ESOPHAGUS & STOMACH

Objectives:
Describe the microscopic structure in correlation with the function of the following organs:

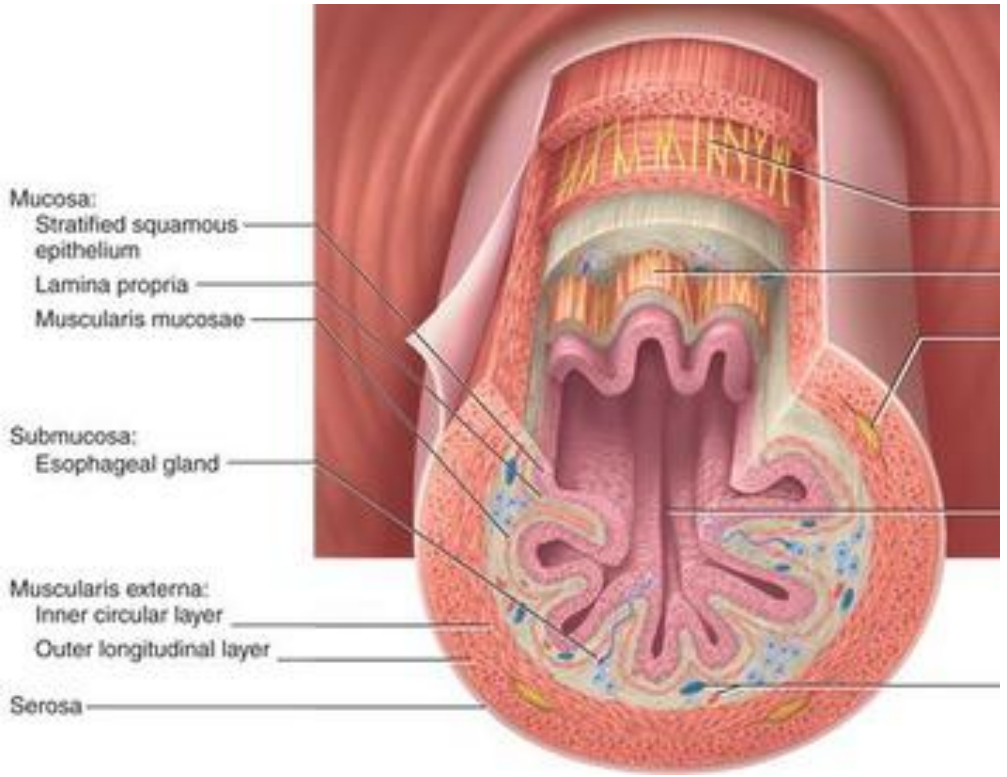
- Esophagus.
- Stomach.

- **Editing file**
- **Important**
- **Doctor notes / Extra**

Alimentary Canal

Is the tubular portion of digestive system.

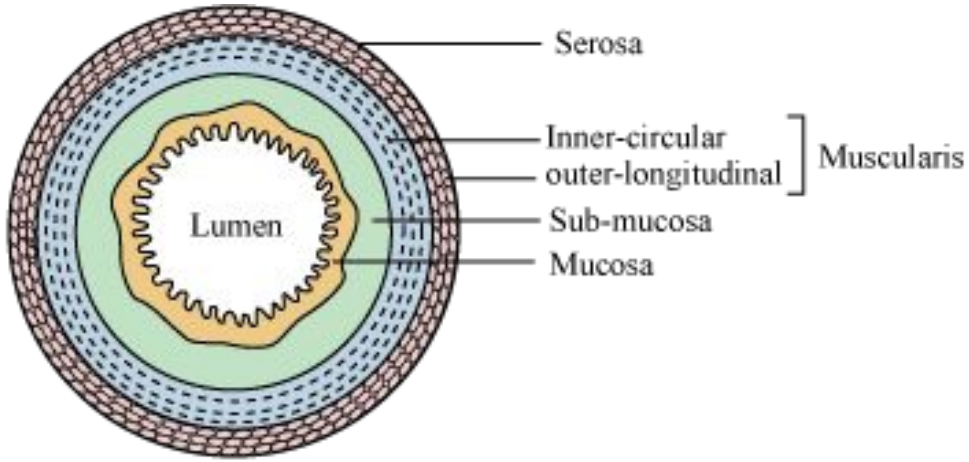
Is subdivided into: esophagus, stomach, small intestine (duodenum, jejunum and ileum), and large intestine (cecum, colon, rectum, anal canal, and appendix).



