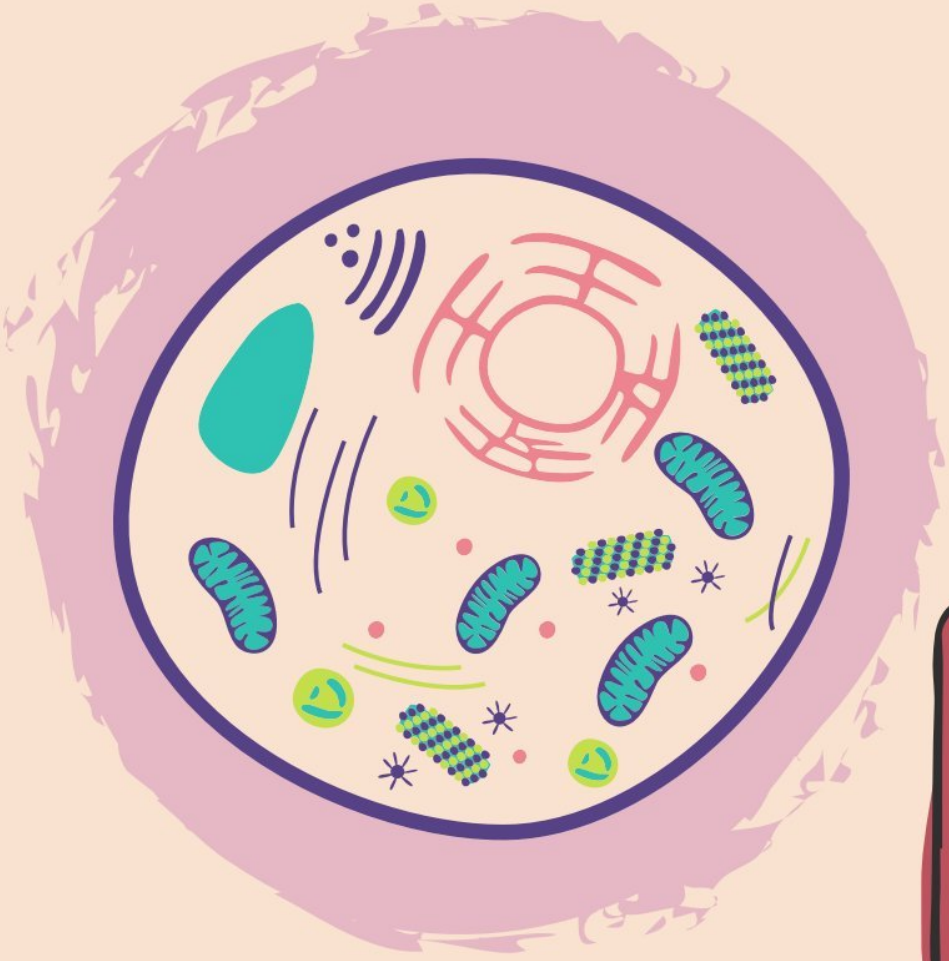
Level (2) - Semester (3)

HISTOLOGY

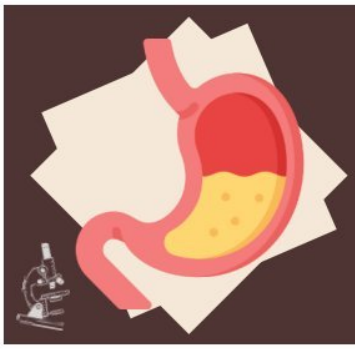


SCAN ME

GIT - Lecture (1)

