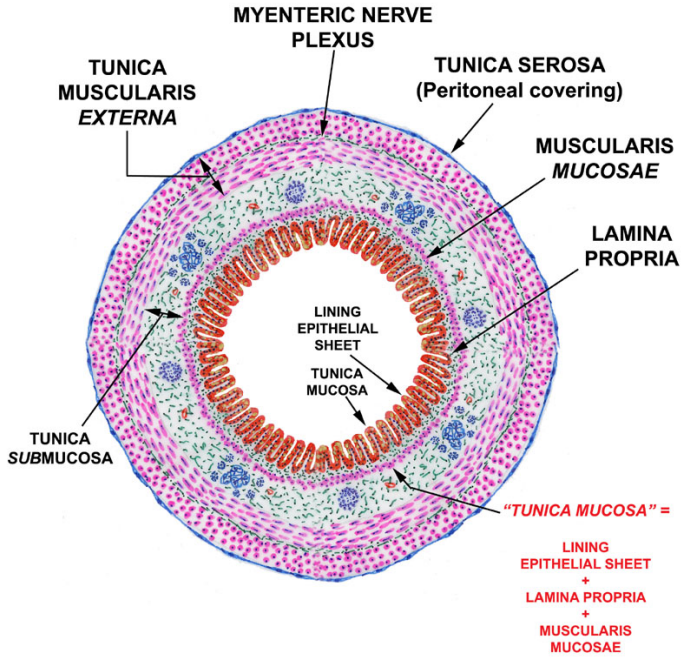
HISTOLOGY OF GASTROINTESTINAL TRACT

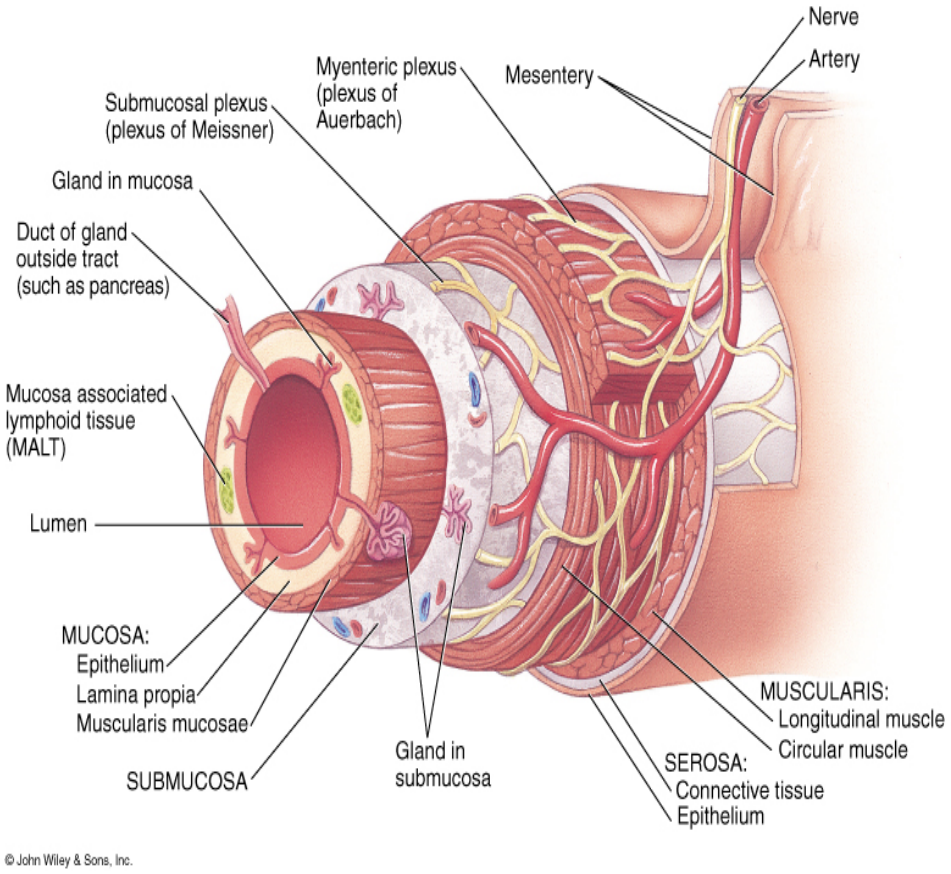


Dr.
AMAL ALBTOOSH

Histology of the Digestive System

Basic Histological Layers:

1. **Mucosa:**
   a. **Epithelium**
   b. **Lamina Propria**
   c. **Muscularis Mucosae**
2. **Submucosa:**
   Submucosal plexus
   "Plexus of Meissner"
3. **Muscularis:**
   Myenteric plexus
   "Plexus of Auerbach
4. **Serosa**



