

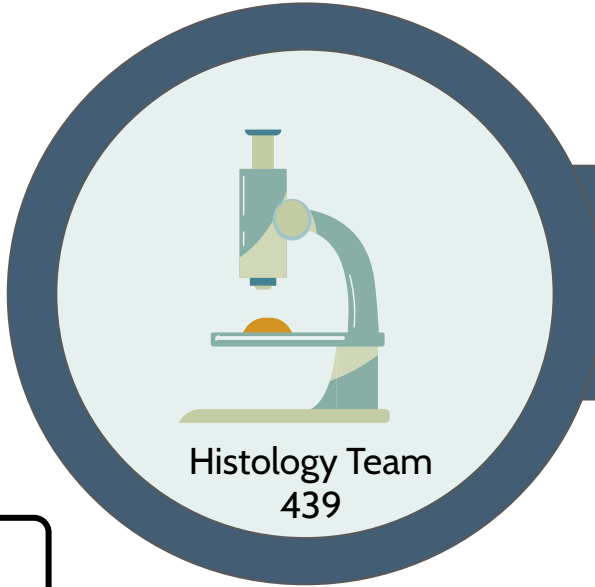


MED439  
KING SAUD UNIVERSITY

Revised & Approved



جامعة  
الملك سعود  
King Saud University



Histology Team  
439

# Esophagus & Stomach

Color index:

Slides



Important



Doctors notes



Extra



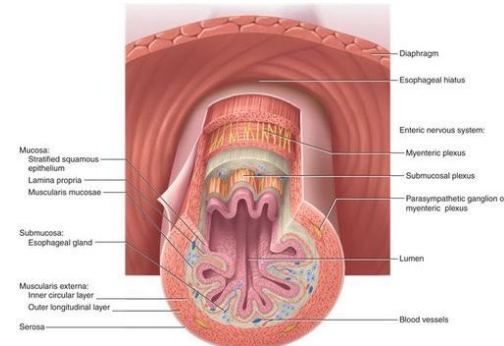
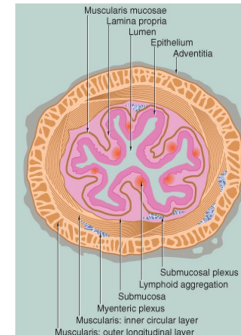
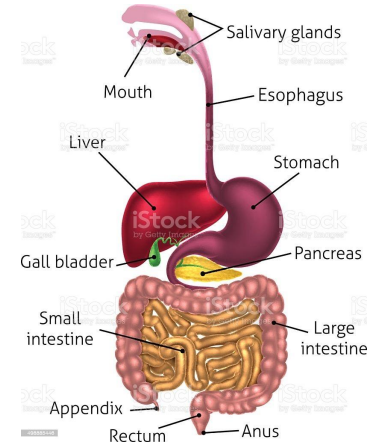
[Editing file](#)

## ► Objectives:

- By the end of this lecture, the student should be able to discuss the microscopic structure in correlation with the function of the following organs :
  1. Esophagus.
  2. Stomach.

# ► Alimentary Canal

- Is the tubular portion of digestive system. Muscular tube
- 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 (inner circular muscle appears in the section as long and outer longitudinal muscle appears in the section as circular)
  - Adventitia/Serosa (covering, the adventitia is only connective tissue While the serosa is CV covered by peritoneum 'mesothelium')
  - 10% of neurons present in submucosa and muscularis externa

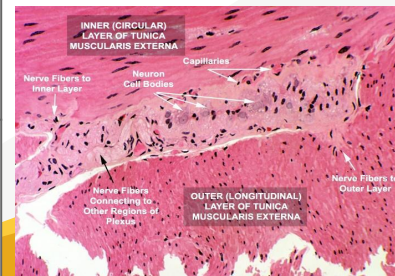
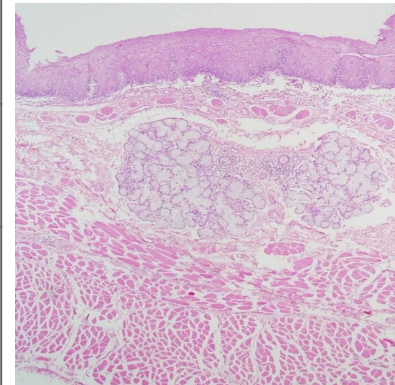
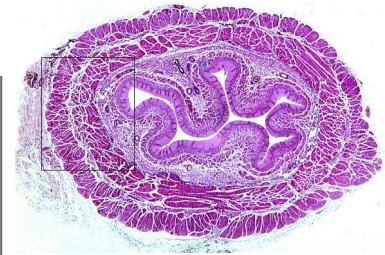


# ► Esophagus

Majority of the esophagus is in the thoracic

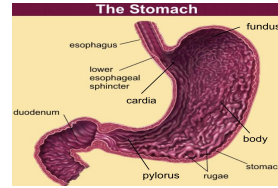
Four concentric layers:

<p><b>Mucosa</b></p>	<p>Is irregular to change the diameter for squeezing and conducting the food</p> <ul style="list-style-type: none"> <li>• <b>Epithelial Lining:</b> Non-Keratinized Stratified Squamous Epithelium.</li> <li>• <b>Lamina propria:</b> Loose areolar C.T. with <b>mucosal esophageal glands</b> (secretion of mucus) for lubrication found in the upper and lower ends little or no in the mid.</li> <li>• <b>Muscularis mucosae:</b> Few layers of smooth muscle fibers</li> </ul>
<p><b>Submucosa</b></p>	<p>Loose areolar C.T. containing <b>blood vessels, nerves, submucosal esophageal glands</b> (secretion of mucus) and <b>Meissner's plexus</b> of nerve fibers and nerve cells</p>
<p><b>Muscularis Externa</b></p>	<p>1- <b>Two muscle layers :</b>              Inner circular layer and Outer longitudinal layer.</p> <ul style="list-style-type: none"> <li>- Upper 1/3 : both layers are skeletal M. (Upper 1/3 near the oral cavity which is skeletal muscle)</li> <li>- Middle 1/3 : inner is smooth muscle &amp; outer is skeletal muscle.</li> <li>- Lower 1/3 : both layers are smooth M. (Lower 1/3 near the stomach which is smooth muscle)</li> </ul> <p>2- <b>Auerbach's (myenteric) plexus</b> in between two layers.</p>
<p><b>Serosa/Adventitia</b></p>	<ul style="list-style-type: none"> <li>• <b>Adventitia</b> is loose areolar C.T. <b>not covered by mesothelium.</b> (cervical and thoracic parts)</li> <li>• <b>Serosa</b> is loose areolar C.T. <b>covered by mesothelium</b> (simple squamous epithelium) in the abdominal part of the esophagus. (abdominal part)</li> </ul>

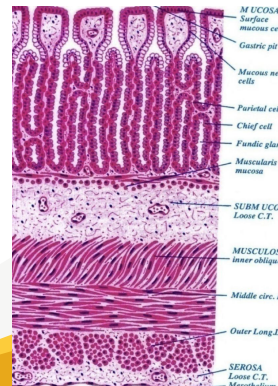


# ► Stomach

- It has 4 regions: **cardia, fundus, body** and **pylorus**.
- Mucosa has folds, known as **rugae** (to ↑ the surface area to ↑ capacity) that disappear in the distended stomach.

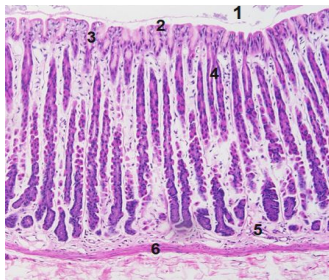


	Fundus (and Body) of Stomach	Pylorus of Stomach
<b>Mucosa</b> Is thick due to the presence of glands invaded by them for chemical digestion for secretion enzymes	<p>The surface epithelium of the mucosa is <b>simple columnar</b> mucus-secreting cells. (the stomach rich in mucus despite there's no goblet cells due to the presence of simple columnar cells and mucous neck cells)</p> <p>Invaded by <b>fundic glands</b>. And composed of:</p> <ol style="list-style-type: none"> <li><b>Surface Columnar Epithelium:</b> Simple columnar epithelium: secretes mucus.</li> <li><b>Lamina propria:</b> C.T. invaded by numerous fundic glands with lymphoid elements.</li> <li><b>Muscularis mucosae:</b> 2 layers of smooth muscle fibers.</li> </ol>	<p>Invaded by <b>Pyloric glands</b>. it secretes mucus which coats and protect stomach</p>
<b>Submucosa</b>	<ul style="list-style-type: none"> <li>• Connective tissue containing blood vessels, nerves, and Meissner's plexus.</li> <li>• <b>NO glands.</b></li> </ul>	
<b>Muscularis Externa</b>	<p>1-<b>Three</b> smooth muscle layers:</p> <ul style="list-style-type: none"> <li>• Inner oblique</li> <li>• Middle circular</li> <li>• Outer longitudinal</li> </ul> <p>2-Auerbach's (myenteric) plexus.</p>	<p>1-<b>Two</b> smooth muscle layers:</p> <ul style="list-style-type: none"> <li>• Inner circular <b>very thick</b> which makes this layer thicker than the others to form sphincter.</li> <li>• Outer longitudinal</li> </ul> <p>2-Auerbach's (myenteric) plexus.</p>
<b>Serosa</b>	C.T. covered by mesothelium.	