Esophagus + Stomach

DR M. YUSUF



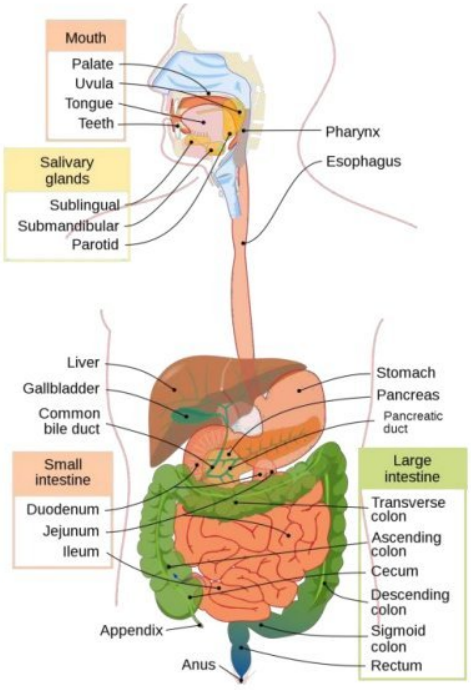
Gastrointestinal Tract

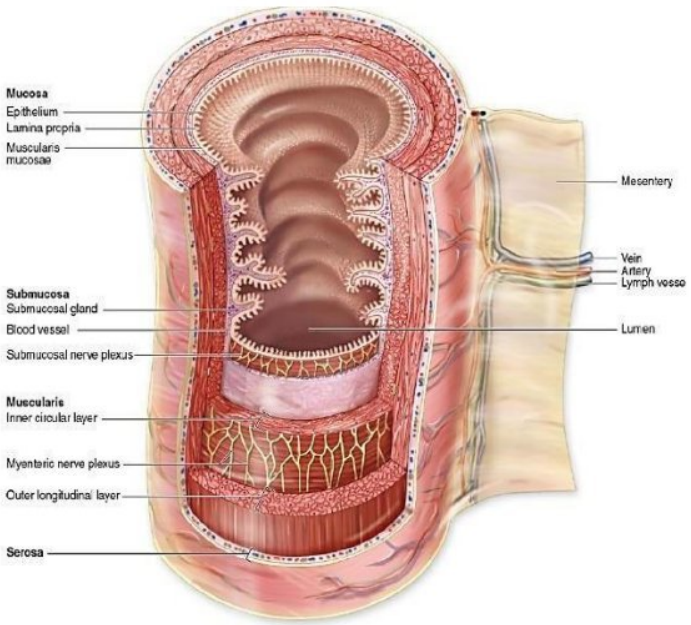
The digestive system includes the following parts:

❶	**Mouth cavity**	1) Lip 2) Tongue 3) Teeth 4) Salivary glands
❷	**Alimentary canal**	1) Esophagus 2) Stomach 3) Intestine
❸	**large glands**	1) Liver 2) Pancreas

Basic wall organization in the GIT:

❶	**Mucosa**	1) Epithelium 2) Corium 3) Muscularis mucosa
❷	**Submucosa**	---
❸	**Musculosa**	---
❹	**Outer coat**	▪ Adventitia or Serosa





Layers (from inside to outside):

<table>
<tr><td>❶</td><td>Mucosa</td><td>① Epithelium: May be…
<table>
<tr><td>PROTECTIVE</td><td rowspan="3">e.g.</td><td>Stratified squamous epithelium of the esophagus</td></tr>
<tr><td>SECRETORY</td><td>Simple columnar secretory epithelium of the stomach</td></tr>
<tr><td>ABSORPTIVE</td><td>Simple columnar absorptive epithelium of the intestine</td></tr>
</table>
② Corium:
▪ C.T layer contains (Blood vessels – Nerves – Lymphatics).
③ Muscularis mucosa:
▪ Inner circular & outer longitudinal layers of smooth muscle fibers.</td></tr>
<tr><td>❷</td><td>Submucosa</td><td>☑ Loose C.T layer contains (Blood vessels – Nerves – Lymphatics).</td></tr>
<tr><td>❸</td><td>Musculosa</td><td>☑ Formed of:
▪ 2 layers of smooth muscles IC & OL.
▪ Responsible for the peristaltic movement.
▪ Provides the tone of the wall of the viscus.</td></tr>
<tr><td>❹</td><td>Outer coat</td><td>
<table>
<tr><th>ADVENTITIA</th><th>SEROSA</th></tr>
<tr><td>Loose C.T containing (Blood vessels – Nerves – Lymphatics).</td><td>---</td></tr>
<tr><td>Thick</td><td>Thinner than adventitia.</td></tr>
<tr><td>Not covered with mesothelial layer.</td><td>Covered with mesothelial layer.</td></tr>
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</td></tr>
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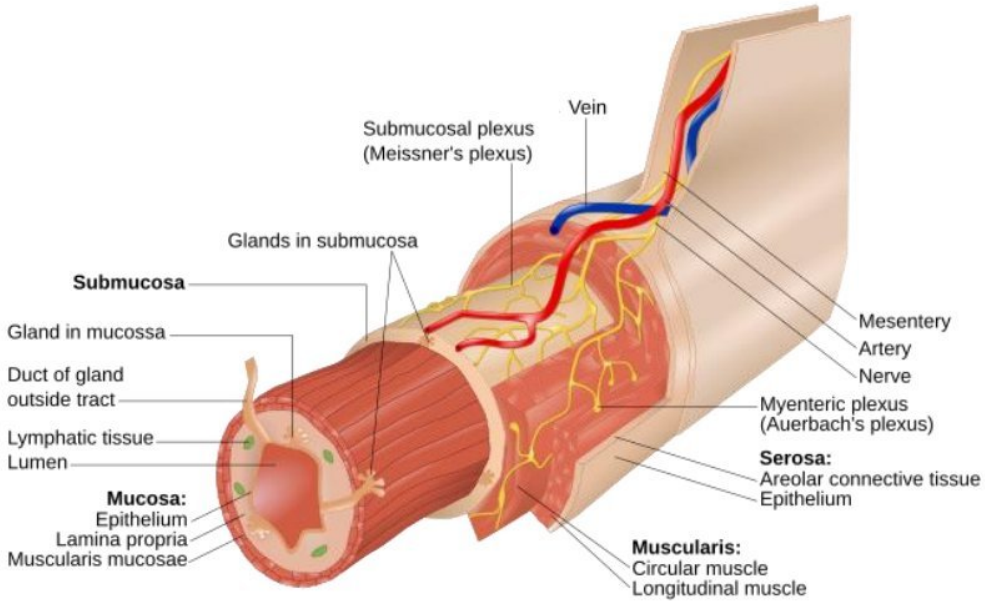
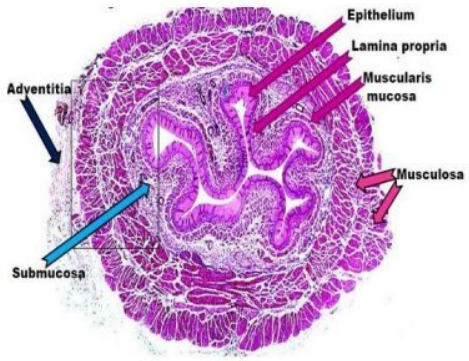