Histology of the Mucosa

Organ	Epithelium
Mouth	Nonkeratinized Stratified Squamous
Pharynx	Nonkeratinized Stratified Squamous
Esophagus	Nonkeratinized Stratified Squamous
Stomach	Simple Columnar
Small Intestine	Simple Columnar
Large Intestine	Simple Columnar
Anus	Nonkeratinized Stratified Squamous

Histology of the Mucosa

Organ	Folds of the epithelium
Esophagus	none
Stomach	L: Rugae, S: gastric pits
Small Intestine	L: Plicae circulares, Villi S: Crypts of Lieberkuhn, microvilli
Large Intestine	L: Haustra S: Intestinal glands

Histology of the Submucosa

Organ	Specialized structures
Esophagus	Submucosal mucous glands
Stomach	None
Duodenum	Brunner’s glands
Ileum	Peyer’s Patches
Large Intestine	None

Histology of the Muscularis

Organ	Smooth muscle layers
Esophagus	2, circular and longitudinal
Stomach	3, oblique, circular, and longitudinal
Small Intestine	2, circular and longitudinal
Large Intestine	2, circular and longitudinal

Histology of the Serosa

Organ	Serosa
Esophagus	Adventitia due to the fact that the esophagus is not in a cavity
Stomach	Visceral Peritoneum
Small Intestine	Visceral Peritoneum
Large Intestine	Visceral Peritoneum
Anus	Adventitia

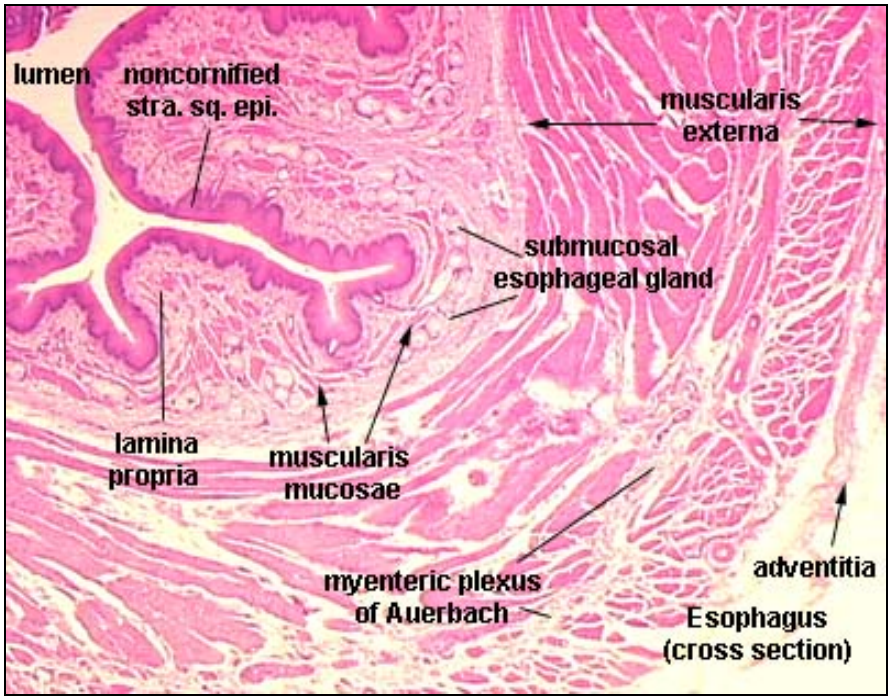
Oesophagus

- **Mucosa:** Stratified squamous non - keratinized epithelium
- **Submucosa**: contains Meissner's plexus and oesophageal glands
- **Muscularis externa:**

