

Alimentary Canal (1) (Esophagus and Stomach)

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:

١. **Esophagus.**
٢. **Stomach.**



Please be sure to check [Histology Edits](#) before you start, to know about any additions/changes.

Alimentary Canal

- Is the tubular portion of digestive system.
- is subdivided into:
 1. Esophagus. ← we will talk about these 2 in this lecture
 2. Stomach. ← we will talk about these 2 in this lecture
 3. Small intestine (duodenum, jejunum and ileum).
 4. Large intestine (cecum, colon, rectum. anal canal and appendix).

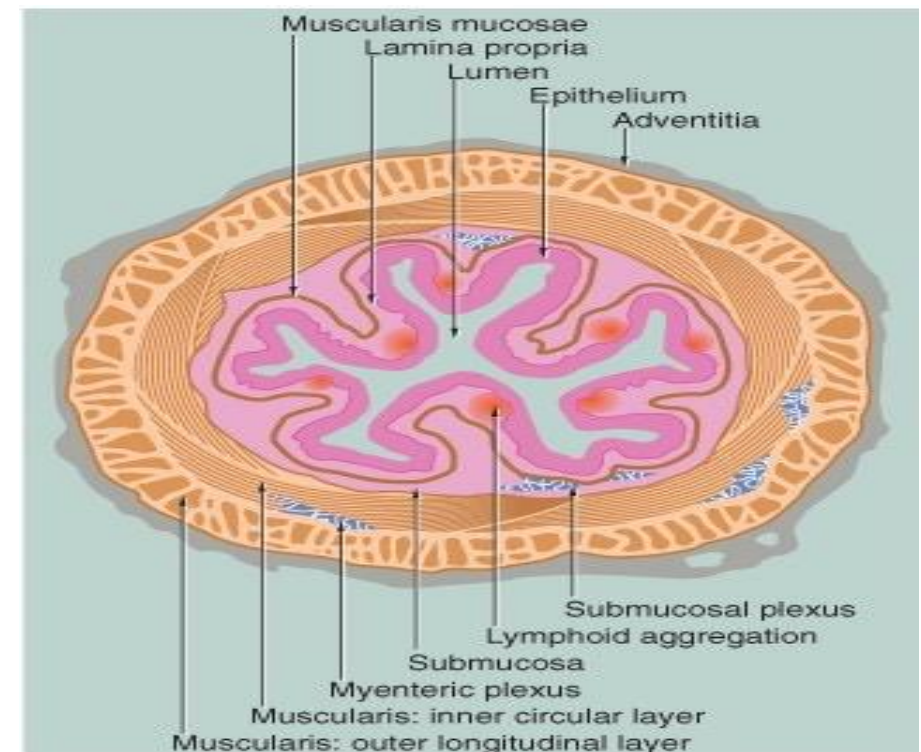
• General Architecture of L/M Structure of Alimentary Canal