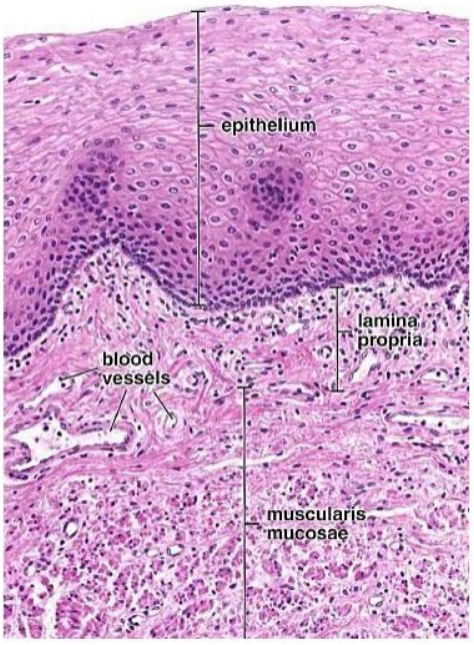
(1) ESOPHAGUS

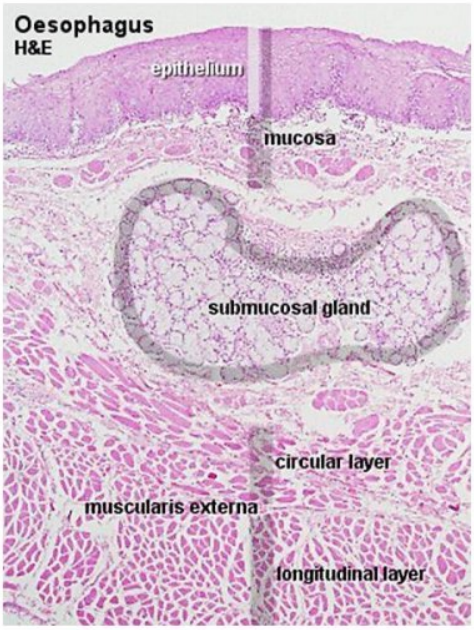
Structure

The wall consists of 4 layers:

❶	Mucosa	① **Epithelium:** ▪ St. Sq. Non-keratinized. ② **Corium:** ▪ Loose C.T layer contains (Blood vessels – Nerves – Lymphatics) ③ **Muscularis mucosa:** ▪ IC & OL smooth muscle fibers
❷	Submucosa	☑ **Loose C.T.** ☑ **It contains mucous secreting esophageal glands.**
❸	Musculosa	☑ **It is formed of IC & OL layers.** ☑ **The muscle is:** ▪ Striated in the upper 1/3. ▪ Mixed in the middle 1/3. ▪ Smooth in the lower 1/3.
❹	Adventitia	☑ **loose C.T** ☑ **Not covered with mesothelium except at the lower end.**