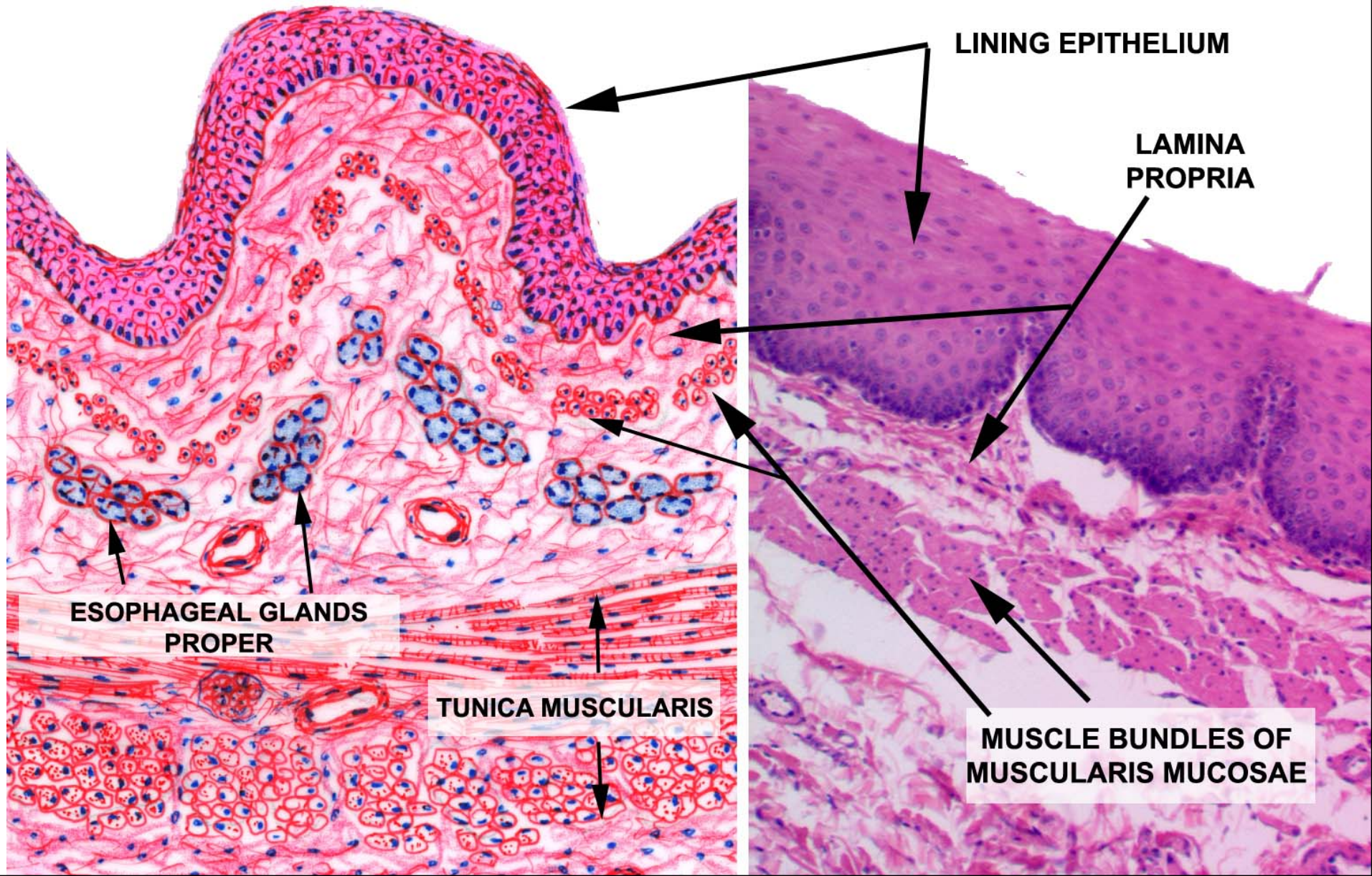
  Upper one-third: skeletal fibres

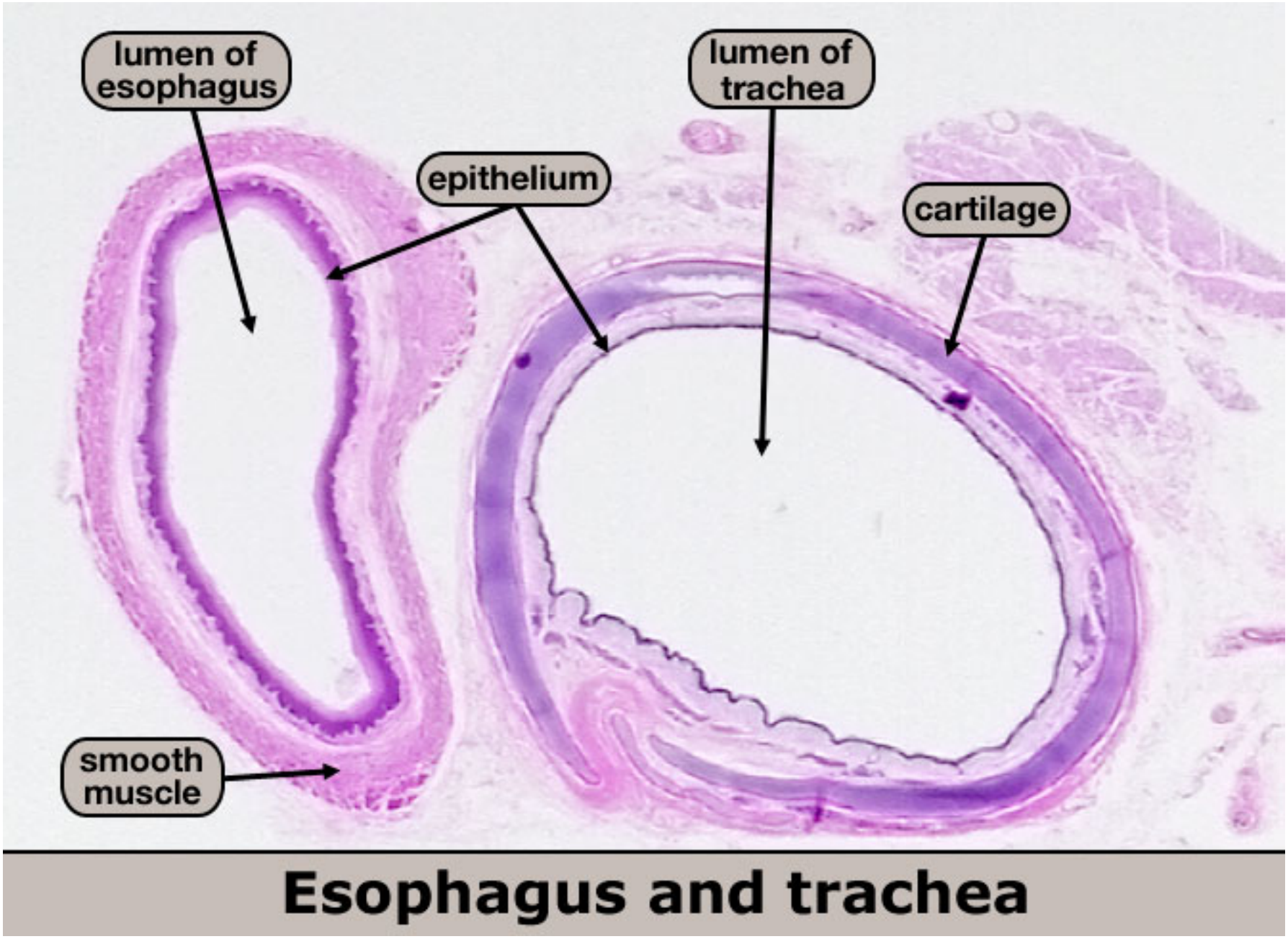
  Middle one-third: mixed fibres

  Lower one-third: smooth fibres
- **Adventitia:** loose areolar connective tissue



Oesophagus


LINING EPITHELIUM
LAMINA PROPRIA
ESOPHAGEAL GLANDS PROPER
TUNICA MUSCULARIS
MUSCLE BUNDLES OF MUSCULARIS MUCOSAE