A. Mucosa (it is folded to allow distention in presence of food)

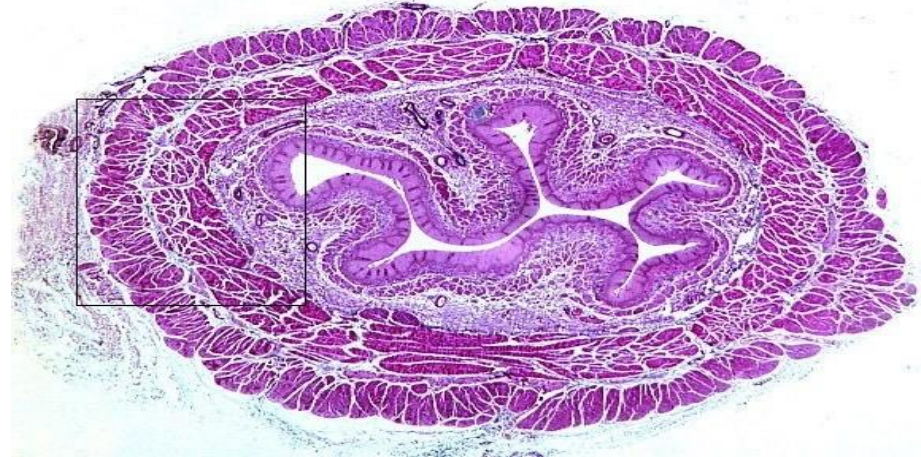
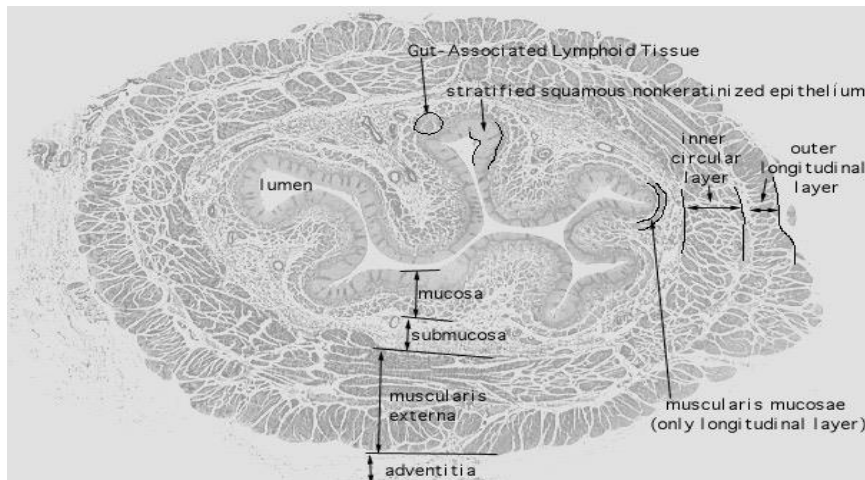
B. Submucosa

C. Muscularis externa

D. Adventitia or Serosa



Esophagus

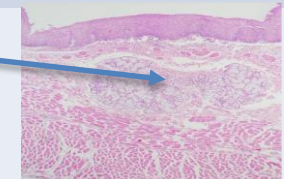


Mucosa

- 1-Epithelial lining:** **Non-Keratinized stratified squamous epithelium.**
- 2-Lamina propria:** Loose areolar C.T. with mucosal esophageal glands (secretion of mucus) in upper and lower ends.
- 3-Muscularis mucosae:** Few layers of smooth muscle fibers.

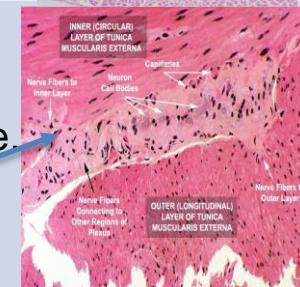
Submucosa

- 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: 1-**Inner circular layer** & 2-**Outer longitudinal layer.**
- in **Upper 1/3:** both layers are skeletal muscles.
- in **Middle 1/3:** inner layer is smooth muscle & outer layer is skeletal muscle.
- in **Lower 1/3:** both layers are smooth muscle.
- **Auerback's (Myenteric plexus)** in between the two muscle layers.

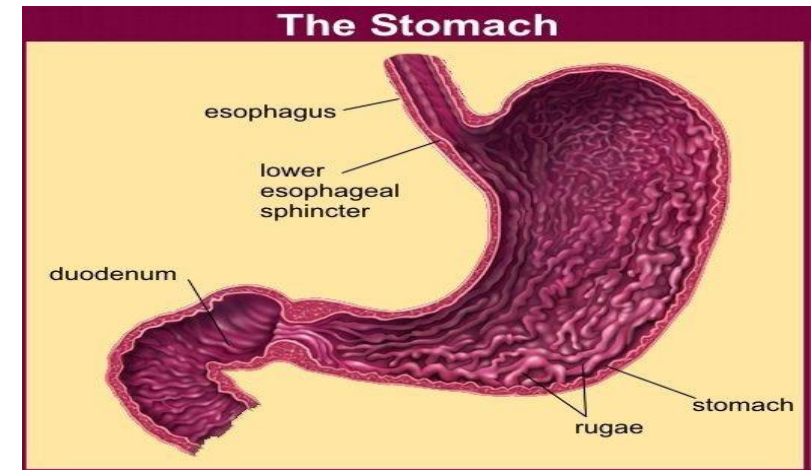


Serosa or adventitia

- **Serosa:** is loose areolar C.T. covered by **Mesothelium** (simple squamous epithelium) in the abdominal part of the esophagus.
- **Adventitia:** loose areolar C.T. **NOT** covered by **Mesothelium.**