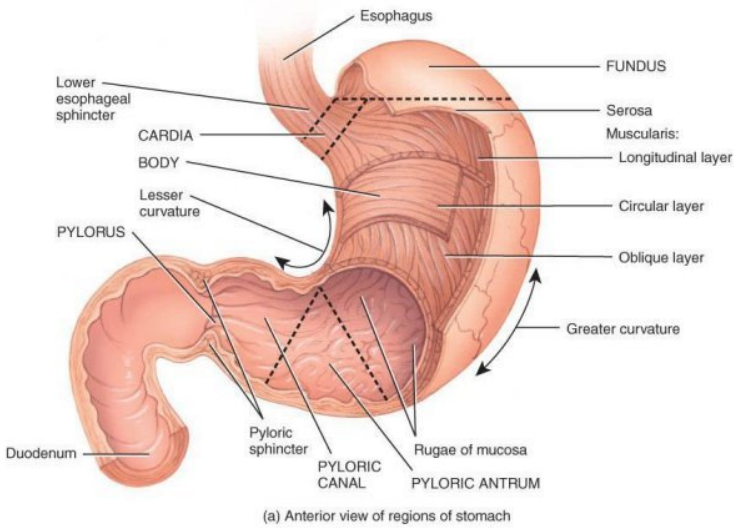




(2) STOMACH

Parts

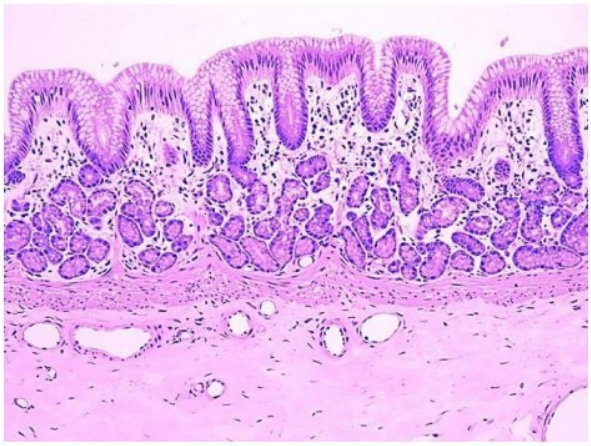
1	Cardiac Region	☑ Surrounds the cardiac orifice at the gastro-oesophageal junction.
2	Fundic Region	☑ Upper convex part above level of the lower end of the esophagus.
3	Body of the stomach	☑ The main part forming the middle 2/3 of the stomach.
4	Pyloric Region	☑ Formed of: Antrum - Pyloric canal - Pyloric sphincter



(a) Anterior view of regions of stomach

M/E

1	Cardiac region	☑ **Mucosa:** Contains cardiac glands ▪ lined by simple columnar cells which secrete mucus & lysozyme.
2	Fundus & Body	☑ **Have the same structure while the pylorus differs.**

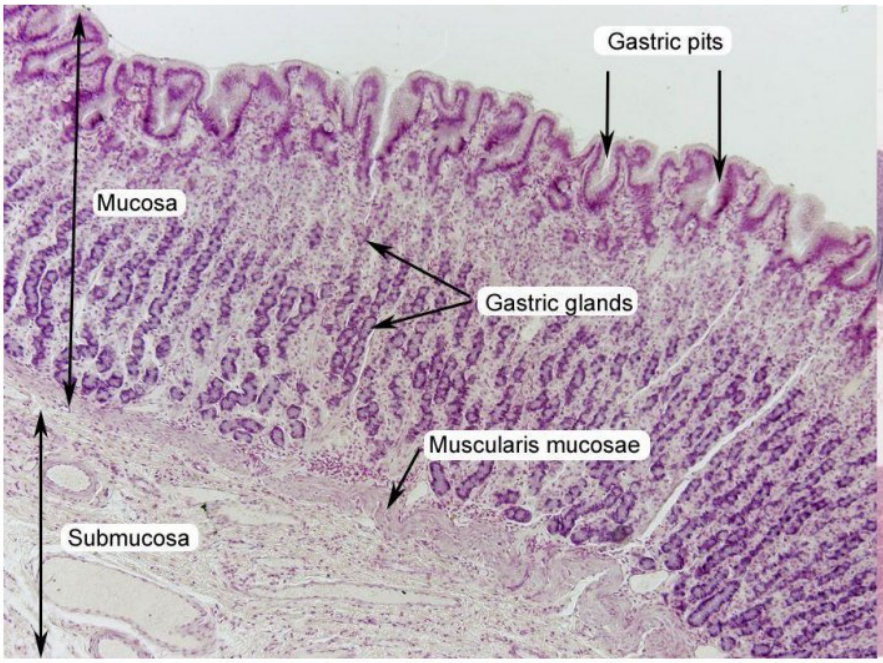


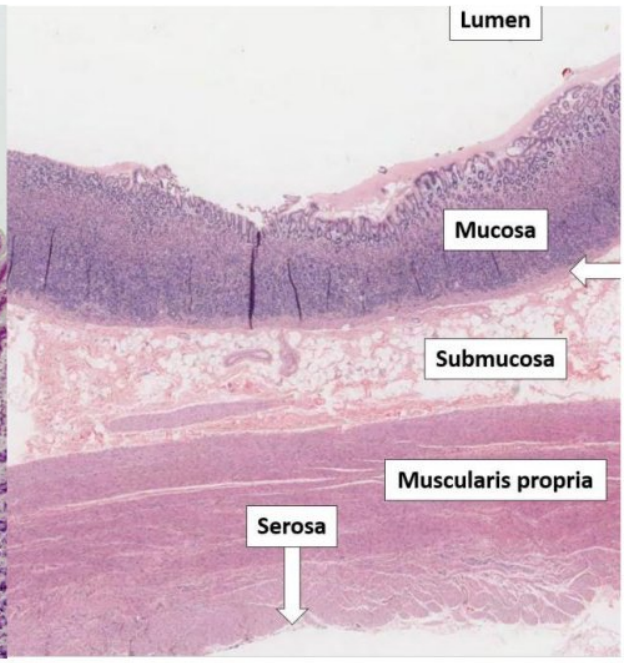
1 Fundus & body of stomach

Structure

The wall is formed of:

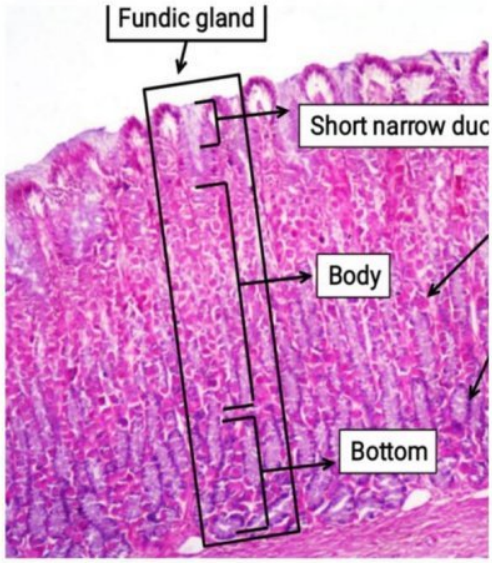
❶	Mucosa	① **Epithelium:** ▪ Simple columnar secretory epithelium with oval basal nuclei. ▪ Secretes mucous ▪ Interrupted by gastric pits ② **Corium:** ▪ Loose C.T occupied by the fundic glands ③ **Muscularis mucosa:** ▪ IC & OL smooth muscle fibers
❷	Submucosa	☑ **Loose C.T.**
❸	Musculosa	☑ **It is formed of Inner oblique, IC & OL layers.**
❹	Serosa	☑ **A layer of flat mesothelial cells** ☑ **Sub-mesothelial loose C.T.**