Esophagus and trachea

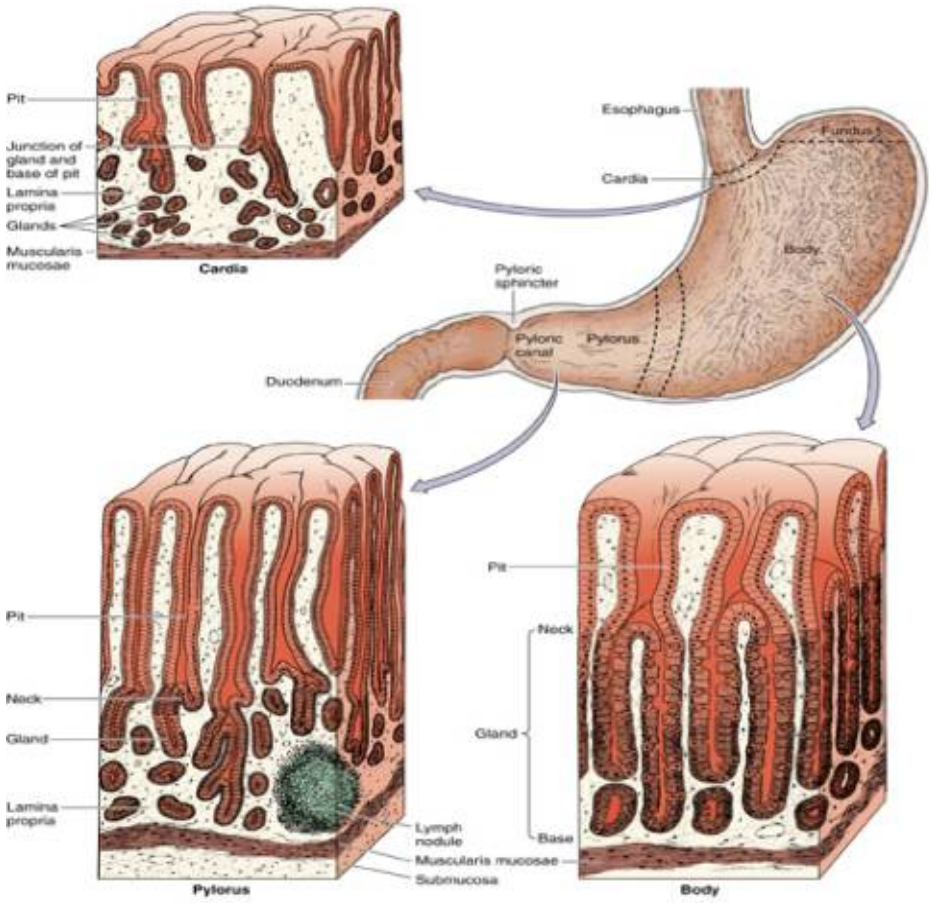
Stomach

- **Mucosa**: simple columnar epithelium and presence of gastric pits.
- Stomach is divided into three histological regions on the basis of nature of glands:

➢Cardiac region

➢Fundic region (fundus & body)

➢Pyloric region

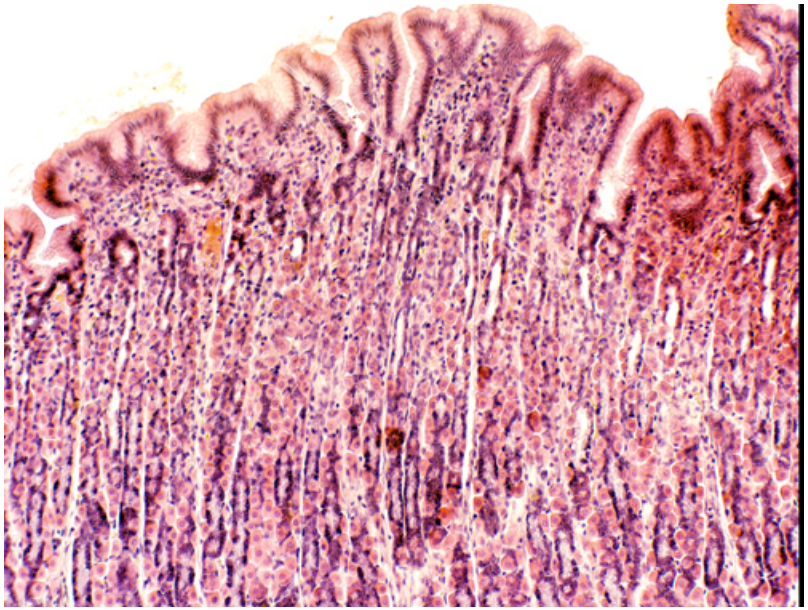


Stomach (Cardiac Region)

