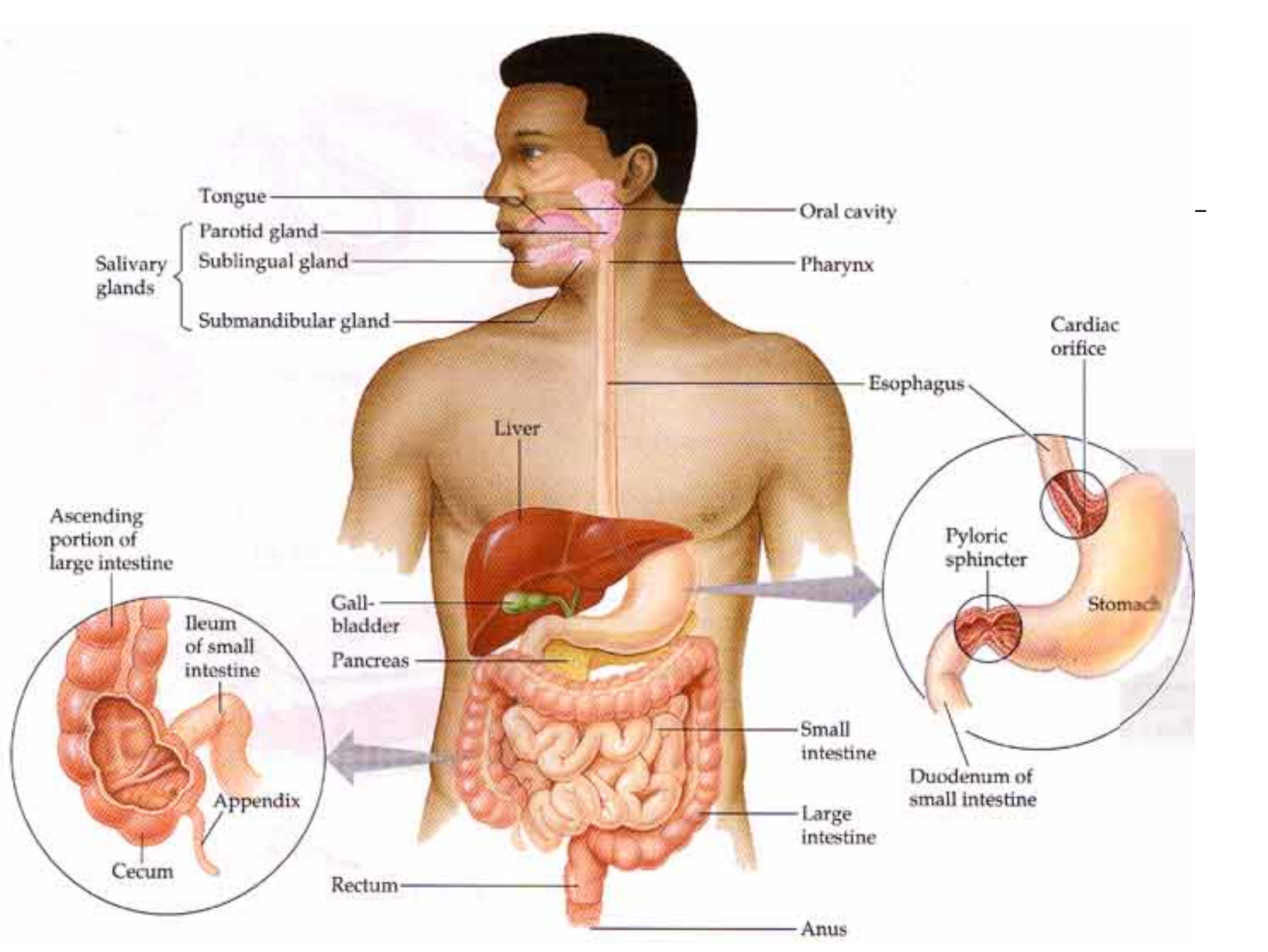




Digestive tract

LIU YING

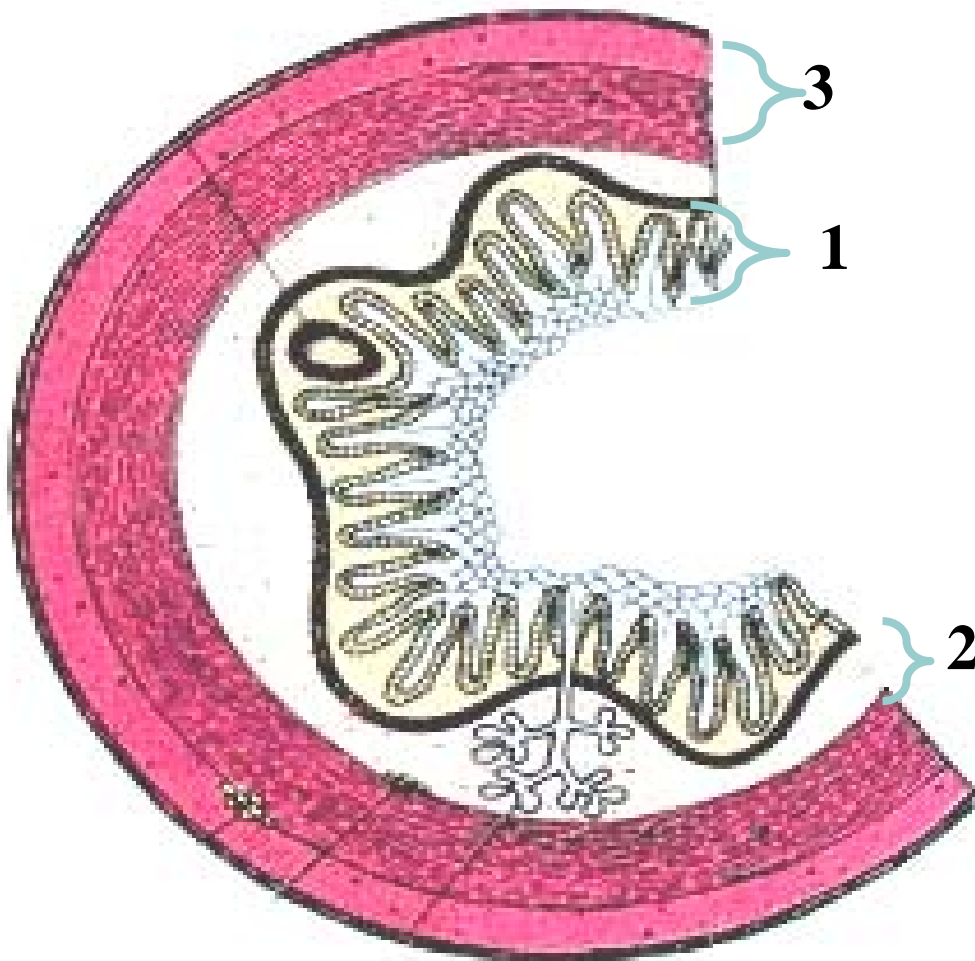
Department of Histology &
Embryology



1. Organization of digestive tract

- * a long tube extending from the mouth to the anus,
 -
- * its main function:
 - digestion: physical/chemical*
 - absorption*
- * two major sections
 - the oral cavity including oropharynx
 - the tubular digestive tract

