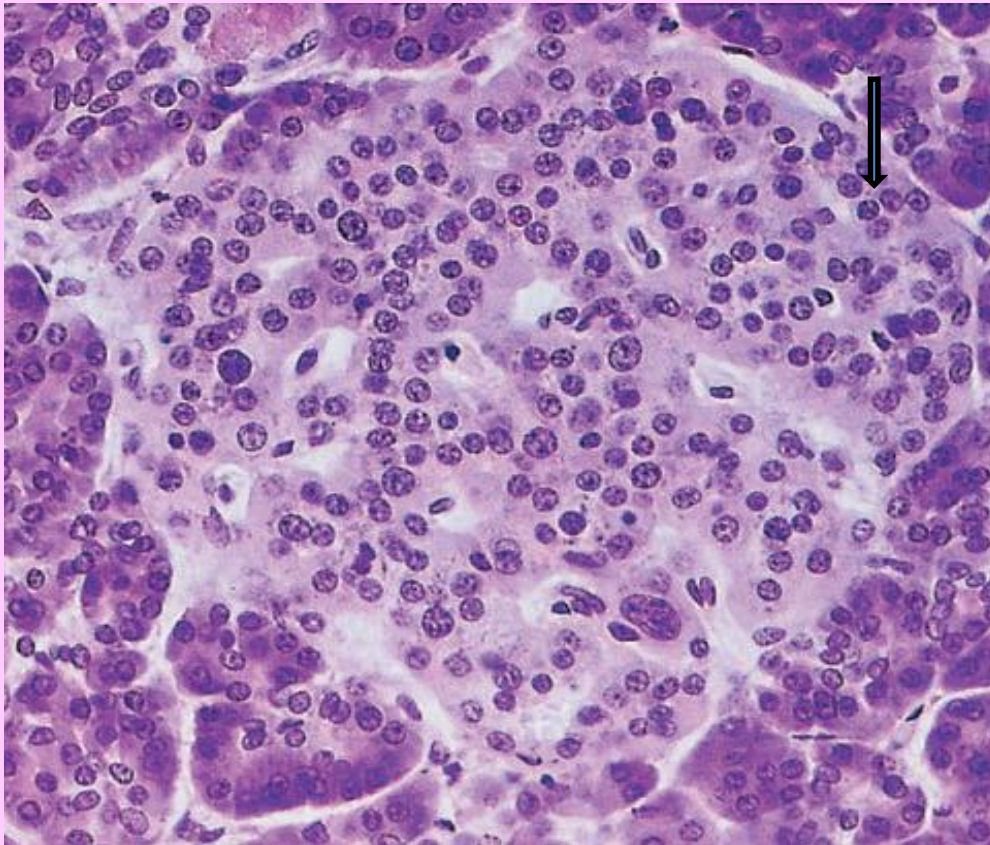


Adrenal gland

2.Follicular type – the cells form spherical structures – e.g. thyroid gland



3. Disseminated type – the endocrine cells are placed in groups or separately in another organ – e.g. Leydig cells in testis, Langerhans islets of pancreas



Langerhans islets of pancreas



Q: *The pineal body & hypothalamous consider as endocrine glands have not been addressed in this session? ?*

A close-up photograph of several pink cosmos flowers with yellow centers, set against a blurred background of more flowers and green foliage. The lighting is soft, creating a gentle, warm atmosphere.

Thank you for listen