- **Mucosa:** simple columnar with oval nuclei, mucous secreting cardiac glands in lamina propria.
- **Submucosa:** connective tissue.
- **Muscle layer:** inner circular, outer longitudinal.
- **Serosa:** simple squamous epithelium.

Stomach (Fundic Region)

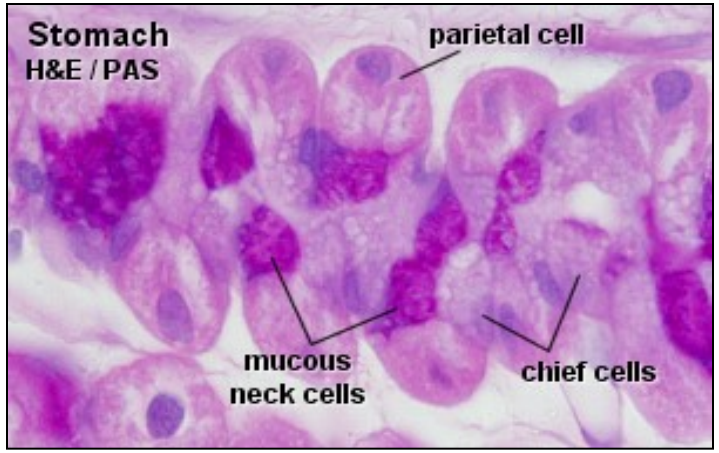
- **Mucosa:** simple columnar with oval nuclei, presence of gastric glands in lamina propria.