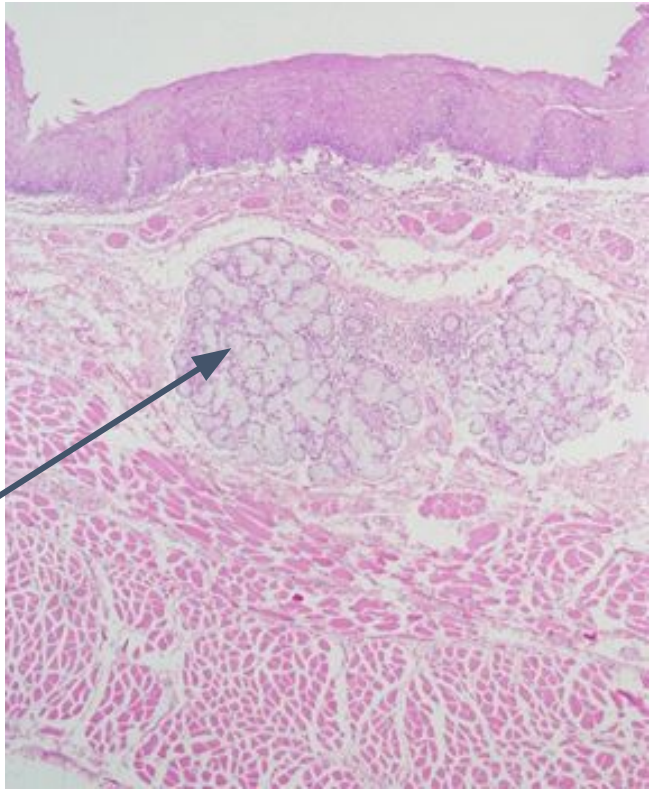
General Architecture of L/M Structure of Alimentary Canal:

- Mucosa.
- Submucosa.
- Muscularis externa.
- Adventitia OR serosa.

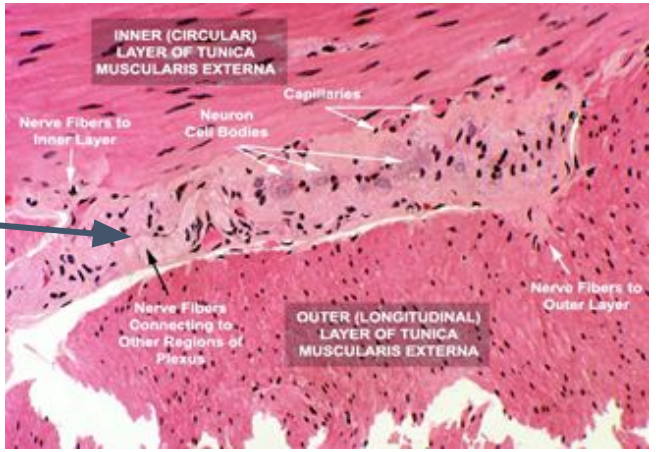
Adventitia: No mesothelium
Serosa: Have mesothelium



Esophagus Four concentric layers:

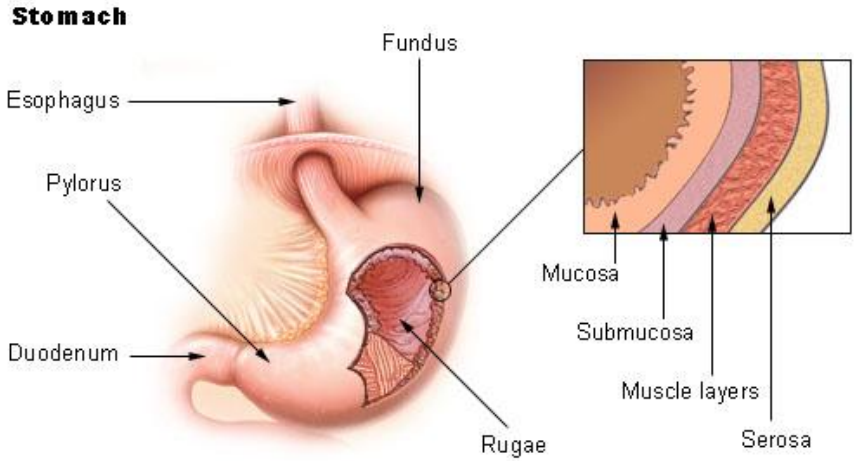


Mucosa	Epithelial Lining: Non-Keratinized Stratified Squamous Epithelium. Lamina propria: Loose areolar C.T. with mucosal esophageal glands (secretion of mucus) in the upper and lower ends. Muscularis mucosae: Few layers of smooth muscle fibers.
Submucosa	Loose areolar C.T. containing blood vessels, nerves, **submucosal esophageal glands** (secretion of mucus). **Meissner's plexus of nerve fibers and nerve cells.**
Muscularis Externa	Two muscle layers: Inner circular layer & Outer longitudinal layer. • Upper 1/3: both layers are skeletal M. • Middle 1/3: inner layer is smooth muscle, outer layer is skeletal M. • Lower 1/3: both layers are smooth M. Auerbach's (myenteric) plexus (nerves) in between the 2 layers.
Serosa or Adventitia	Adventitia: is loose areolar C.T. **not** covered by mesothelium. Serosa: is loose areolar C.T. covered by mesothelium *(simple squamous epithelium)* **in the abdominal part of the esophagus.**

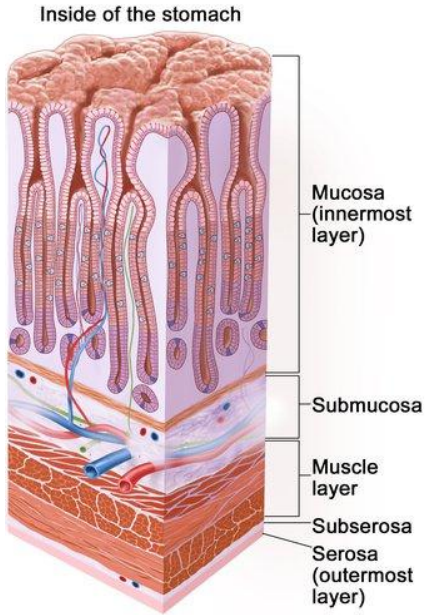


Stomach

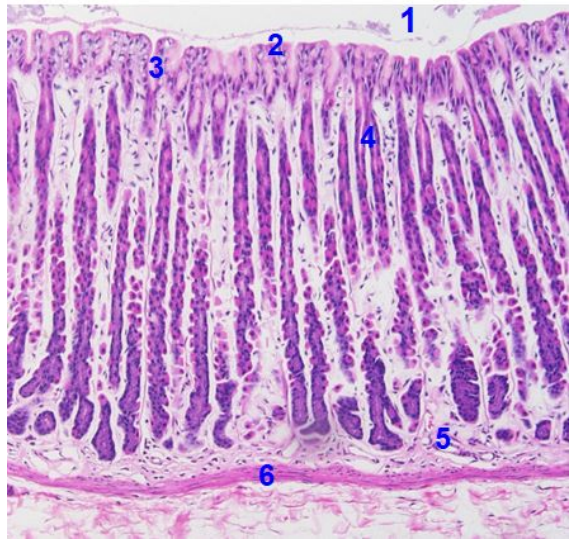
- It has 4 regions: cardia, fundus, body and pylorus.
- Mucosa has folds, known as **rugae** that disappear in the distended stomach.

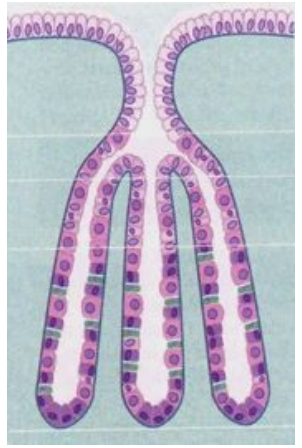


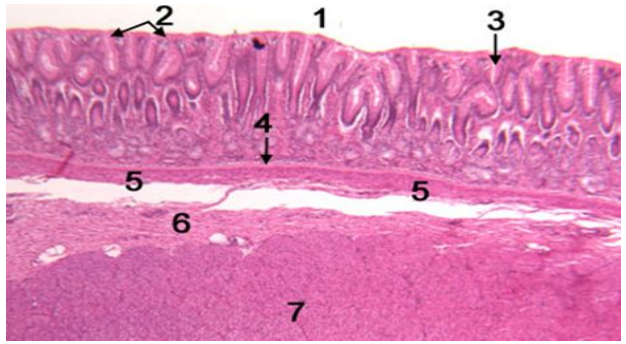
	Fundus (and Body) of Stomach	Pylorus of Stomach
Mucosa	is invaded by **fundic glands**.	is invaded by **pyloric glands**
	The surface epithelium of the mucosa is simple columnar mucus-secreting cells.	
Submucosa	• Connective tissue containing blood vessels, nerves, and Meissner's plexus. • **NO glands**.	
Muscularis Externa	**Three** smooth muscle layers: • Inner oblique. • Middle circular. • Outer longitudinal. Auerbach's (myenteric) plexus.	**Two** smooth muscle layers: • Inner circular. • Outer longitudinal. Auerbach's plexus.
Serosa	C.T. covered by mesothelium.	