general structure of tubular digestive tract



basically four layers

1. Mucosa

2. Submucosa

3. Muscularis

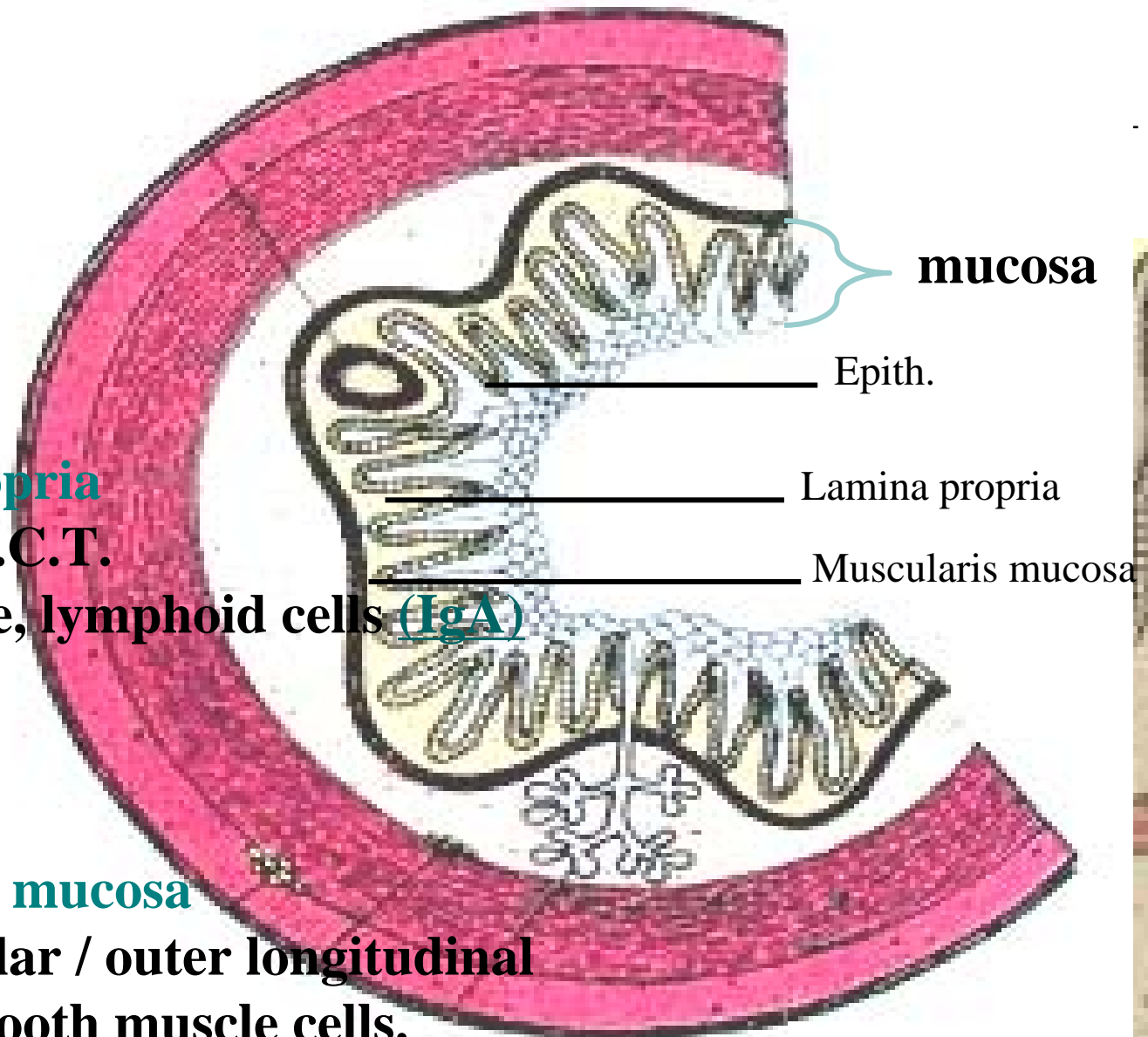
4. adventitia

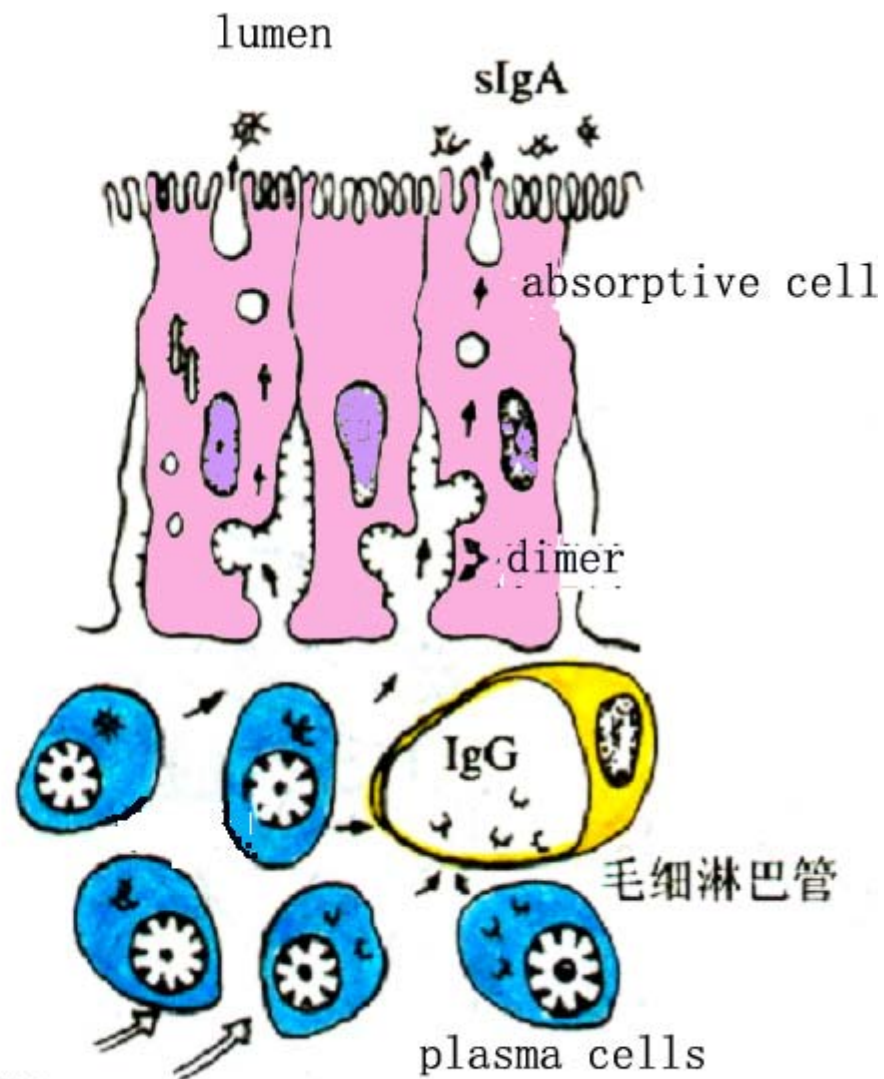
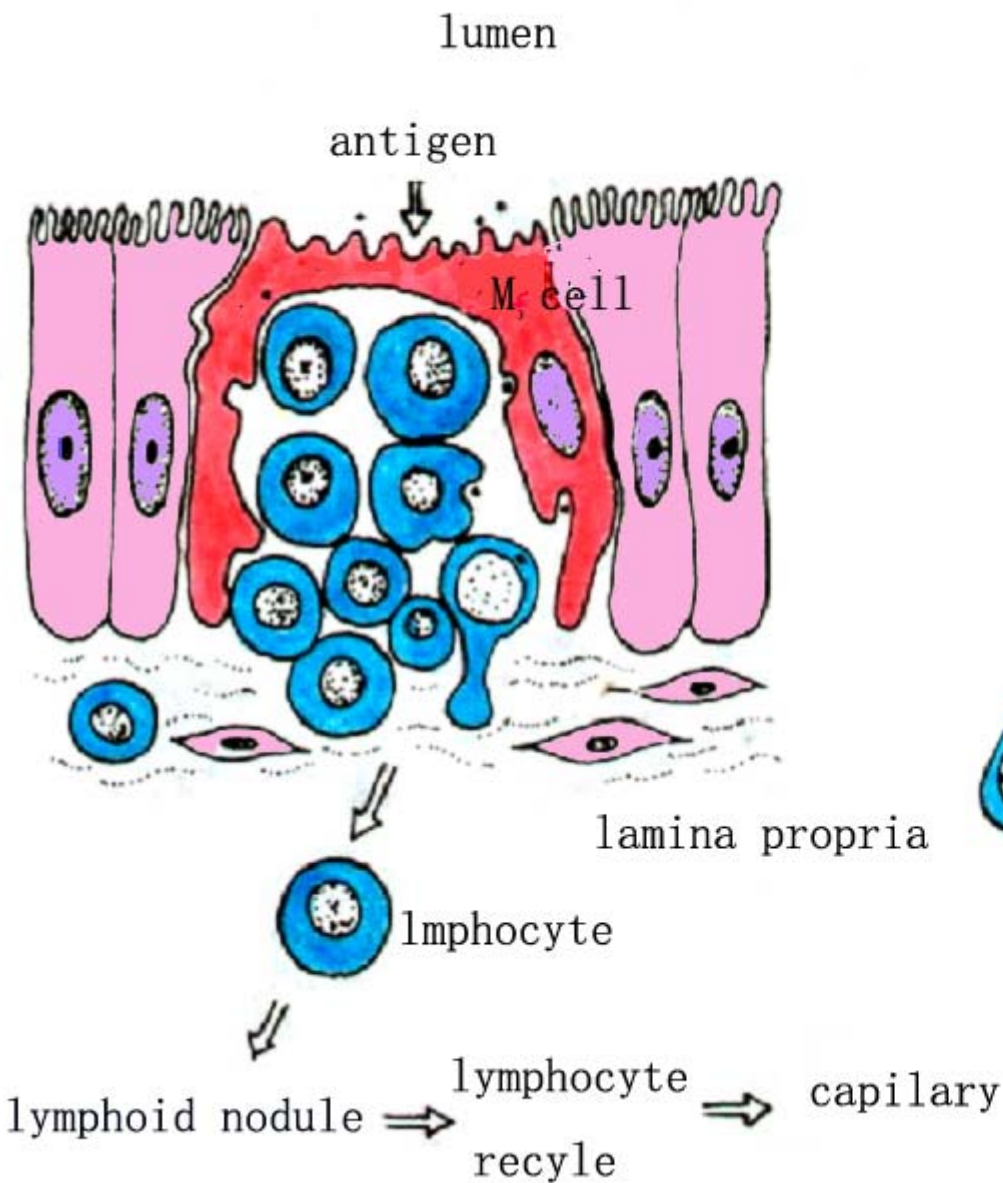
Mucosa

1. Epithelium
stratified

2. Lamina propria
a layer of L.C.T.
macrophage, lymphoid cells (IgA)
gland
capillaries

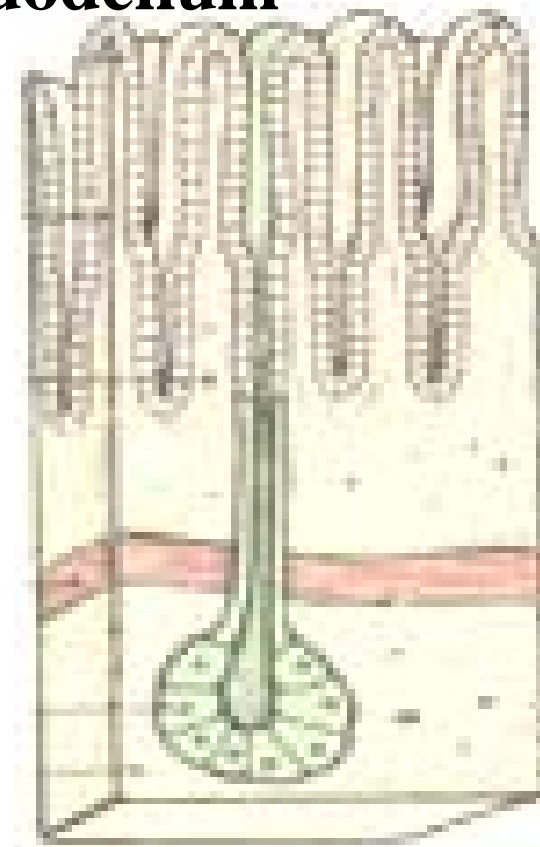
3. Muscularis mucosa
inner circular / outer longitudinal
layer of smooth muscle cells.





Submucosa

- * **C.T. with small blood / lymphatic vessels;**
- * **glands only in the esophagus and duodenum**
- * **submucosal plexus**
- * **also contain lymphatic tissue**

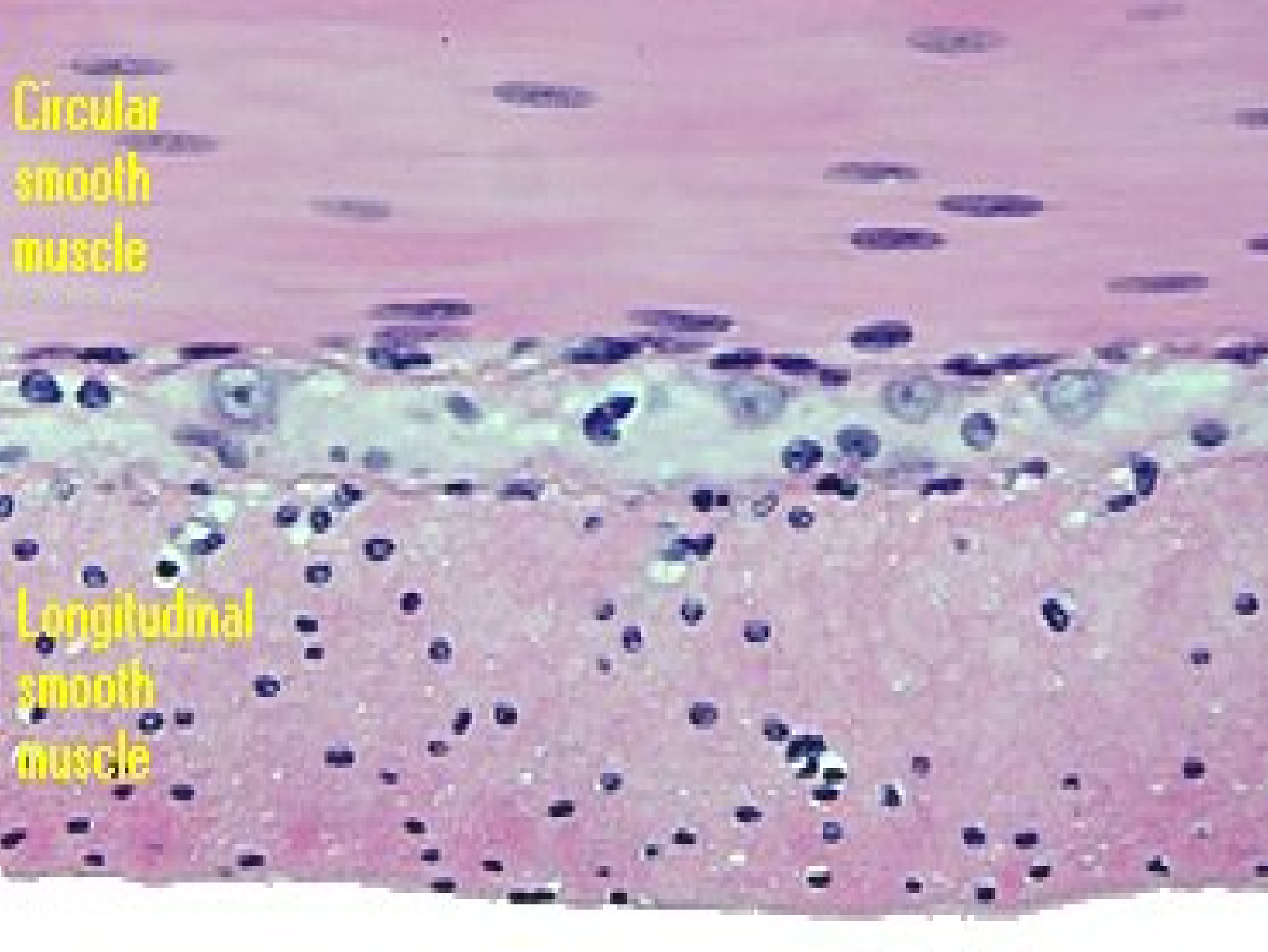


Muscularis

- * **two layers of smooth muscle.**
inner layer: circular muscle.
outer layer: longitudinal muscle.
- * **upper esophagus & the anus with striated muscle.**
- * **three layers in the stomach**
- * **between two layers of muscle are a nerve plexus.**

Circular
smooth
muscle

Longitudinal
smooth
muscle



Adventitia

*the outmost layer formed
by C.T. with two forms:

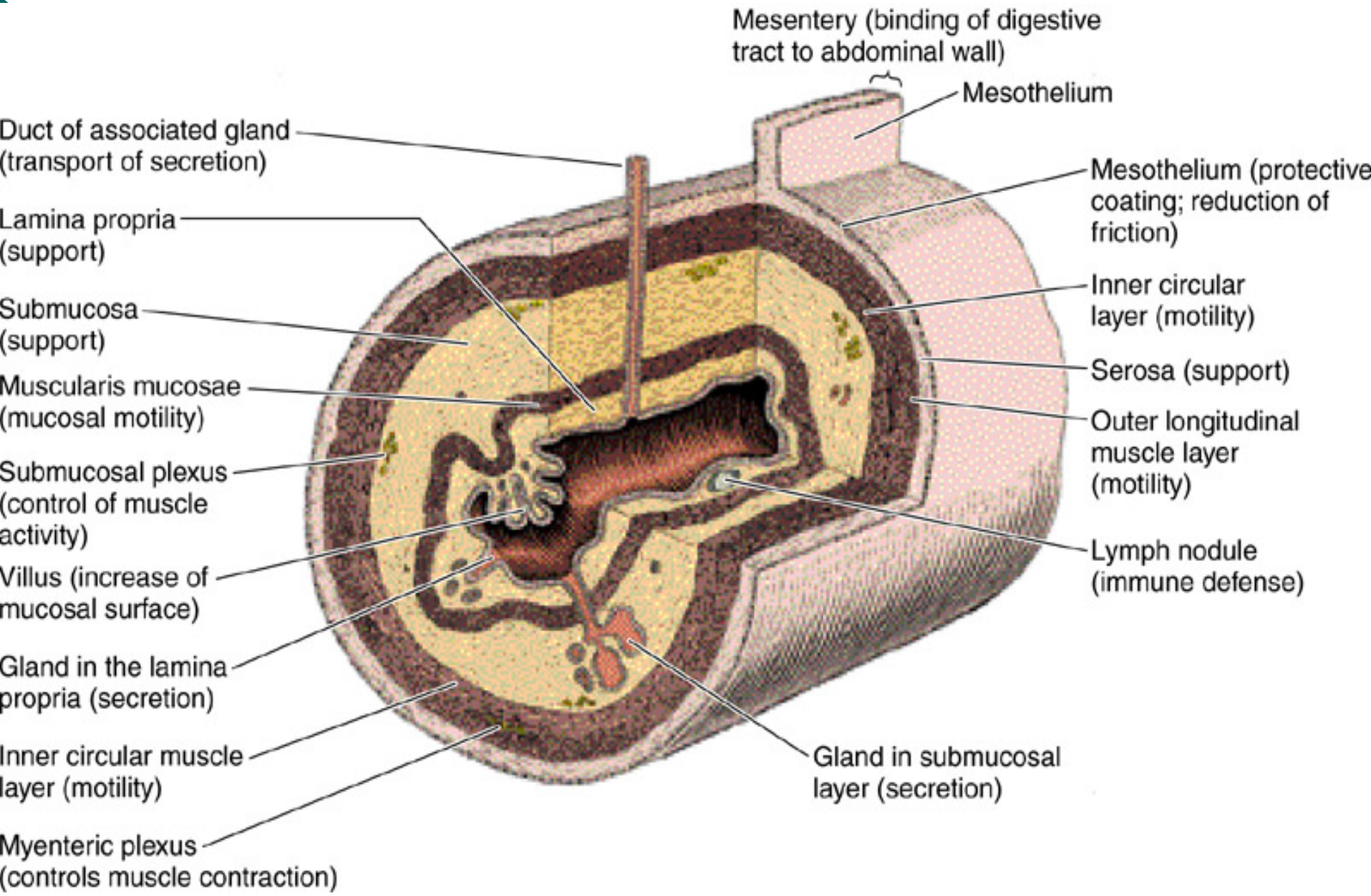
fibrosa:

C.T. blending with
surrounding structure

serosa:

C.T. + mesothelium
(simple squamous epith.)







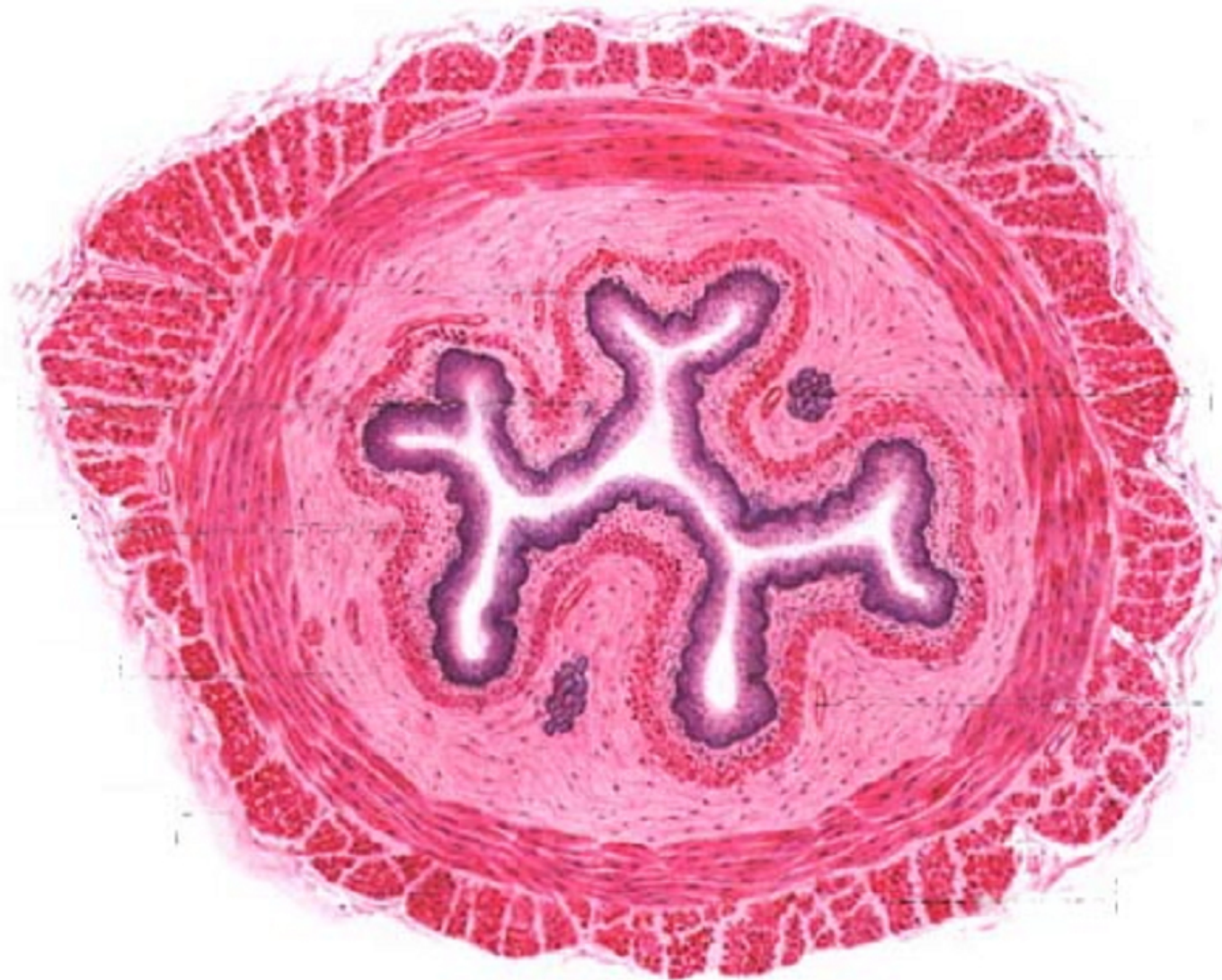
plicae

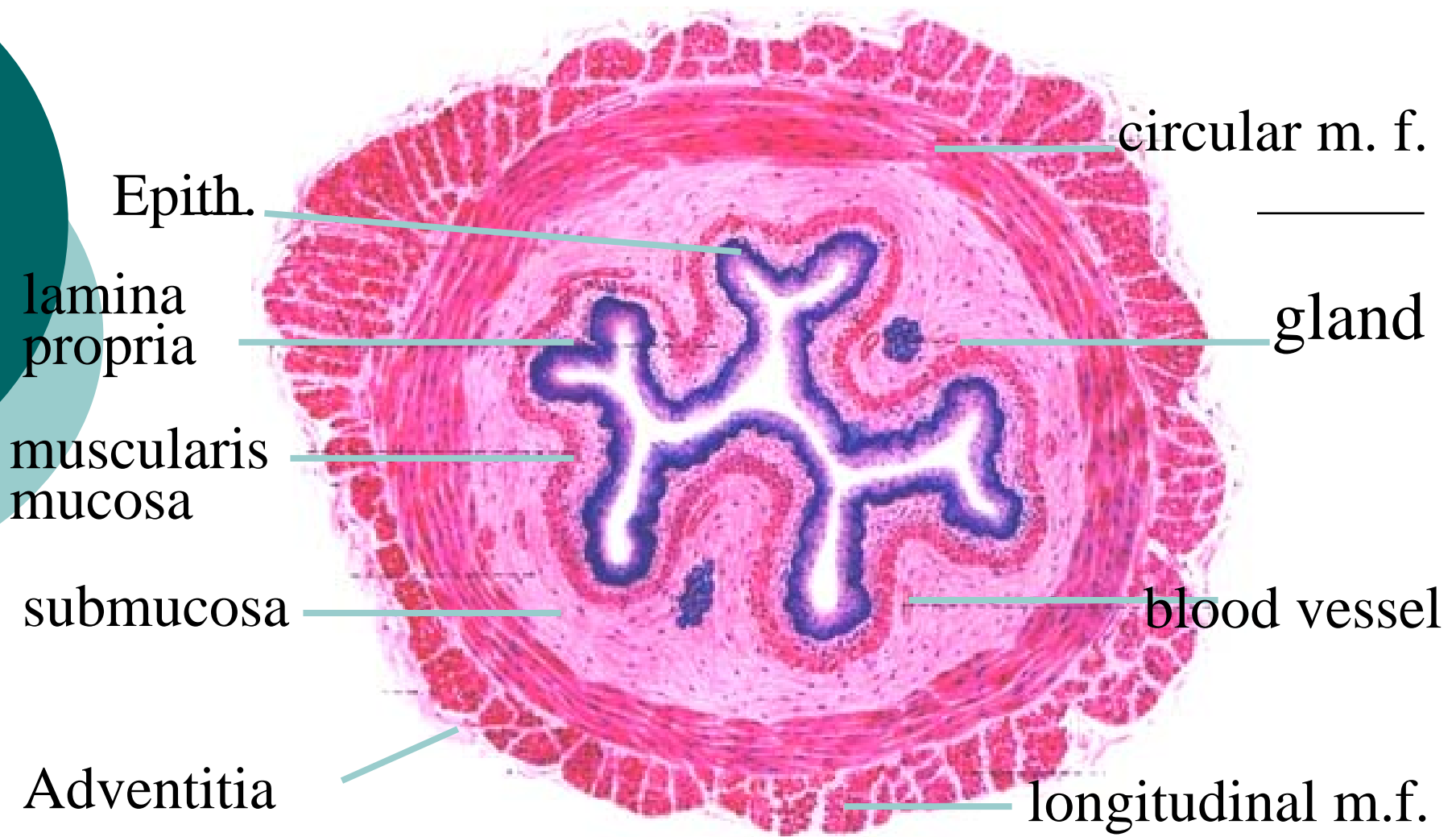
- *macroscopically visible
- *folds of mucosa and submucosa
- *longitudinal/circular form.