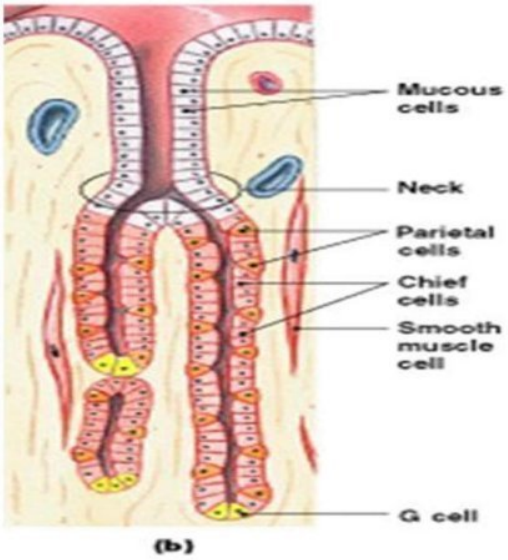


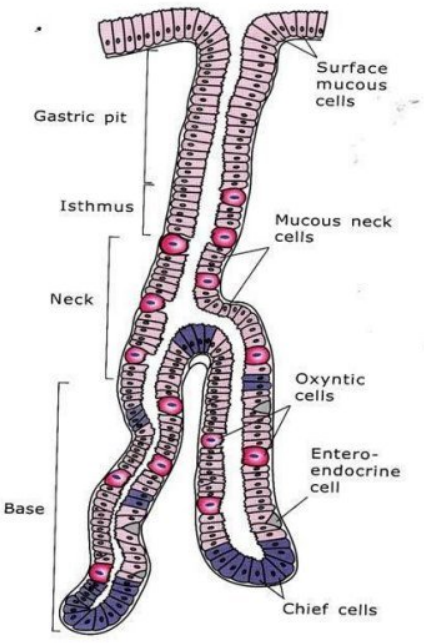
Fundic Glands

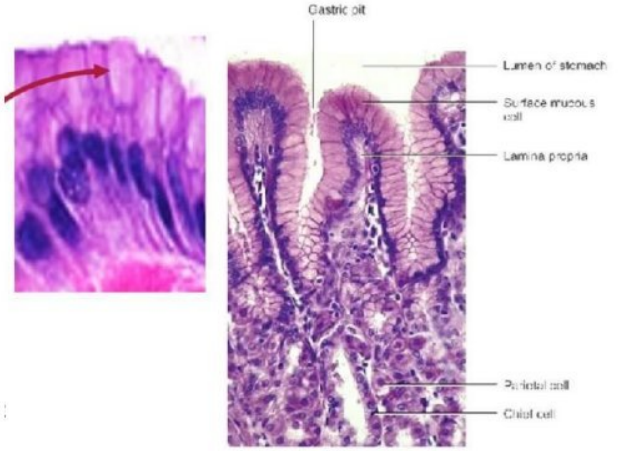
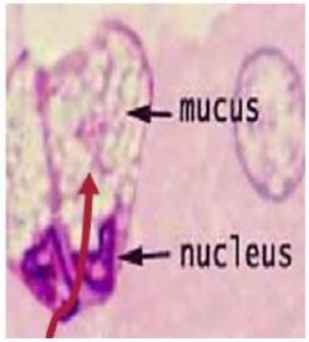
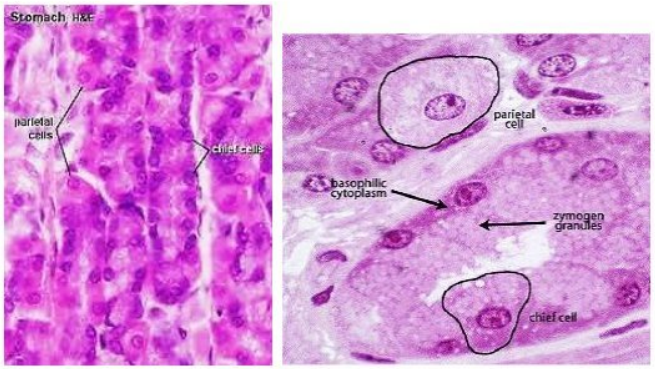
Secrete	▪ Simple branched tubular glands.
Number	▪ Numerous.
Site	▪ Close to each other.
Shape	▪ **Narrow & Long** (extend from the surface to muscularis mucosa).
Arrangement	▪ Narrow. ▪ Straight. ▪ Parallel to each other. ▪ Perpendicular to the surface.



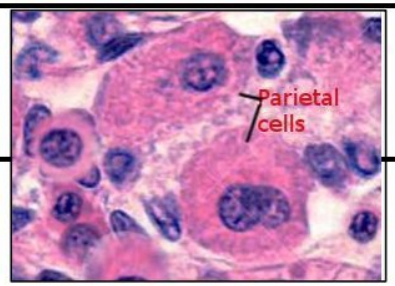
Parts	▪ **The gland is formed of:** 1. Duct (pit) 2. Isthmus 3. Neck 4. Body 5. Bottom
Lining cells	1) Surface epithelium 2) Mucous neck cells 3) Peptic cells (chief - zymogen cells - central) 4) Parietal (oxyntic) cell 5) Entero-endocrine cells 6) Undifferentiated columnar cells (Stem cells) 7) Caveolated cells

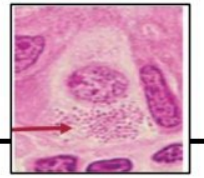




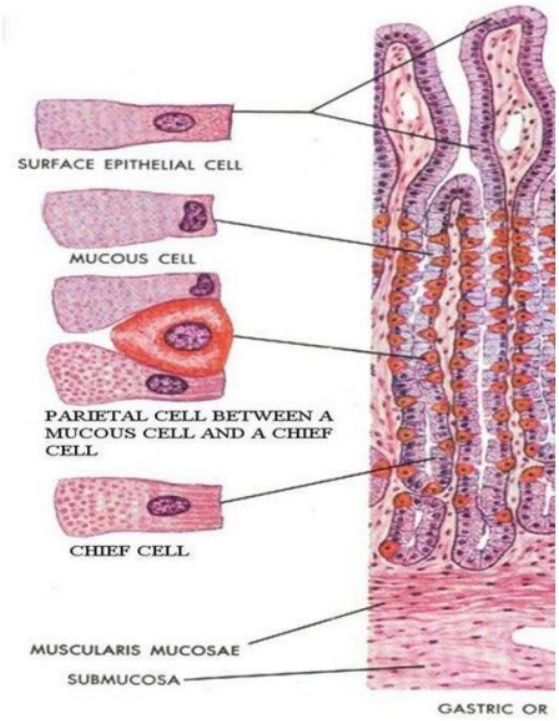
		❶ Surface Epithelium	❷ Mucous Neck Cells	❸ Peptic Cells (Chief / Zymogen Cells / Central)
LM	SHAPE	Simple columnar secretory cells	Columnar cells	Columnar
	NUCLEUS	Basal - Oval	Basal - Flat	Rounded - Basal
	CYTOPLASM	**Clear apical part** Due to dissolved mucin granules	**Foamy** Due to more dissolved mucin granules	**Basal basophilia** due to ⇈ rER. **& Pale apical part** due to unstained zymogen granules.
FUNCTION		**Secrete a film of mucous** (protects the stomach against its enzymes & HCl)	**Secrete acidic mucous**	**Secrets Pepsinogen enzyme**
FIG.				