Mucosa of Fundus of Stomach	1. Lumen. 2. Surface columnar epithelium. 3. Pits of fundic glands. 4. Fundic glands. 5. Lamina propria. 6. Muscularis mucosae.
Mucosa of Pylorus of Stomach	1. Lumen 2. Surface epithelium 3. Pits of pyloric glands 4. Lamina propria 5. Muscularis mucosae 6. Submucosa (not in the mucosa) 7. Muscularis externa (not in the mucosa)

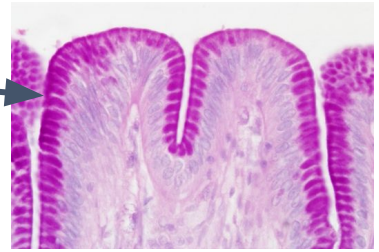






Mucosa of Fundus of Stomach is composed of:

1. Surface Columnar Epithelium: Simple columnar epithelium: secretes mucus.
2. Lamina propria: C.T. invaded by numerous fundic glands with lymphoid elements.
3. Muscularis mucosae: 2 layers of smooth muscle fibers.



Fundic Glands (oxyntic)

- **Short pits** (holes): one fourth of mucosa.
- Simple branched tubular glands.
- Are rich in parietal & chief cells.

Cell types

Peptic (chief) cells: rich in SER -> acidophilic, rich in RER -> basophilic

The predominant cell type.
Shape: Columnar cells.
Nucleus: basal, round.
Cytoplasm: *basophilic* with apical secretory granules.
secrete pepsinogen. (inactive form of pepsin)

Parietal (oxyntic) cells: oxy- = acidophilic

Shape: pyramidal or polygonal.
Nucleus: central, round.
Cytoplasm: **deeply *acidophilic***, rich in SER and mitochondria (40% of the cell volume).
C-shaped intracellular canaliculus. numerous mitochondria
Secrete HCl and gastric intrinsic factor that helps absorption of vitamin B12.

Mucous neck cells: secrete mucus.

Enteroendocrine (EE) (DNES) cells:
Enterochromaffin (EC) cells: secrete hormones (e.g. serotonin, endorphin).

Stem cells: regenerative cells. (renew the other cell types)

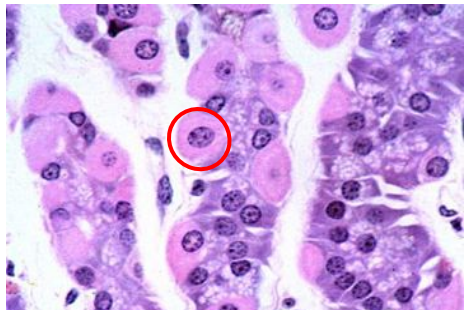
Pyloric glands

- **Deep pits** (holes): half the length of mucosa.
- They are branched and convoluted, many cross sections.

Cell types

No Peptic (chief) cells

Few Parietal (oxyntic) cells



Mucous neck cells:
The predominant cells

Enteroendocrine (EE) (DNES) cells:
EC cells, G cells, D cells, A cells

Stem cells: regenerative cells.

Quiz

1- which one of the following is NOT part of gastric (stomach) glands?

A. Peptic (chief) cells
B. Mucous neck cells
C. Simple columnar epith.
D. Enteroendocrine cells

2- Which of the following have Two muscle layers in it's Muscularis Externa?

A. Esophagus
B. Fundus of stomach
C. Pylorus of stomach
D. A & C

3- Peptic (chief) cells secretes

A. HCl
B. pepsinogen
C. gastric intrinsic

4- The predominant cell type of fundic glands is:

A. Peptic (chief) cells
B. Parietal (oxyntic) cells
C. Mucous neck cells
D. EE cells

5- The predominant cell type of pyloric glands is:

A. Peptic (chief) cells
B. Parietal (oxyntic) cells
C. Mucous neck cells
D. EE cells

6- Cytoplasm of Parietal cells is:

A. Acidophilic
B. Basophilic

1.C 2.D 3.B 4A 5.C 6.A

Team Leaders

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Good luck