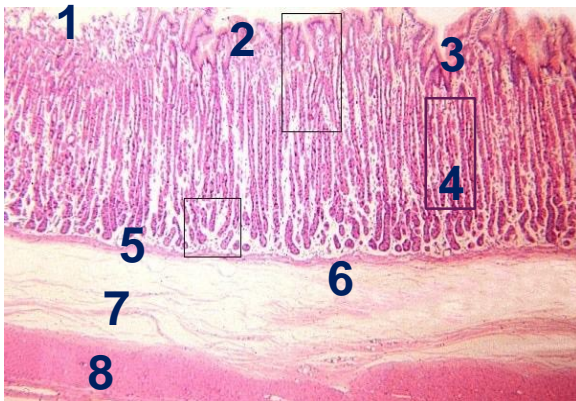
Stomach

- It has 4 regions: *cardia*, *fundus*, *body*, and *pylorus*.
(In microscopic point of view *Fundus* is identical to *Body* of stomach)
- Mucosa has (longitudinal) folds, known as *rugae* that disappear in the distended (full) stomach.



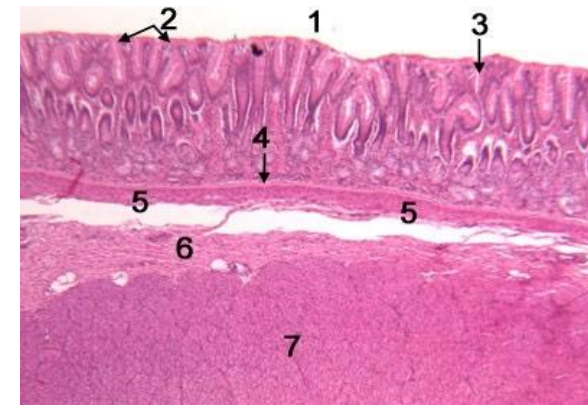
Layers of Fundus (or body)

1. Lumen.
2. Surface columnar epithelium.
3. Pits of fundic glands.
4. Fundic glands.
5. Lamina propria.
6. Muscularis mucosae.
7. Submucosa.
8. Muscularis externa.