villi

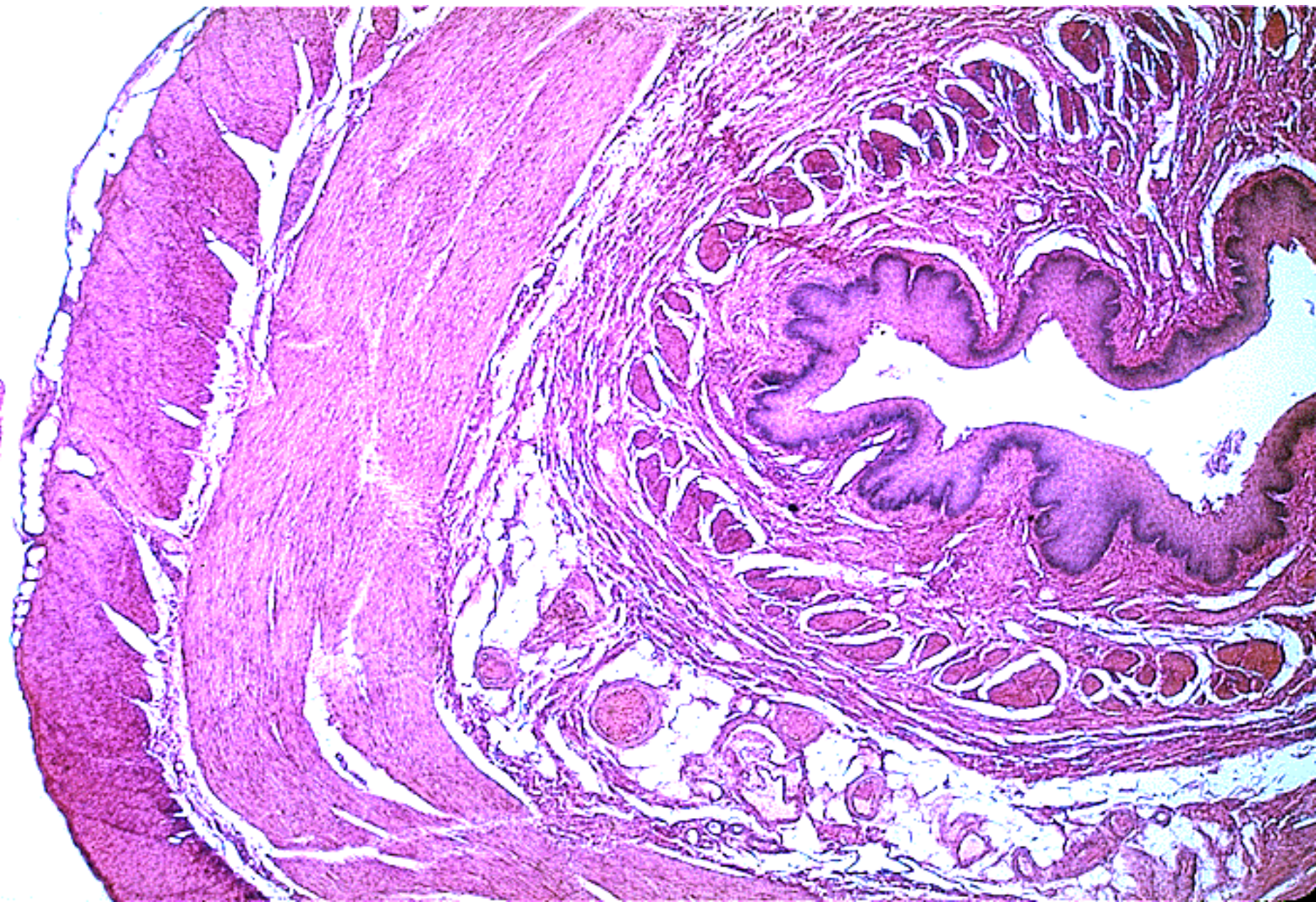
- *folds of epith. and lamina propria

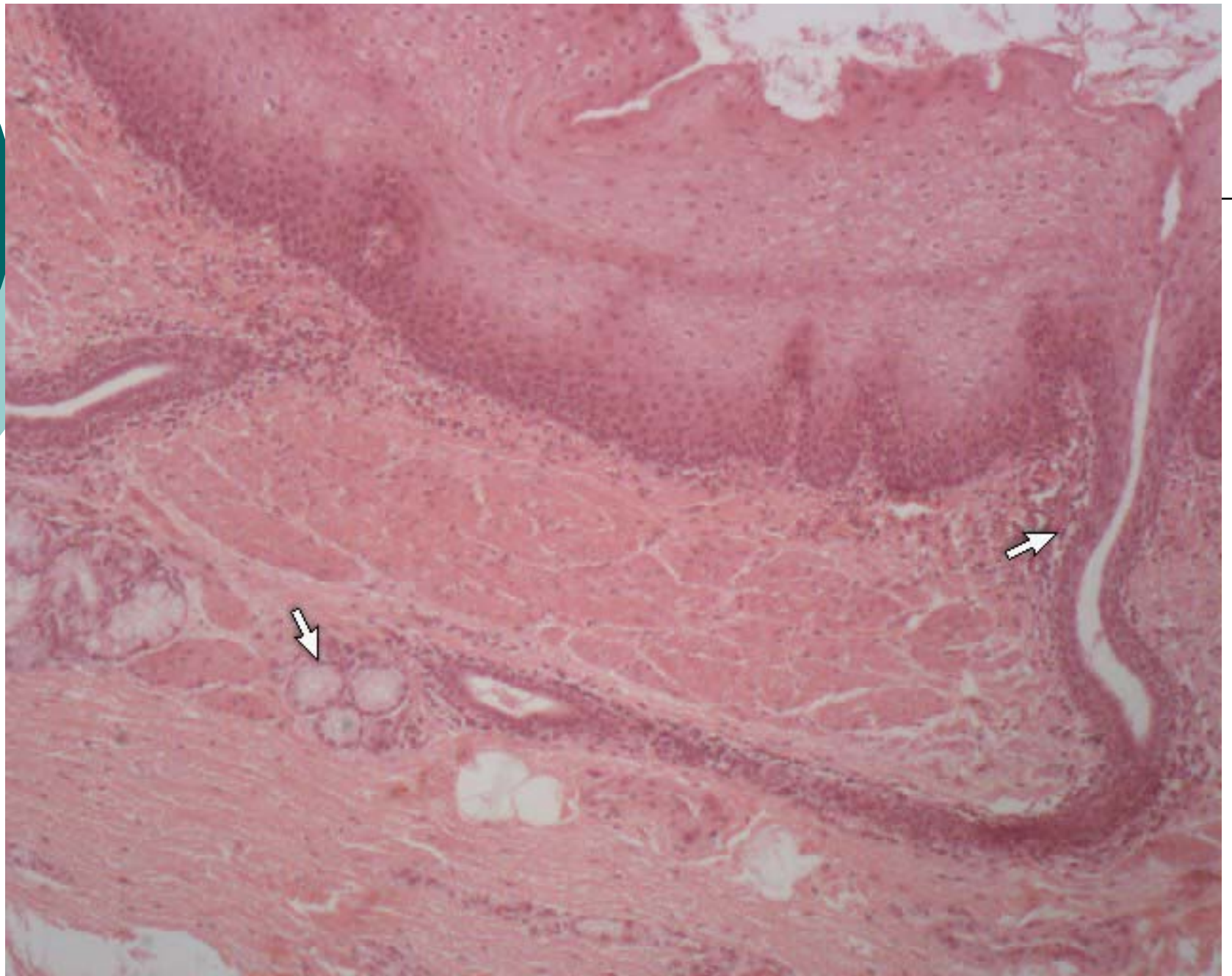
Esophagus





Esophagus (transverse section)





Mucosa

- *epithelium: nonkeratinized striated squamous epith.**
- * lamina propria**
- * muscularis mucosa: only longitudinal muscle bundles**

Submucosa

- * esophageal glands**

several longitudinal folds (plicae**)**

***muscularis:**

upper third: skeletal muscle.

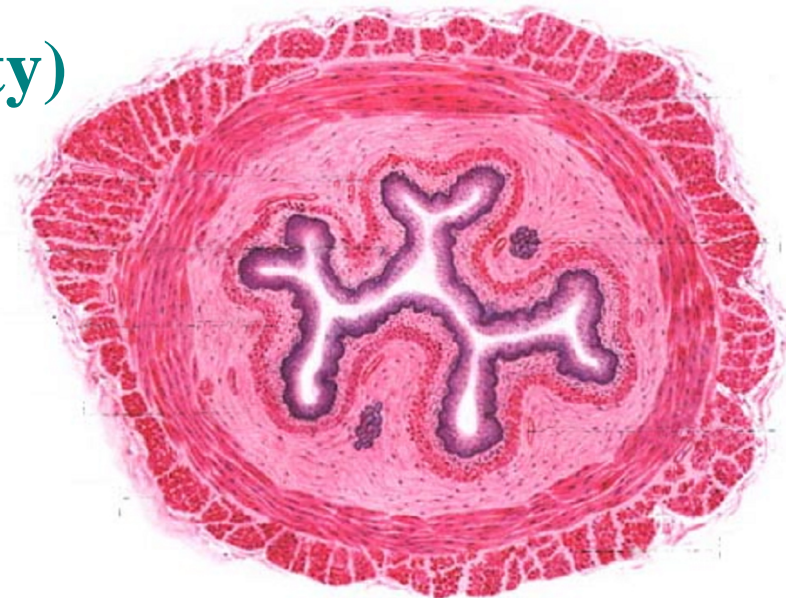
lower third: only smooth muscle.

middle third: mixed with both muscles

***adventitia**

fibrosa

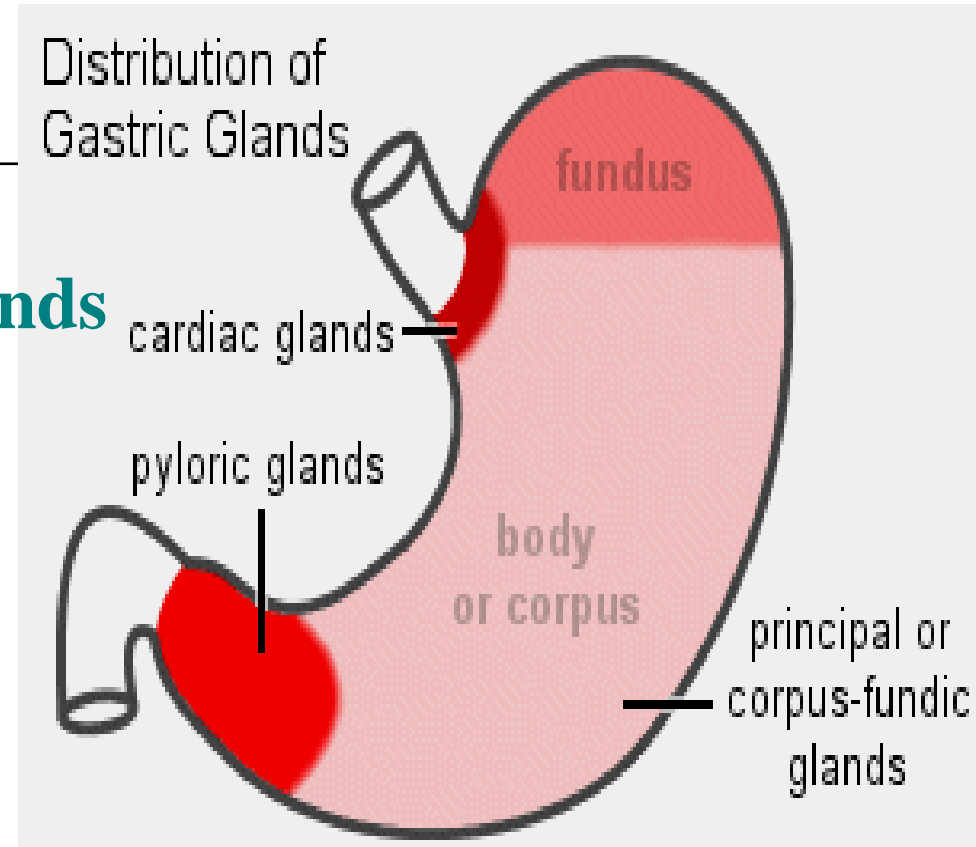
serosa (in peritoneal cavity)