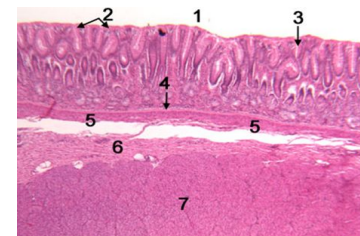
## Mucosa of Fundus of Stomach

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

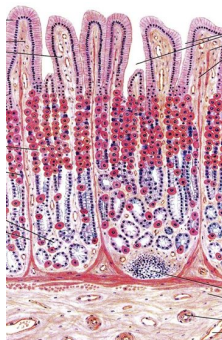
1. Lumen.
2. Surface epithelium.
3. Pits of pyloric glands.
4. Lamina propria.
5. Muscularis mucosae.
6. Submucosa (not in the mucosa)
7. Muscularis externa (not in the mucosa)



## Fundic glands

- **Short pits:**  $\frac{1}{4}$  the length of mucosa.
- Simple branched tubular glands.
- Are rich in parietal & chief cells.

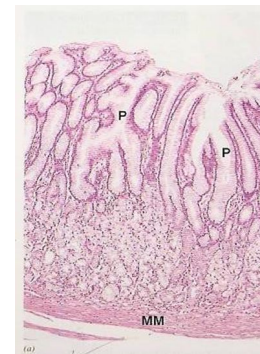
They form invagination called gastric pits



## Pyloric glands

It's function is neutralizing the acidity before reaching the small intestine by secreting mucus .

- **Deep pits most of it (فراغ)** due to the **mucus secretion** :  $\frac{1}{2}$  the length of mucosa.
- They are branched and convoluted, many cross sections.



# ▶ Stomach Glands Cell Types

Cell type	Fundic glands	Pyloric glands
<b>Peptic (chief) cells</b> <small>Also known as zymogenic cells</small>	<p>The predominant cell type.</p> <p><b>Shape:</b> Columnar cells.</p> <p><b>Nucleus:</b> basal, round.</p> <p><b>Cytoplasm:</b> <b>basophilic</b> with apical secretory granules.</p> <p><b>Secrete:</b> pepsinogen. (inactive form of pepsin).</p>	<p>No Peptic cells</p>
<b>Parietal (oxyntic) cells</b> <small>Oxy=acidophilic, partial due part of it not sharing to lumen.</small>	<p><b>Shape:</b> pyramidal or polygonal. (Narrow apex with wide base protruding into lumen)</p> <p><b>Nucleus:</b> central, round.</p> <p><b>Cytoplasm:</b> <b>deeply acidophilic</b>, rich in SER and mitochondria (due to its need for energy) (40% of the cell volume) and C-shaped intracellular canaliculus to increase the surface area which help in increasing the HCl Secretion for acidic medium .</p> <p><b>Secrete:</b> HCl (for activation of pepsinogen ) and gastric intrinsic factor that helps absorption of vitamin B12.</p>	<p><b>Few Parietal cells</b>  <small>Or no because no need for acidic secretion</small></p>
<b>Mucous neck cells</b> <small>Epithelial cells</small>	<p>Secrete mucus</p>	<p>The predominant cell secrete mucus</p>
<b>Enteroendocrine (EE, DNES) cells</b>	<p>Enteroendocrine = <b>entero from the intestine</b></p> <p>Enterochromaffin (EC) cells: secrete hormones (e.g. serotonin, endorphin).</p>	<p>EC cells, G cells, D cells, A cells.</p>
<b>Stem cells</b>	<p>Regenerative cells (renew the other cell types)</p>	

# MCQs

Q1) Which of the following cells are not found in the pyloric glands?

- A- Mucous neck cells
- B- Stem cells
- C- Peptic (chief) cells
- D- Parietal (oxyntic) cells

Q2) Which of the following cells secrete HCl and gastric intrinsic factor?

- A- Mucous neck cells
- B- Stem cells
- C- Peptic (chief) cells
- D- Parietal (oxyntic) cells

Q3) Which one of the following epithelium lines the stomach?

- A- Non-Keratinized Stratified Squamous
- B- Keratinized Stratified Squamous
- C- Simple columnar
- D- Pseudostratified columnar

Q4) Which of the following is found in Fundus and Body of Stomach?

- A- Two smooth muscle layers
- B- Glands in Submucosa
- C- Pyloric glands
- D- Three smooth muscle layers

Q5) Which type lines the epithelium of esophageal mucosa?

- A- Stratified squamous epithelium
- B- Simple squamous epithelium
- C- Keratinized stratified squamous epithelium
- D- Non keratinized stratified squamous epithelium

Q6) The Meissner's plexus of esophagus is found in which layer?

- A- Mucosa
- B- Submucosa
- C- Muscularis externa
- D- Adventitia



## Team leaders

Mariam Alruhaimi

Mohamed Albabtain

## Team members

- ✓ Abdullah Alburikan
- ✓ Fayez AlTabbaa  
Mohammed Alhejji
- 📄 Nawaf Alshahrani  
Nawaf Alghamdi  
Yazeed Alomar

- Afnan AlMohsen
- ✓ Joud Alarifi  
Maha Alqahtani  
Nourah Alklaib
- 📄 Rania Almutairi  
Shahad Alrasheed
- 🔍 Sumo Abdulrahman