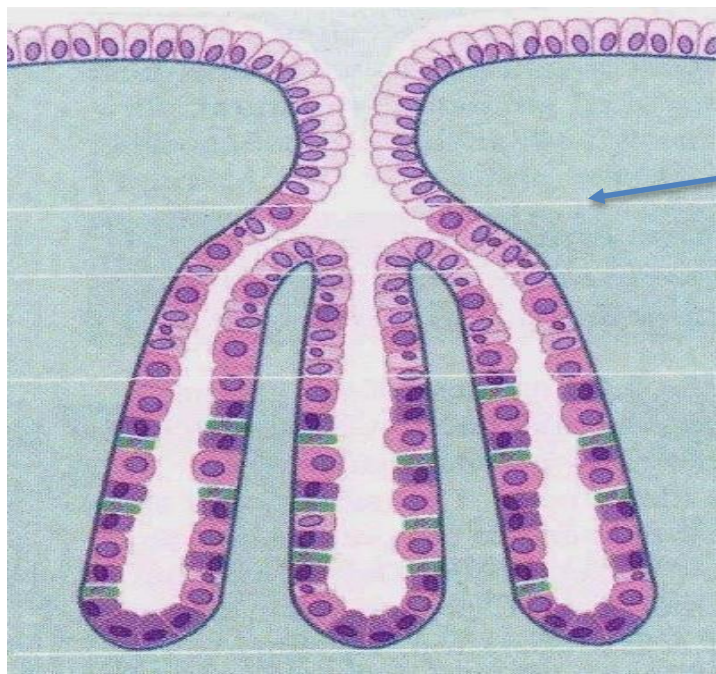


Layers of Pylorus

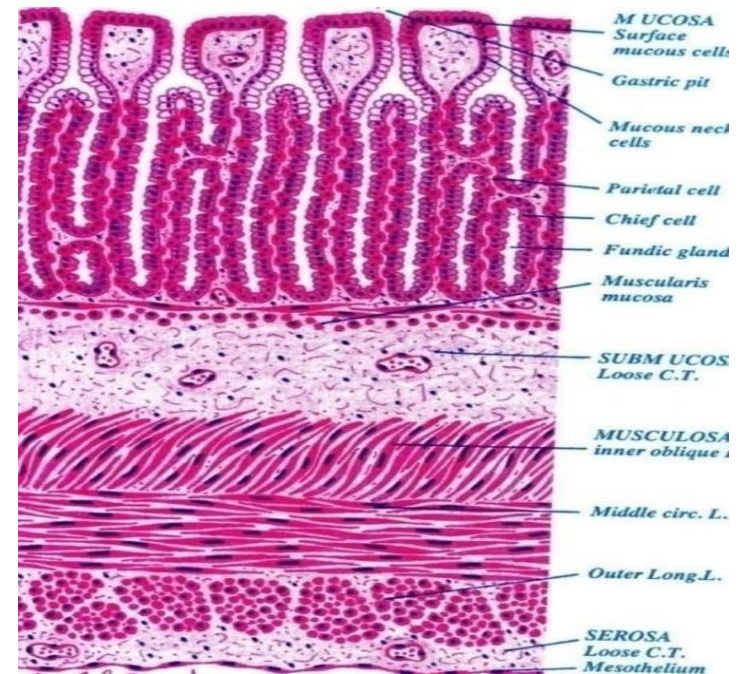
1. Lumen
2. Surface epithelium
3. Pits of pyloric glands
4. Lamina propria
5. Muscularis mucosae
6. Submucosa
7. Muscularis externa



Funds (and body) of stomach



Fundic gland



MUCOSA
Surface mucous cells
Gastric pit
Mucous neck cells
Parietal cell
Chief cell
Fundic gland
Muscularis mucosa
SUBMUCOSA
Loose C.T.
MUSCULOSA
inner oblique
Middle circ. L.
Outer Long. L.
SEROA
Loose C.T.
Mesothelium

Mucosa

- 1-Surface epithelium: **Simple columnar epithelium**: secretes mucous.
 - Fundic Glands.
- 2-Lamina propria: C.T. invaded by numerous Fundic glands with lymphoid elements.
- 3-Muscularis mucosae: two layers of smooth muscle fibers.

Submucosa

- C.T. containing Blood vessels, nerves & Meissner's plexus.
- NO glands

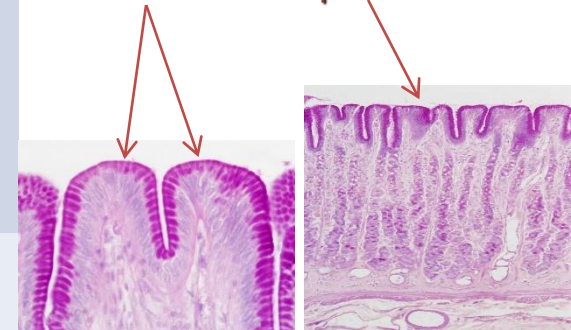
Muscularis externa

- **Three** smooth muscle layers:
 - 1-Inner oblique. 2-Middle circular. 3-Outer longitudinal.
- **Auerback's (Myenteric) plexus** (between circular & longitudinal muscles).

serosa

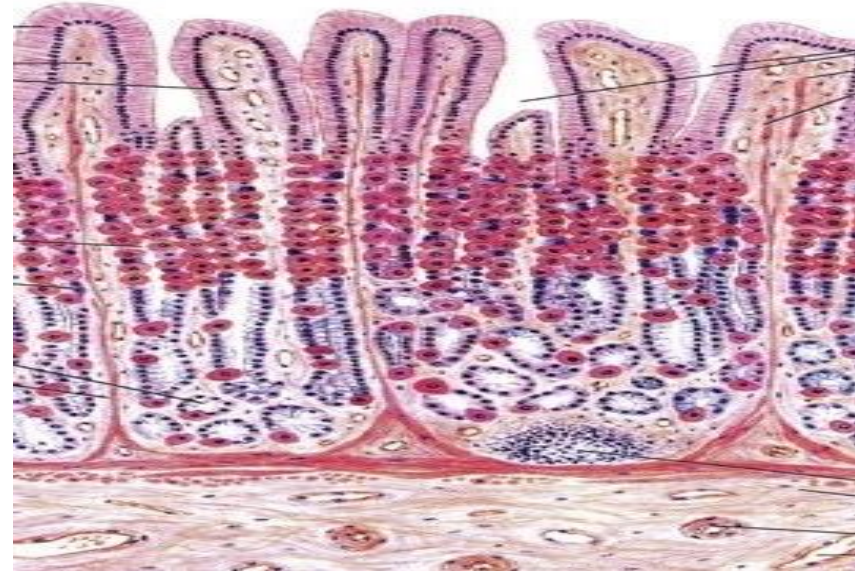
- C.T. covered by Mesothelium. (NOT adventitia)