4. Stomach

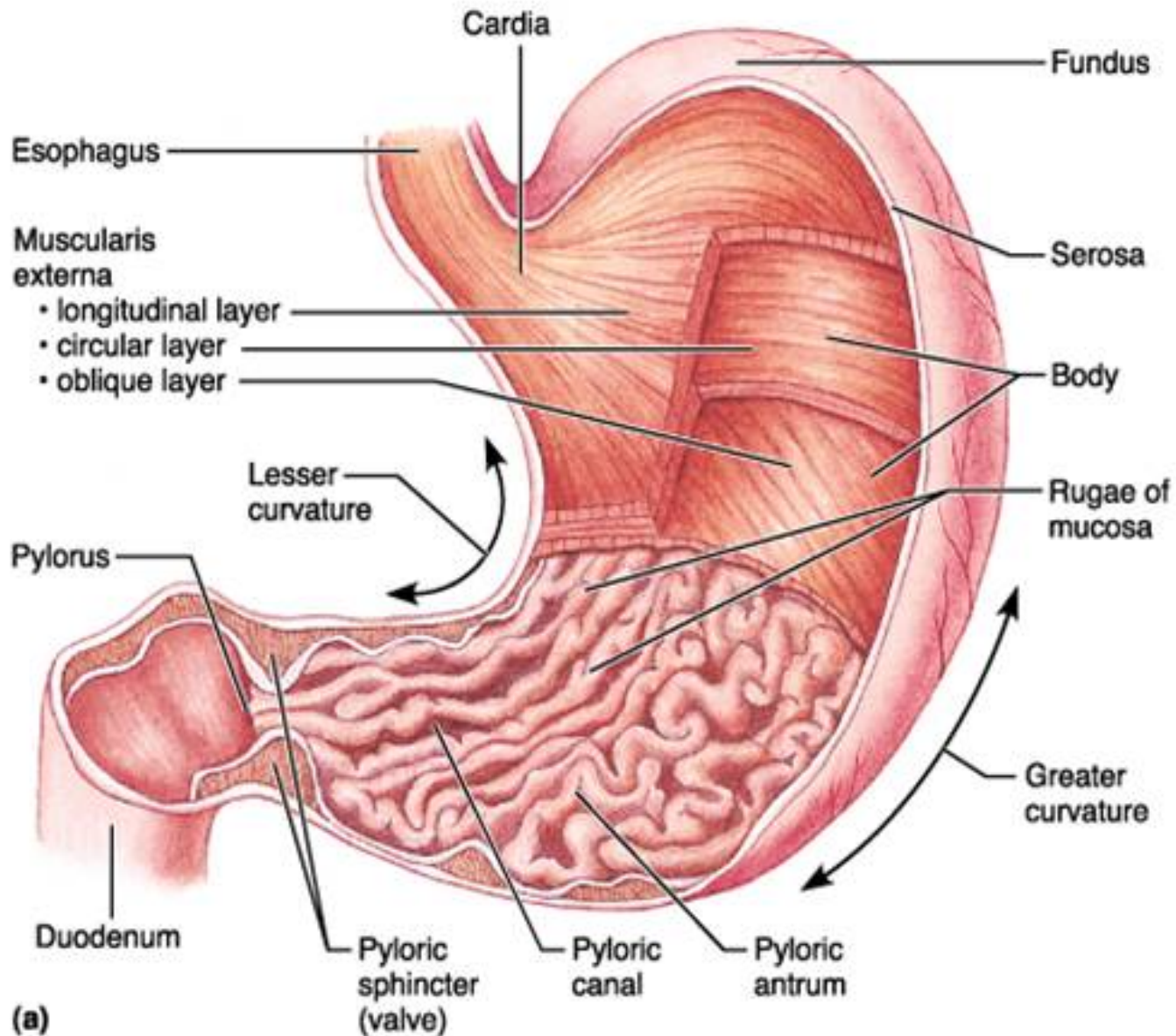
Three types of gastric glands

- *cardiac glands
- *pyloric glands
- *fundic /oxyntic glands

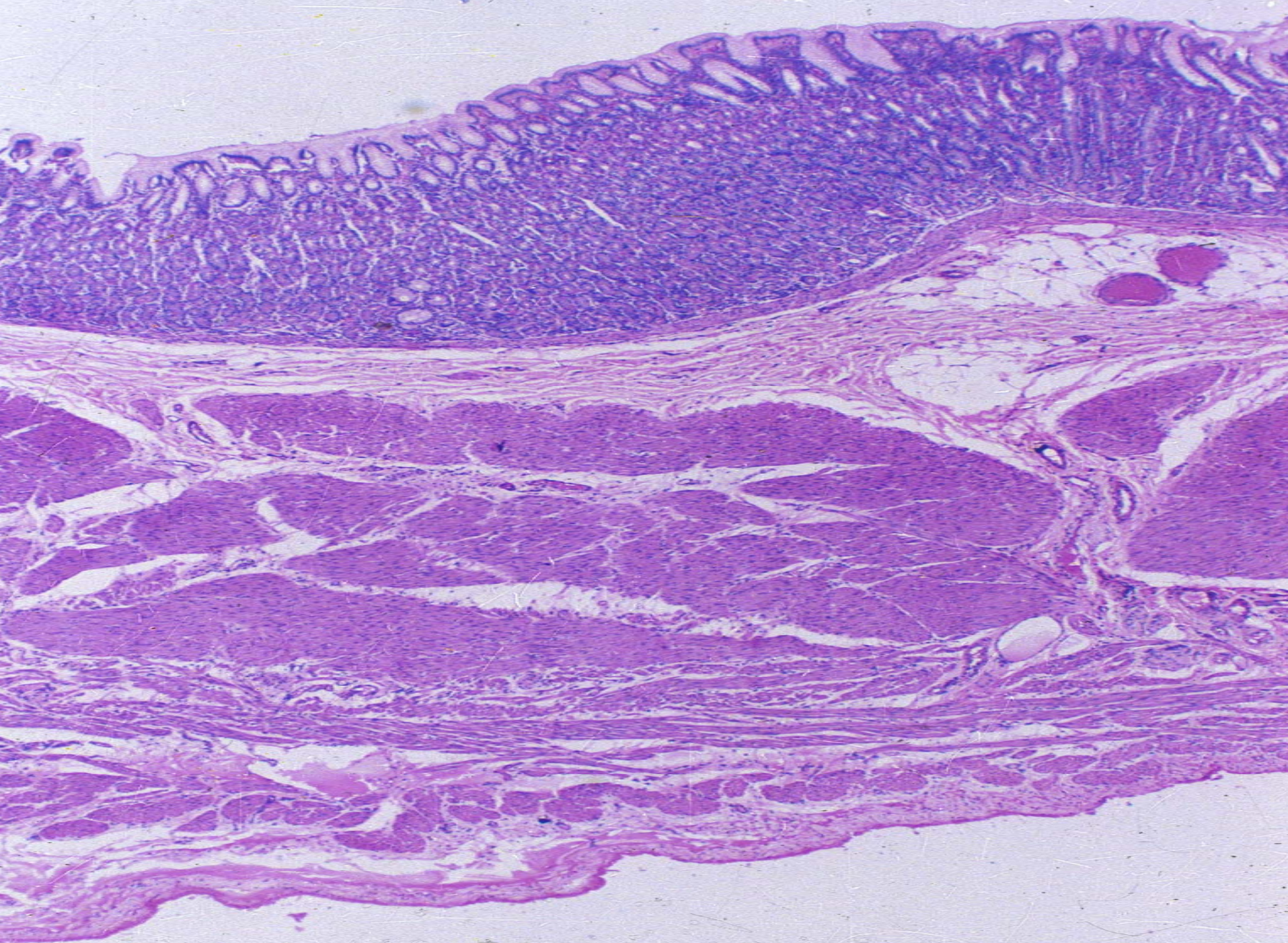


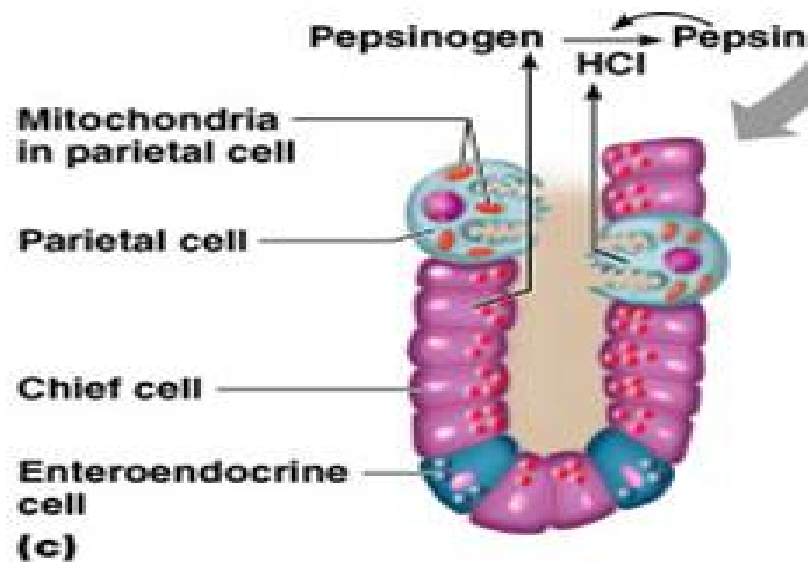
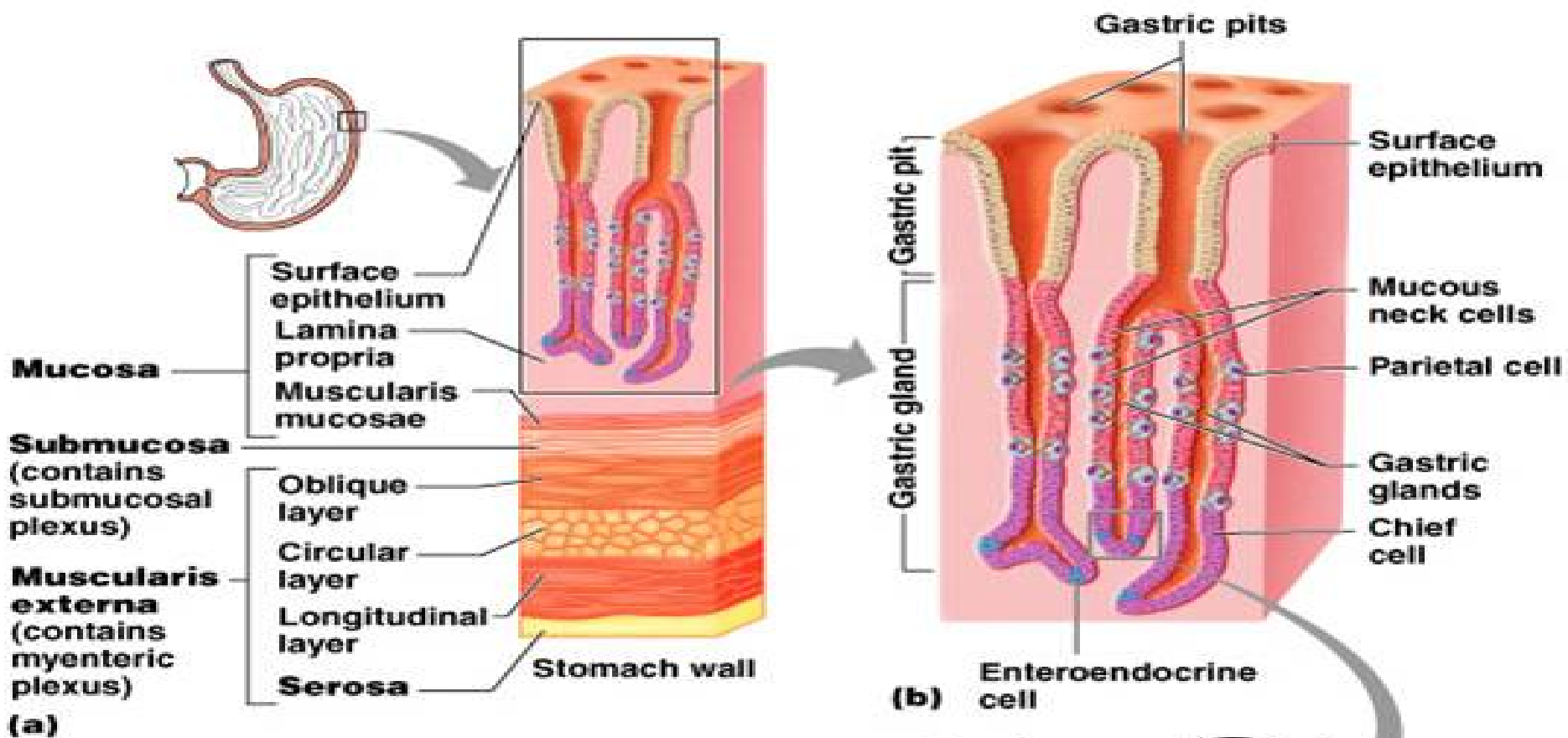
- occupied the largest area of the stomach
- the epith. of the glands formed by different cell types secreted acid, enzymes, mucus and hormones