		❹ Parietal (Oxyntic) Cells	❺ Entero- Endocrine Cells *"Modified cells which secrete hormones"*
SITE		---	**Fundic glands have 1 type** (Enterochromaffin or EC cells)
LM	SHAPE	▪ **Triangular**	**Pyramidal with narrow apex**
	NUCLEUS	▪ **Central** ▪ **Rounded** ▪ **Deeply stained**	▪ **Rounded** ▪ **Near the base** ▪ **Vesicular**
	CYTOPLASM	▪ **Deep acidophilic**	▪ **Pale basophilic.** ▪ **Contains basal granules stained with silver (Argentaffin granules).**
EM		▪ Containabundantnumberof **mitochondria** & **sER** ▪ Show **long microvilli** on their **outer** surface. ▪ **Intracellular canaliculi:** ↳ Protect cytoplasm against HCL. ▪ **Intercellular canaliculi:** ↳ Between parietal cells. ↳ To conduct HCl to lumen of the gland.	
FUNCTION		▪ **They secrete:** - HCl - Intrinsic factor (which helps absorption of vit. B12).	▪ **Some secrete serotonin (vasoconstrictor).** ▪ **Others secrete endorphin (morphine like substance).**





	❻ Undifferentiated columnar cells (stem cells)	❼ Caveolatedcells
Function	**Stem cells for renewal** of the cells of the fundic glands.	Large columnar cells with **long microvilli** that **act as receptors.**



Mucous Gastric Barrier	
Definition	▪ **Thick** film of mucous which **protects** the stomach against **its enzymes** & **HCl.**
Secreted by	▪ **Surface epithelium** & **Mucous neck cells.**

II Pylorus of Stomach

The wall is formed of:

① Mucosa
② Submucosa
③ Musculosa
④ Serosa

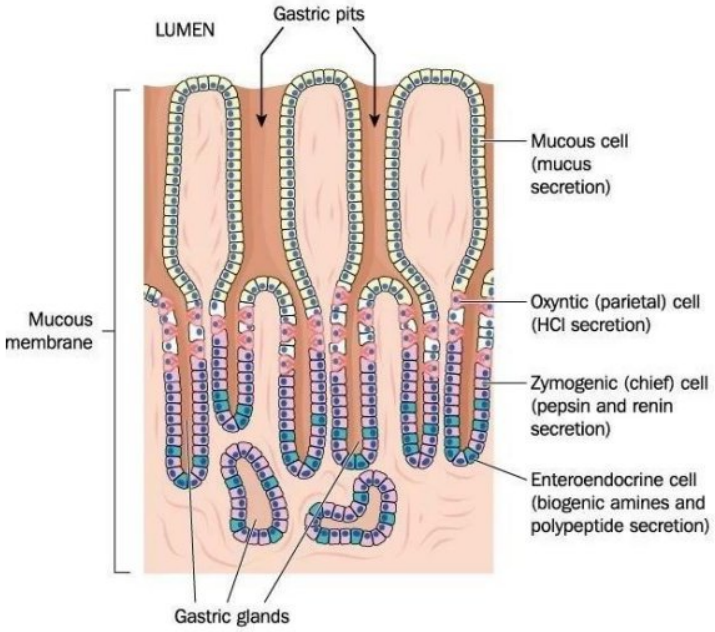
Pyloric Glands

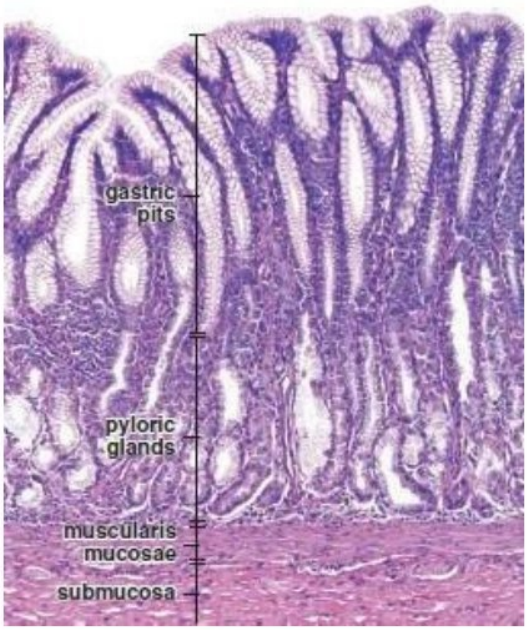
Characters:

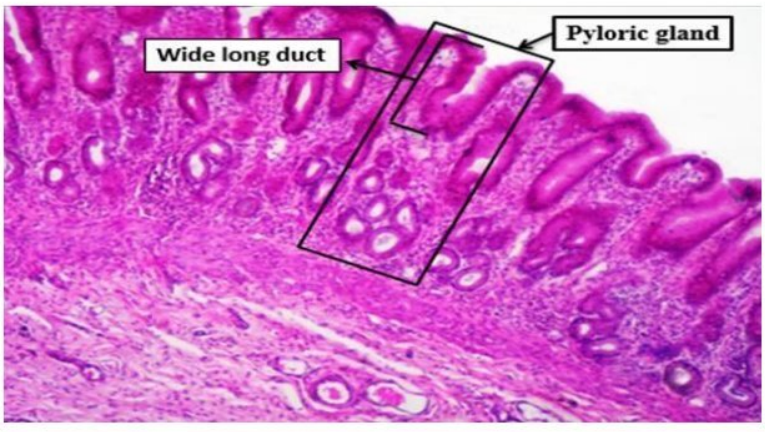
- **Not crowded** as fundic glands (**Widely separated** from each other).
- **Shorter** than the fundic glands.
- **Branched & coiled glands** with **wider lumen** than fundic glands
- Occupy ½ **thickness** of the mucosa.
- **The gastric pits** are **deeper** than those of the fundus.