Surface Columnar Epithelium



Fundic Glands

Fundic glands have:
Short pits: one fourth of mucosa.
Simple **branched** tubular glands.
are rich in **Parietal & Chief cells**.



Composed of **5** cell types

Parietal (oxyntic) cells

- **secrete:**
1-**HCl** (responsible for stomach acidity)
2-**Gastric intrinsic factor** that help in the absorption of **vitamin B12**

*Peptic (chief) cells
(predominant cells)*

- **secrete: Pepsinogen**

Mucous neck cells

- **secrete Mucus**

*Enteroendocrine
(EE) (DNES) cells*

- **secrete hormone
(eg Serotonin & endorphin)**

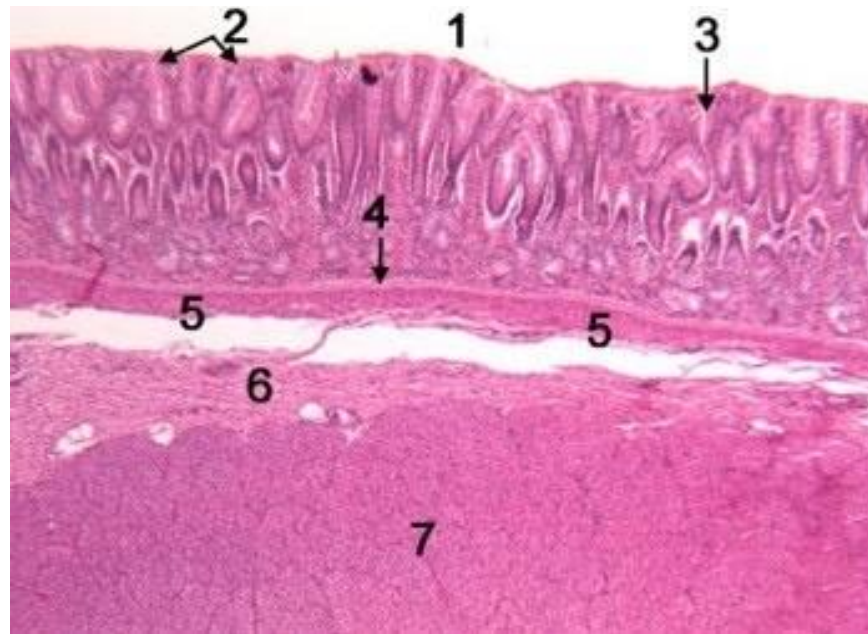
Stem cells

- **regenerative cells**

Notes:

- Parietal cells** are **Acidophilic**, rich in in sER mitochondria and have pyramidal or polygonal shape with central, round nucleus. C-shaped intracellular canaliculus.
- **Peptic cells** are **Basophilic**, rich in rER, they columnar cells with basal, round nucleus.

Pylorus of stomach



1. Lumen
2. Surface epithelium
3. Pits of pyloric glands
4. Lamina propria
5. Muscularis mucosae
6. Submucosa
7. Muscularis externa

<i>Mucosa</i>	<ul style="list-style-type: none"> • Surface epithelium: Simple columnar epithelium: secretes mucous. • <u>Invaded by Pyloric Glands.</u>
<i>Submucosa</i>	<ul style="list-style-type: none"> • C.T. containing Blood vessels, nerves & <u>Meissner's plexus.</u> • <u>NO glands</u>
<i>Muscularis externa</i>	<ul style="list-style-type: none"> • Two smooth muscle layers: 1-Inner circular.. 2-Outer longitudinal.. • Auerback's (Myenteric) plexus.
<i>serosa</i>	<ul style="list-style-type: none"> • C.T covered by <u>Mesothelium.</u> (NOT adventitia)

Pyloric Glands

Their pits are deep: about **half the length of mucosa**.
they are branched and convoluted > many cross sections.