4. Stomach (fundus)





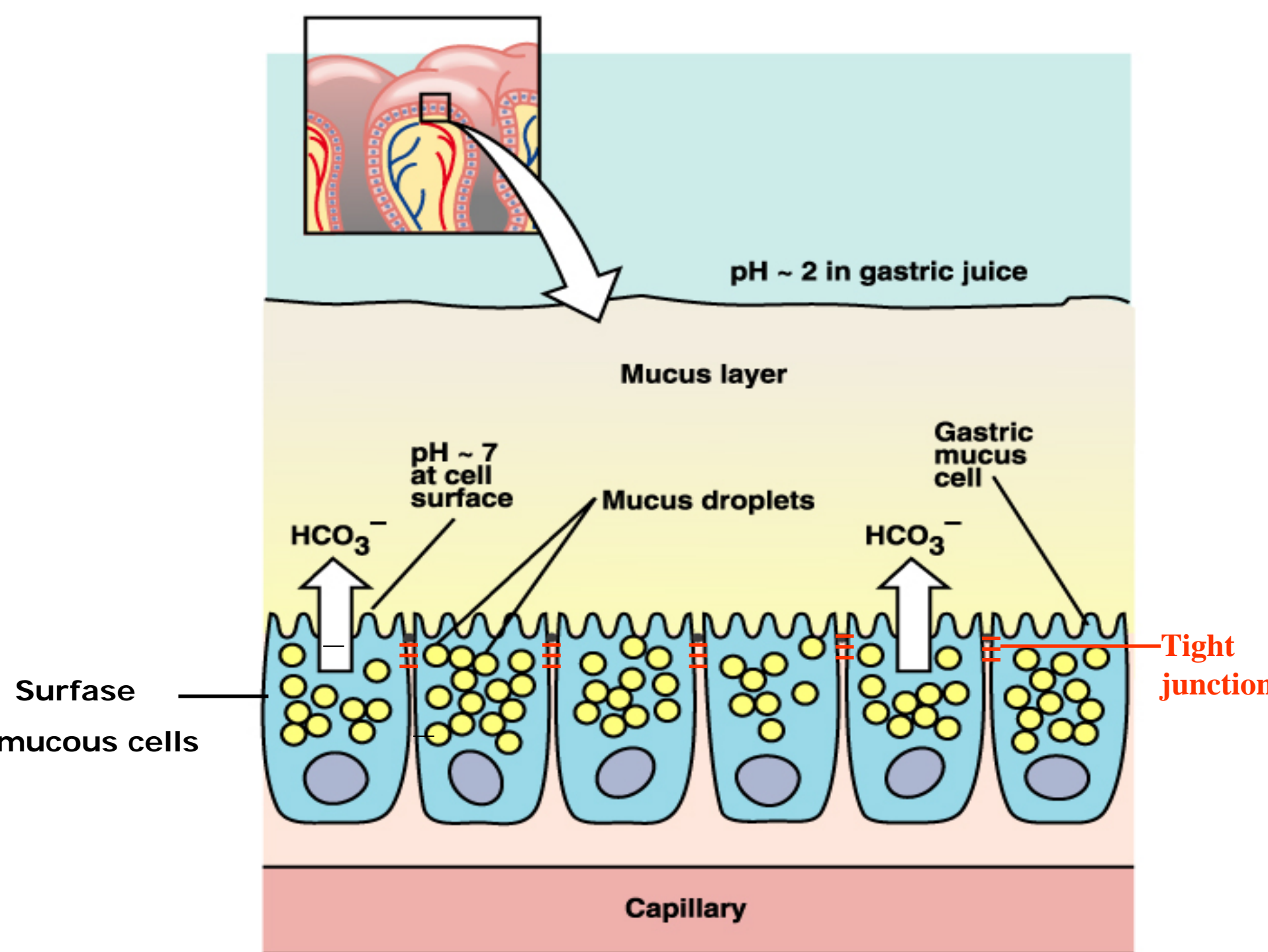




Surface mucous cells

- * simple columnar epith.
- * extending into lamina propria, forming the gastric pits
- * ovoid, basally-located nuclei
- * mucin granules occupy the supranuclear region with poorly staining in H.E.
- * prominently tight junction at the cell periphery

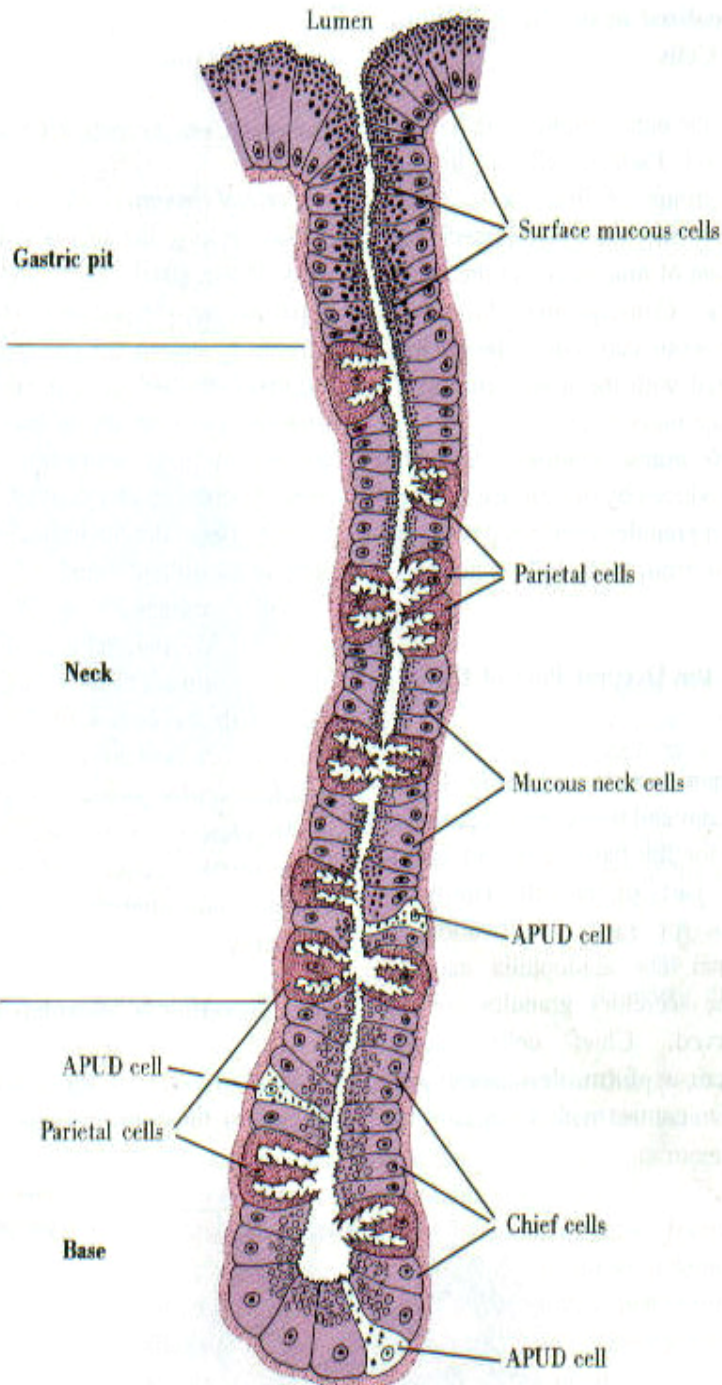




Mucous HCO₃-Barrier

- **Mucus:** Have mucus-containing secretory granules in upper part of cytoplasm. Secrete insoluble mucus containing high content of HCO₃-.
- **tight junctions:** form part of barrier for acid.
- **Function :** protects mucosa from being eroded by acid (pH = 0.9~1.5) and enzymes in the lumen of stomach.

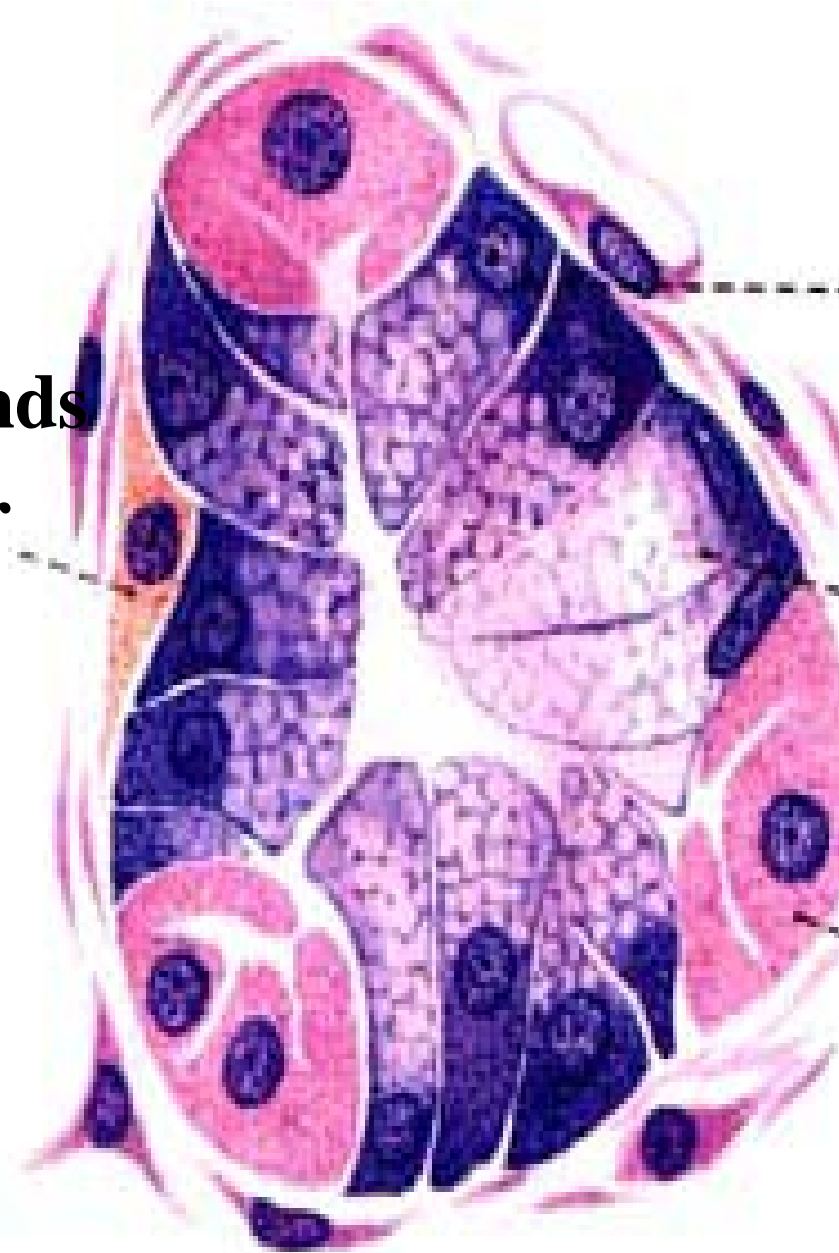
4.1.1 fundic glands



- Chief or zymogenic cells
- Parietal or oxyntic cells
- Mucous neck cells
- Stem cells
- endocrine cell

LM of chief cells

- **In the lower region of glands**
- **Cuboidal or low columnar**
- **Vacuolated appearance**
- **Basally-located nuclei**