Entero-endocrine cells in pylorus (Small number):

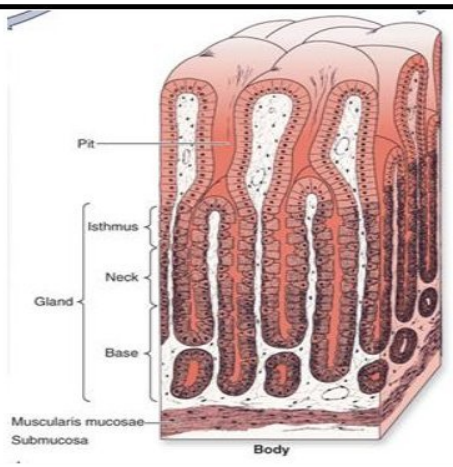
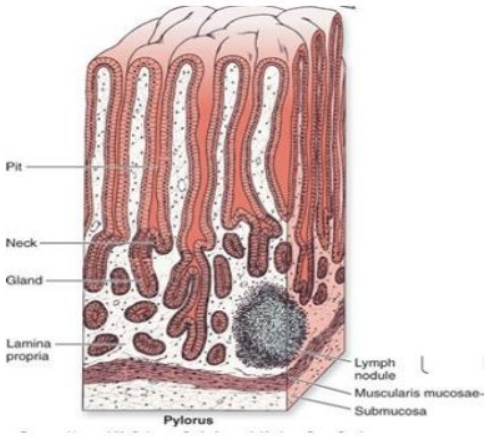
❶ EC Cells	SECRETION	**Seretonine** & **Endorphine**
❷ G cells		**Gastrin hormone** (Which stimulates oxyntic cells to secrete HCl)
❸ D cells		**Somatostatin hormone** (Which inhibits release of other hormones & regulates the activity of GIT)

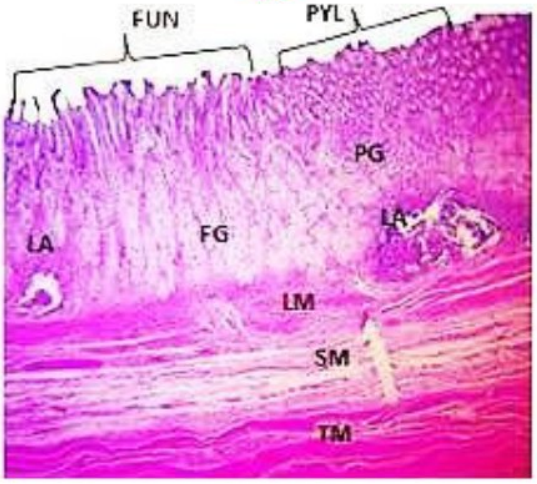






Fundus VS Pylorus

	A) Fundus	B) Pylorus
Mucosa	Thick & more folded	Thinner & less folded
Duct	Short, narrow, occupy 1/4 corium	Long-wide occupy 1/2 corium
Gland		
Type	Simple branched tubular	Coiled, more branched
Number	More numerous	Less numerous
Length	Long (occupy 3/4 corium).	Shorter (occupy 1/2 corium).
Arrangement	▪ Parallel to each other. ▪ Perpendicular to the surface. ▪ Straight. ▪ Cut in one plane.	▪ Not parallel. ▪ Not perpendicular. ▪ Coiled. ▪ Cut in various planes.
Cells of glands	All types of cells	No peptic, no oxyntic
Entero-endocrine cells	Only 1 type (EC cells) is present	3 types (E.C. G and D cells)
Corium	No lymph nodule	Lymph nodules are present
Musculosa	Thin (3 layers) ▪ Inner Oblique. ▪ Middle Circular. ▪ Outer Longitudinal.	Thicker (2 layers) ▪ **Inner circular** which is thickened to form pyloric sphincter. ▪ **Outer longitudinal.**
Fig.		



Clinical hint

Peptic ulcer:

CAUSES	1) **Stress & other psychosomatic factors** 2) **Ingested substances as:** aspirin – NSAIDS – ethanol 3) **Some microorganisms** (e.g. Helicobacter pylori) ▨ **Disrupt this epithelial layer and lead to ulceration**
MECHANISM	▨ **Aspirin & Ethanol** → Irritate the mucosa partly ↓↓ mucosal blood flow ▨ **Several anti-inflammatory drugs** → Inhibit the production of prostaglandins of the E type (which are very important substances for the alkalinization of the mucus layer & protection).
FATE	▨ **The initial ulceration may heal** ▨ **OR** It may be **further aggravated** by the local aggressive agents, leading to **additional gastric & duodenal ulcers.**