*Mucus neck cells
(predominant cell)*

secrete mucus

*Enteroendocrine
(DNES) cells*

*secrete hormone
(eg Serotonin & endorphin)*

Stem cells

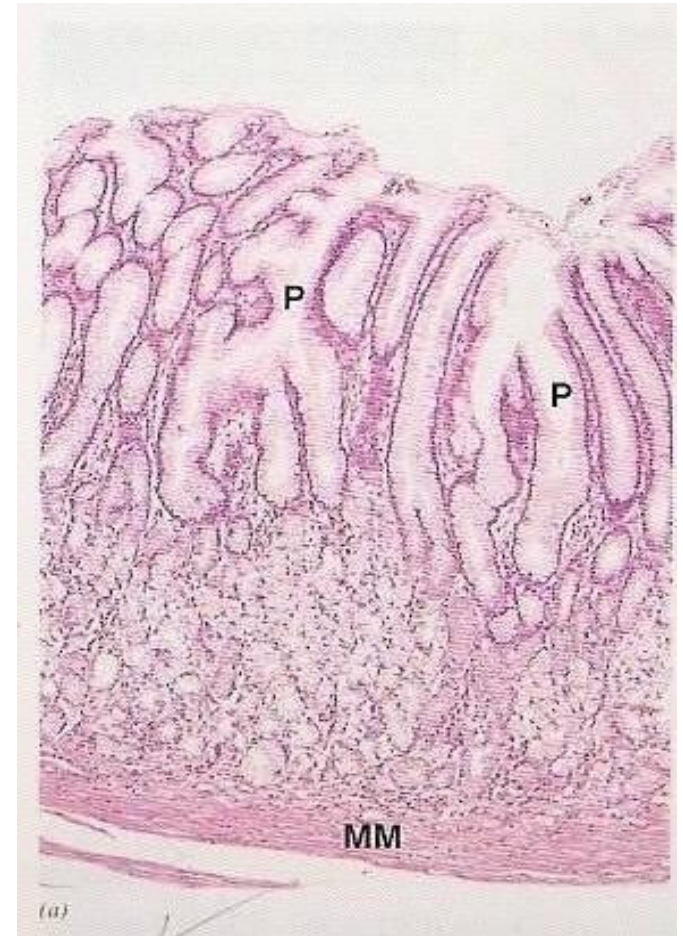
regenerative cells

*Parietal (oxyntic)
cells*

only few present here

NO peptic cells.

because the parietal
cells which secrete
Pepsinogen are few..



Summary

	Esophagus	Stomach	
Layers	-----	Fundus	Pylorus
Mucosa	Non-Keratinized Stratified Squamous Epithelium.	Surface epithelium: Simple columnar mucus-secreting cells.	
		Fundic glands.	Pyloric glands.
		Short pits (1\4 of mucosa).	Deep pits (1\2 of mucosa).
Submucosa	Glands.	NO glands.	
	Meissner's plexus.		
Muscularis externa	2 smooth muscle layer.	3 layers.	2 layers.
	Auerbach's plexus.		
Serosa OR adventitia	Serosa in the abdominal part of the esophagus. Or adventitia.	Serosa.	



MCQs

Q1- Which one of the following contains glands in its submucosa ?

- a) Fundus of stomach
- b) Pylorus of stomach
- c) Esophagus

Q2- Which one of the following is the predominant cell in Fundic glands ?

- a) Mucus neck cells
- b) Parietal cells
- c) Peptic cells

Q3- which one of the following is the predominant cell in pyloric glands ?

- a) Parietal cells
- b) Mucus neck cells
- c) Enteroendocrine cells

Q4- Which one of the following cell type of fundic glands help in absorption of Vitamin B12 ?

- a) Peptic cells
- b) Parietal cells
- c) Enteroendocrine cells



Answers:

Q1- c

Q2- c

Q3- b

Q4- b

Done by:

Ouf ALoofy

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SUCCESSFUL

Thank you for checking our work

For any correction, suggestion or any useful information
do not hesitate to contact us: Histology434@gmail.com