EM of chief cells

Microvilli

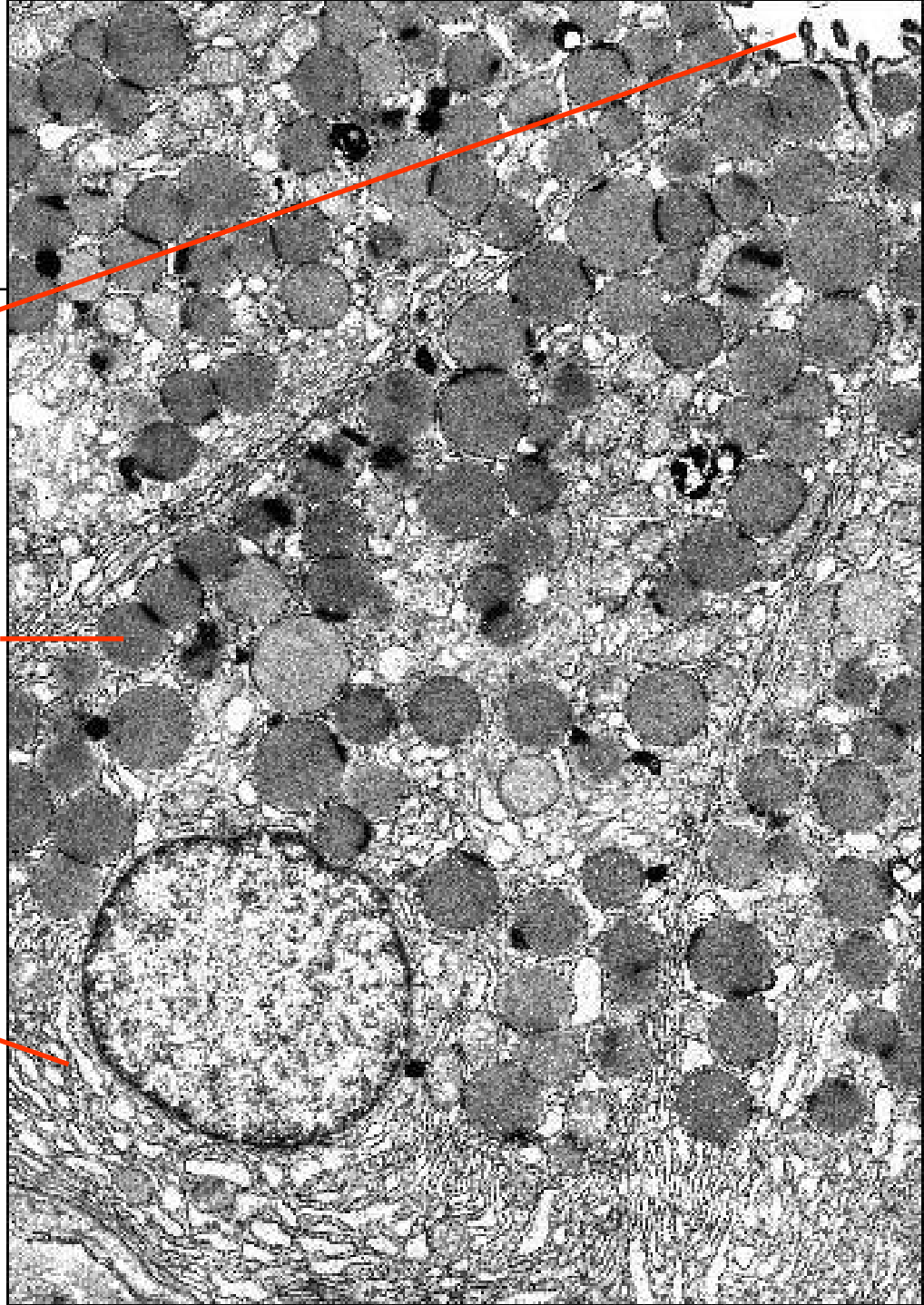
○ **Zymogen granules**

○ **RER**

○ **Mitochondria**

Function:

Produce pepsinogen, lipase



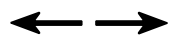
LM of parietal cell

- In the neck and base of gland
- Pyramidal or spherical
- Strong eosinophilic plasma
- Centrally-placed nuclei

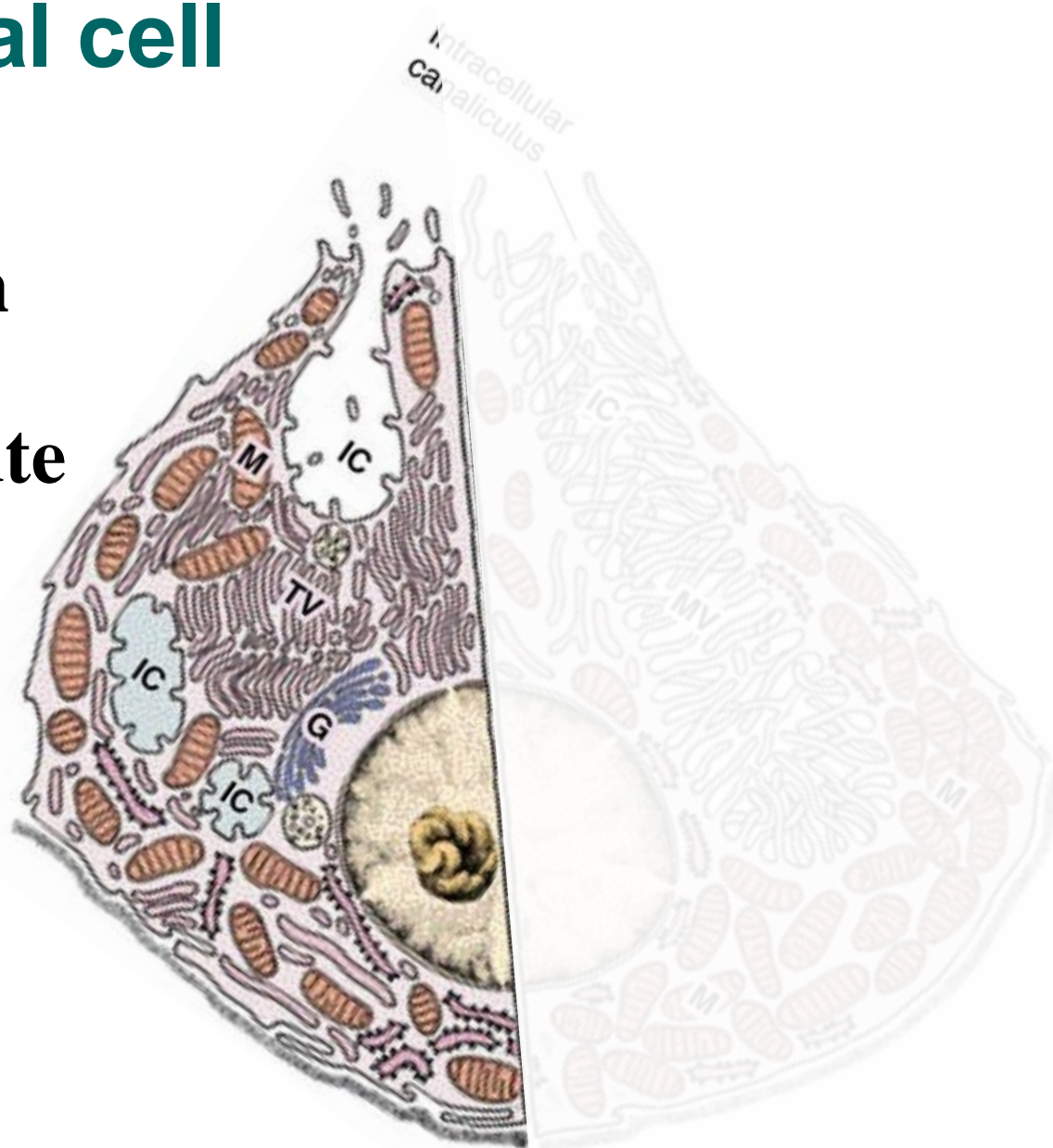


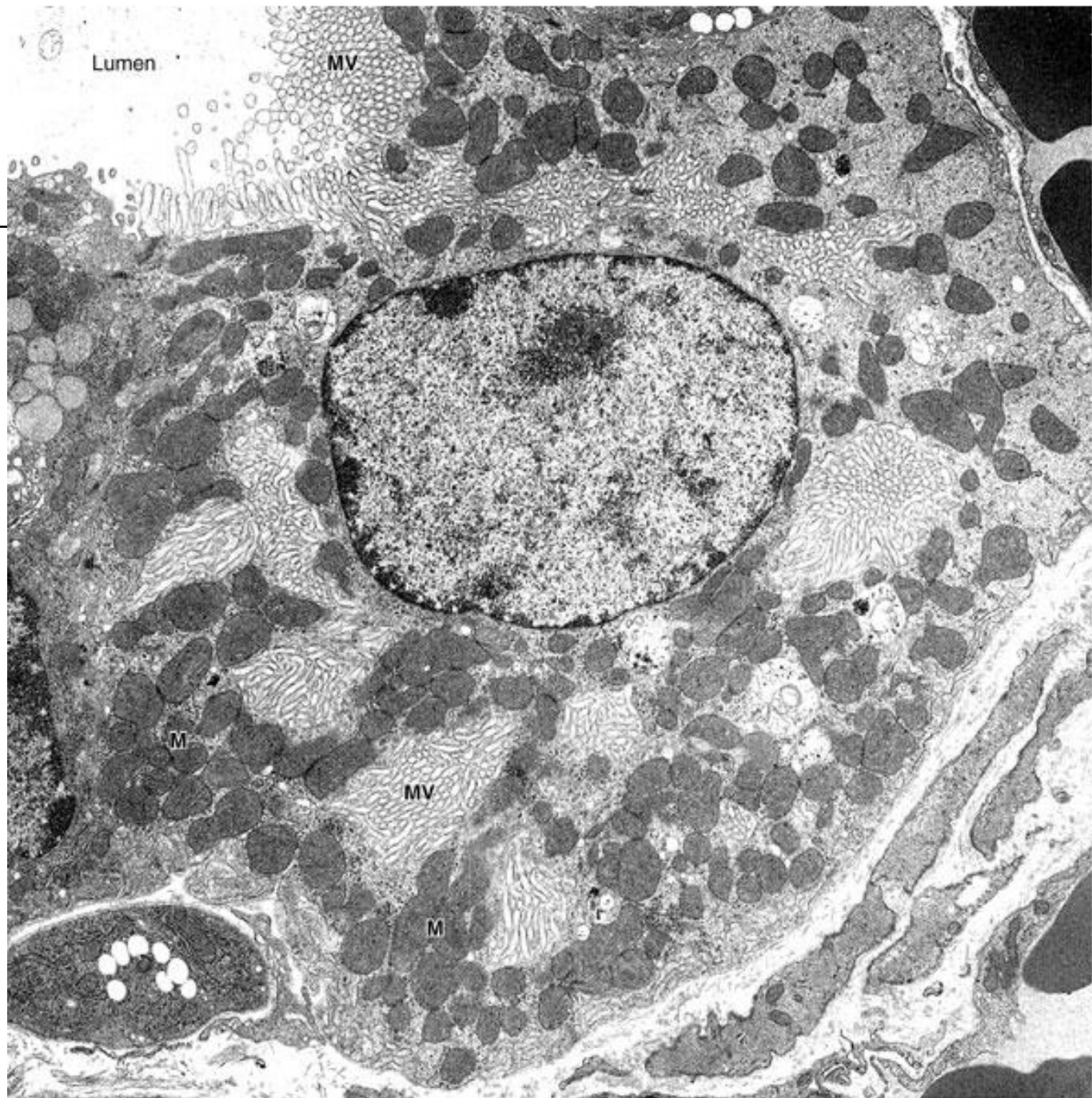
EM of parietal cell

**Intracellular canaliculi(IC) with few microvilli
more SER constitute the tubulovesicles (Resting state)**



IC lined by more microvilli, few tubulovesicles (Active state).





**Active
parietal
cells**

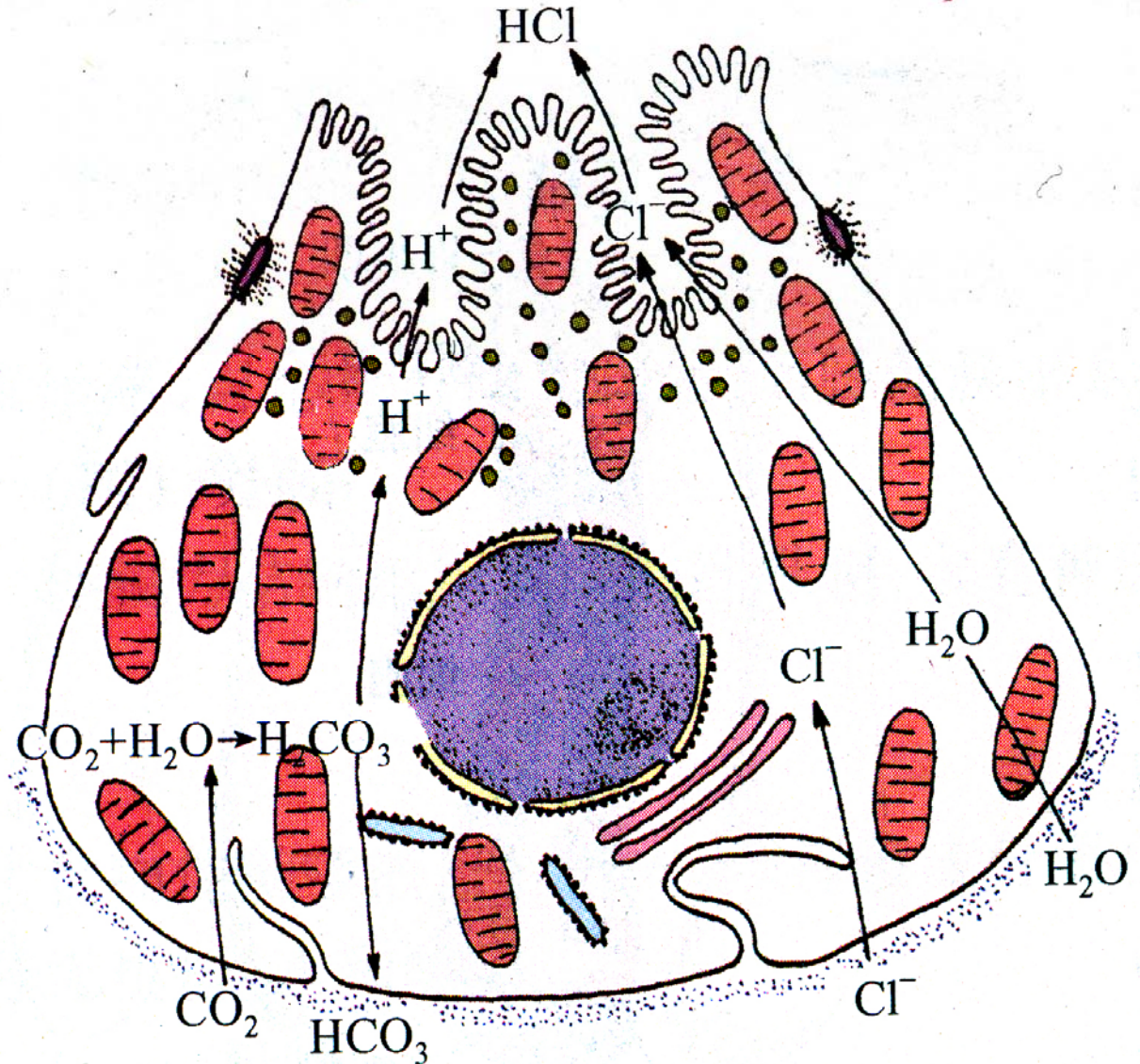
Function of parietal cell (oxyntic cell)

*secreting

- providing
- pepsin
- to kill

*producing

- binding
- in the s



Mucous neck cells

* located

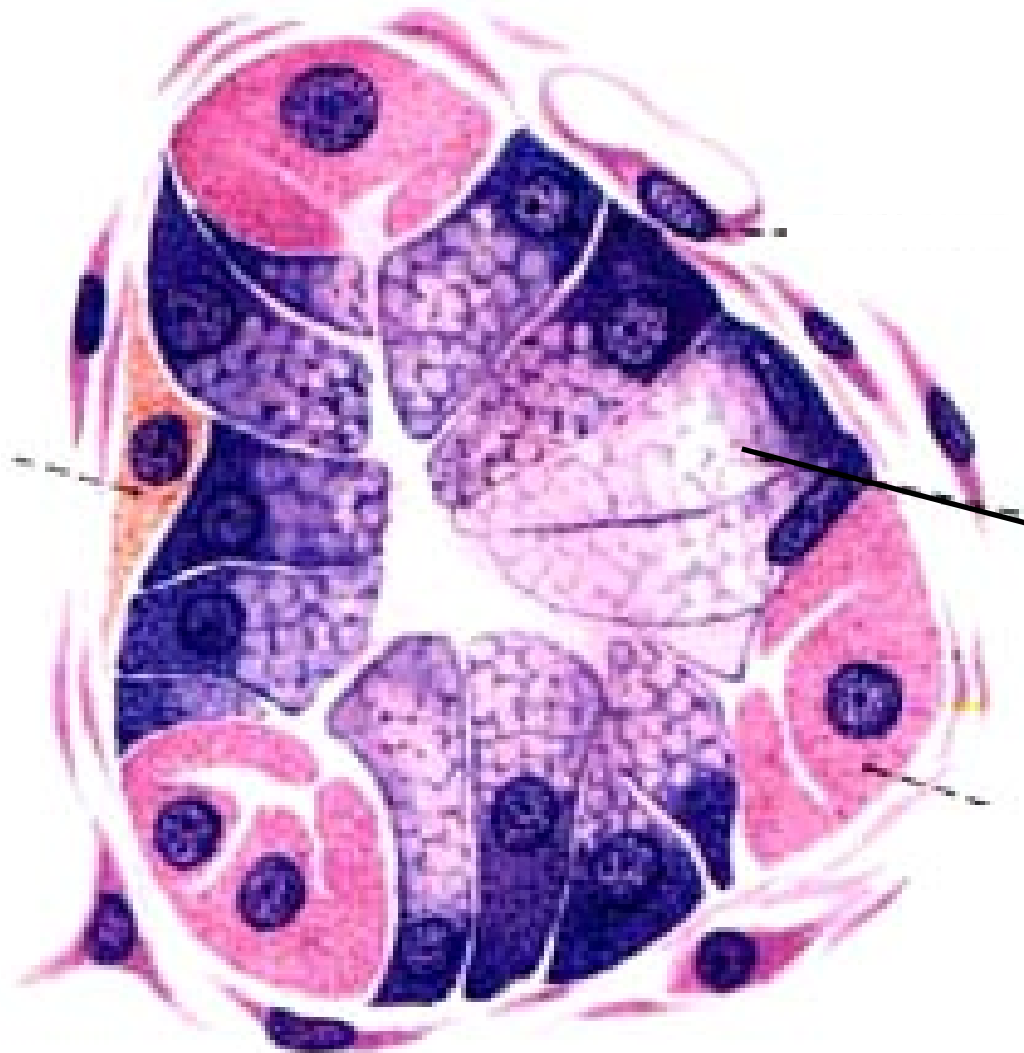
* flatten

* mucin

supran

* secreti

roups;



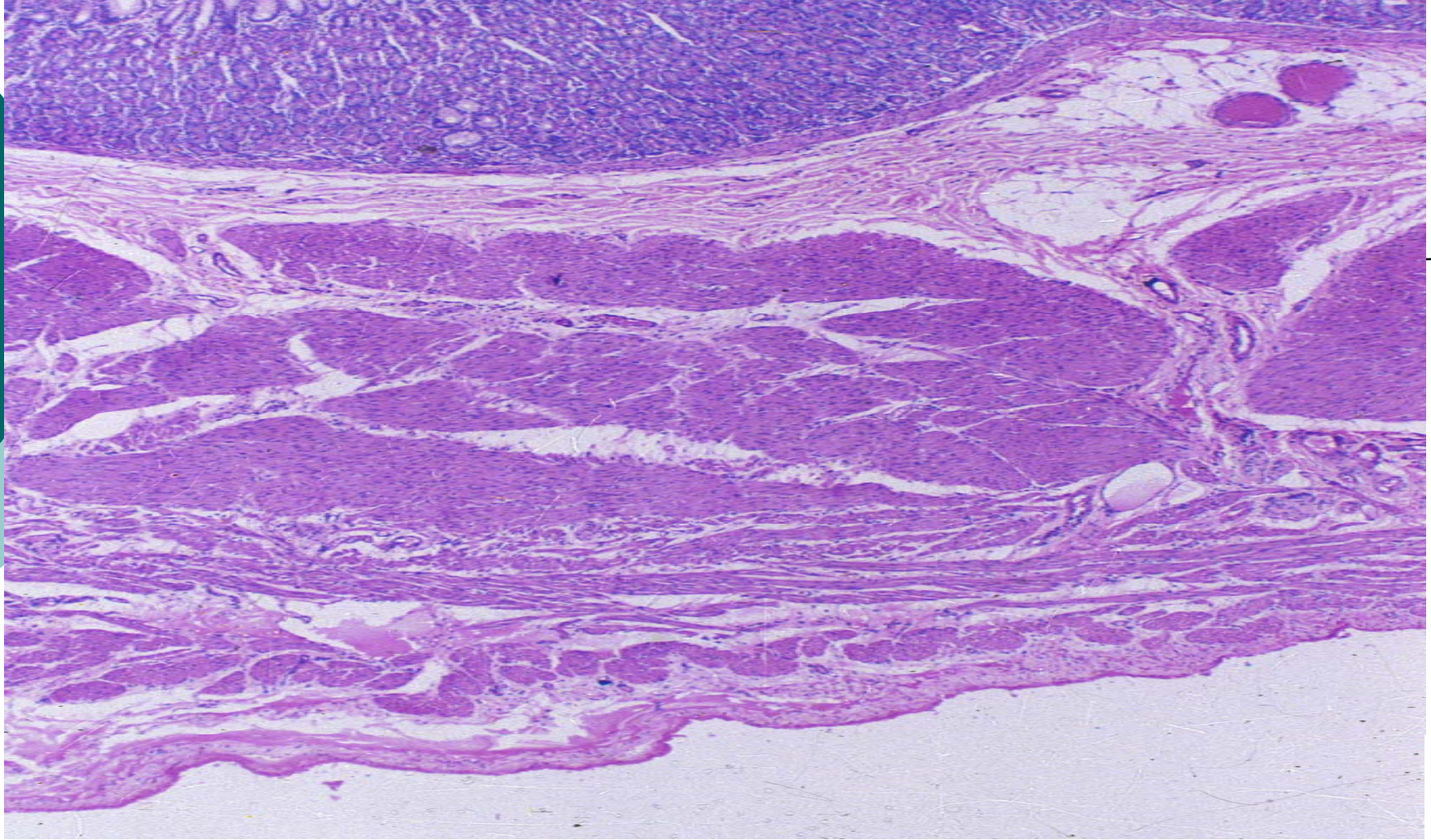
Mucous neck cells

Stem cell

- * in the neck
- * a group of undifferentiated cells located in the neck region of the gland;
- * differentiating into surface mucous cells, chief cells and parietal cells;

Endocrine cells

- * In the base
- * **EC cell:** serotonin
- * **A cell:** Glucagon stimulated the hepatic glycogenolysis
- * **D cell:** somatostatin inhibited secretion of parietal cells and other endocrine cells



4.2. Submucosa: LCT containing large blood, lymph vessels and nerves.

4.3. Muscularis: Inner oblique layer + middle circular layer + external longitudinal layer of **smooth muscles**. Between the layers of smooth muscles exist the **nerve plexus** (intramural ganglia).

4.4. Adventitia: **Serous** membrane.

Summary

- **Master the structure of esophagus, stomach, especially the structure and functions of fundic gland, mucous-HCO₃- barrier.**
- **Know gastrointestinal five kinds of endocrine cells (EC cells, ECL cells, G cells, I cells and S cells).**
- **Understand the general structure of digestive tract.**