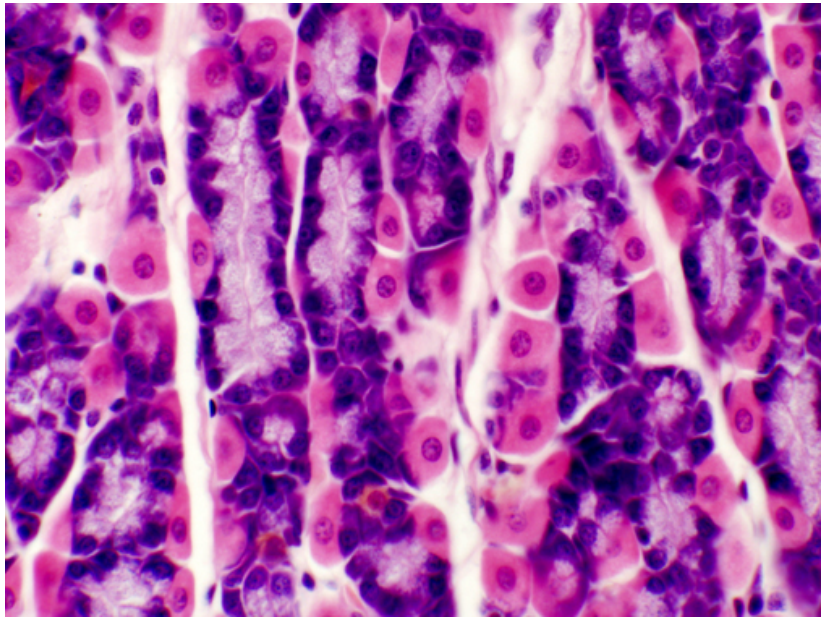


Stomach (Fundic Region)

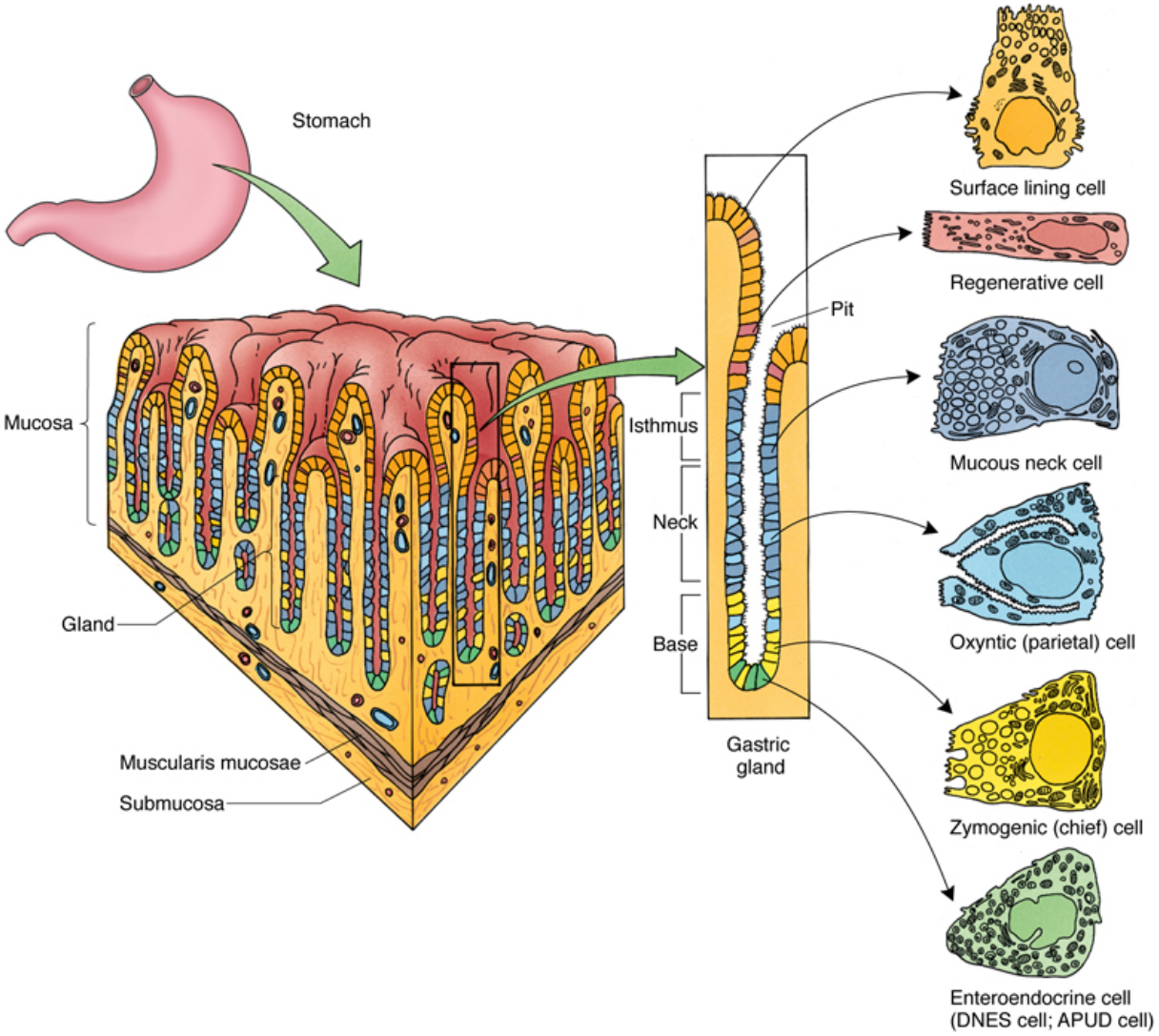
Cells of fundic region:

- Mucous neck cells
- Parietal (oxyntic) cells
- Chief (peptic/zymogen) cells
- Enteroendocrine cells
- Undifferentiated cells

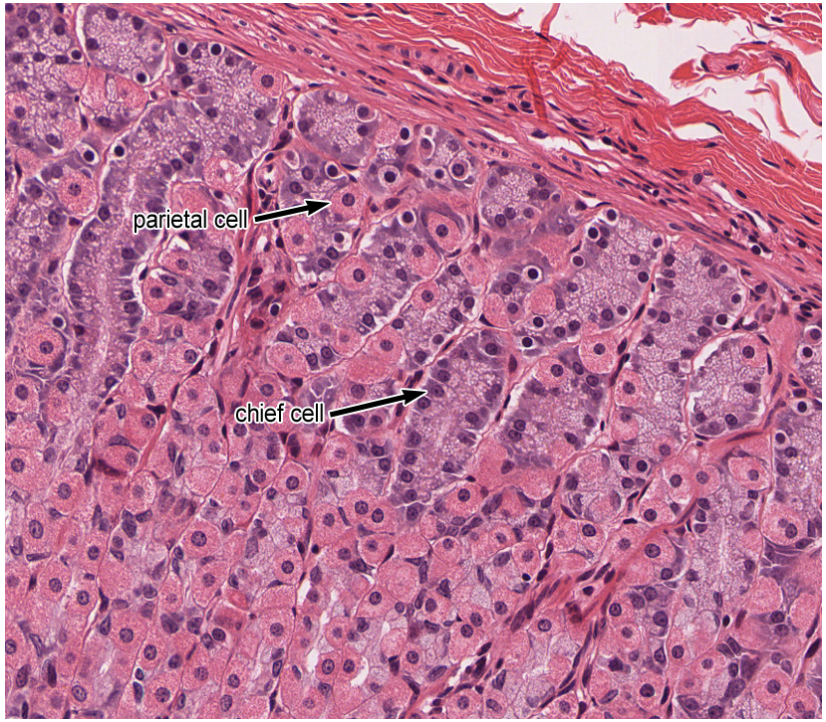


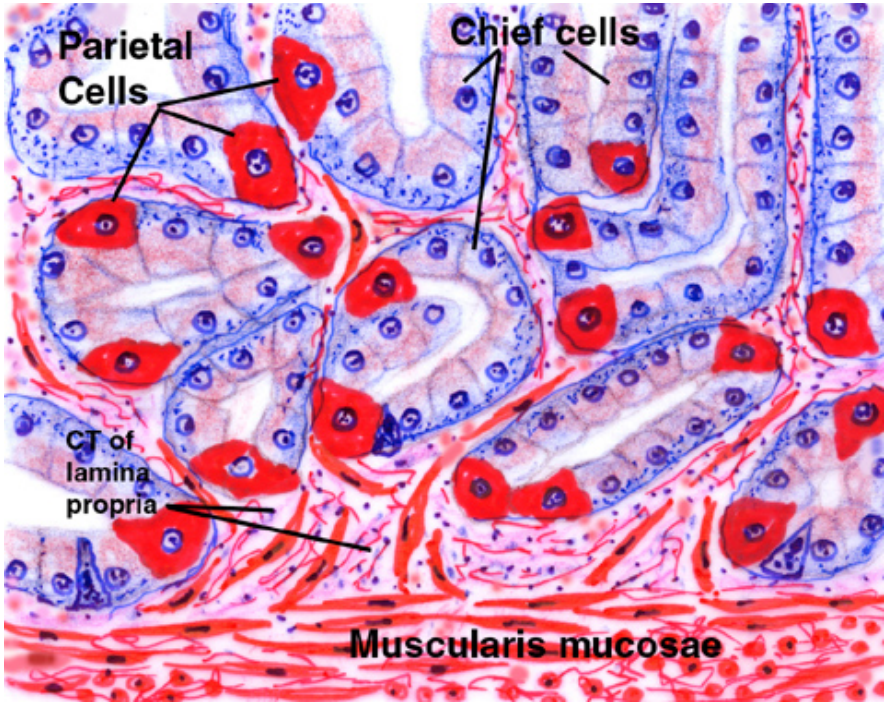


Cells of fundic region



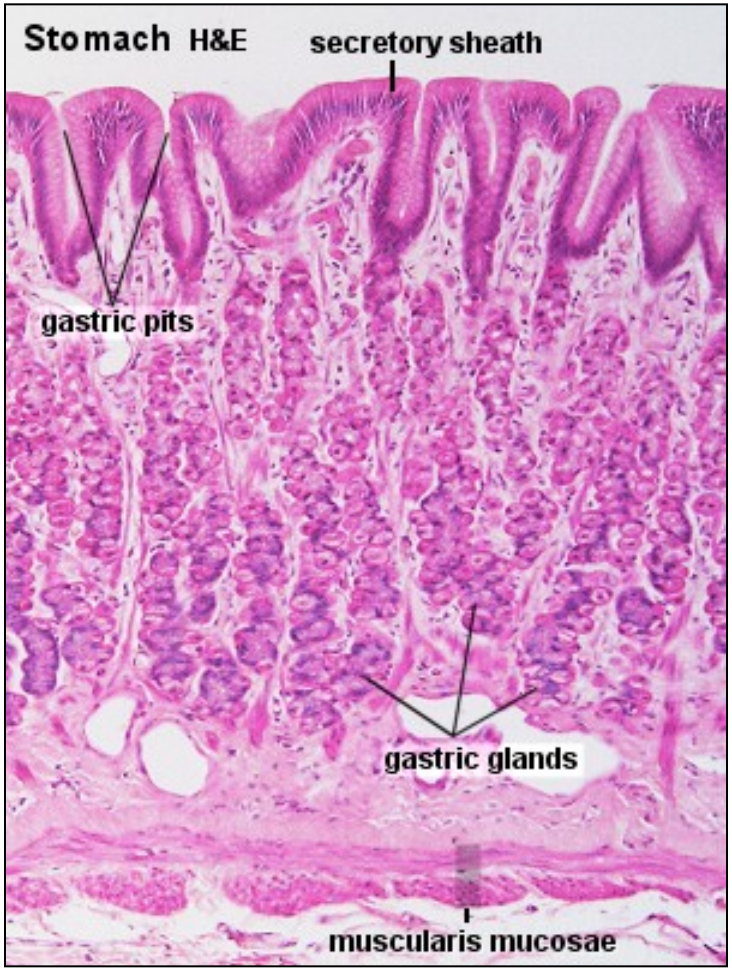
Cells of fundic region





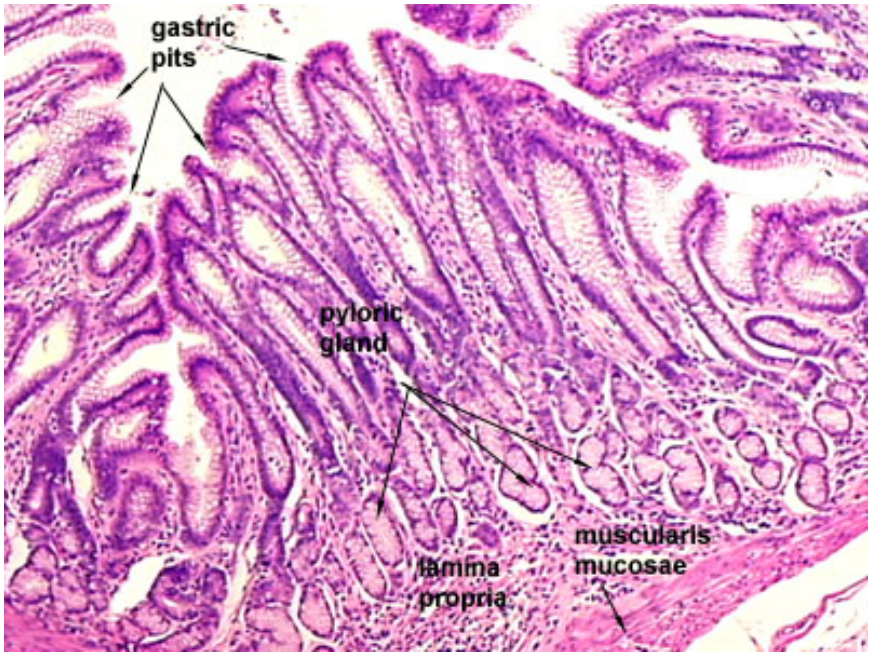
Stomach (Fundic Region)

- **Submucosa:** contains blood vessels, lymphatics and Meissner's plexus.
- **Muscularis Externa**: an inner oblique (absent in pylorus), middle circular and outer longitudinal layer.
- **Serosa**: consist of surface layer of flattened mesothelial cells resting on a thin layer of loose connective tissue with blood vessels and lymphatics.

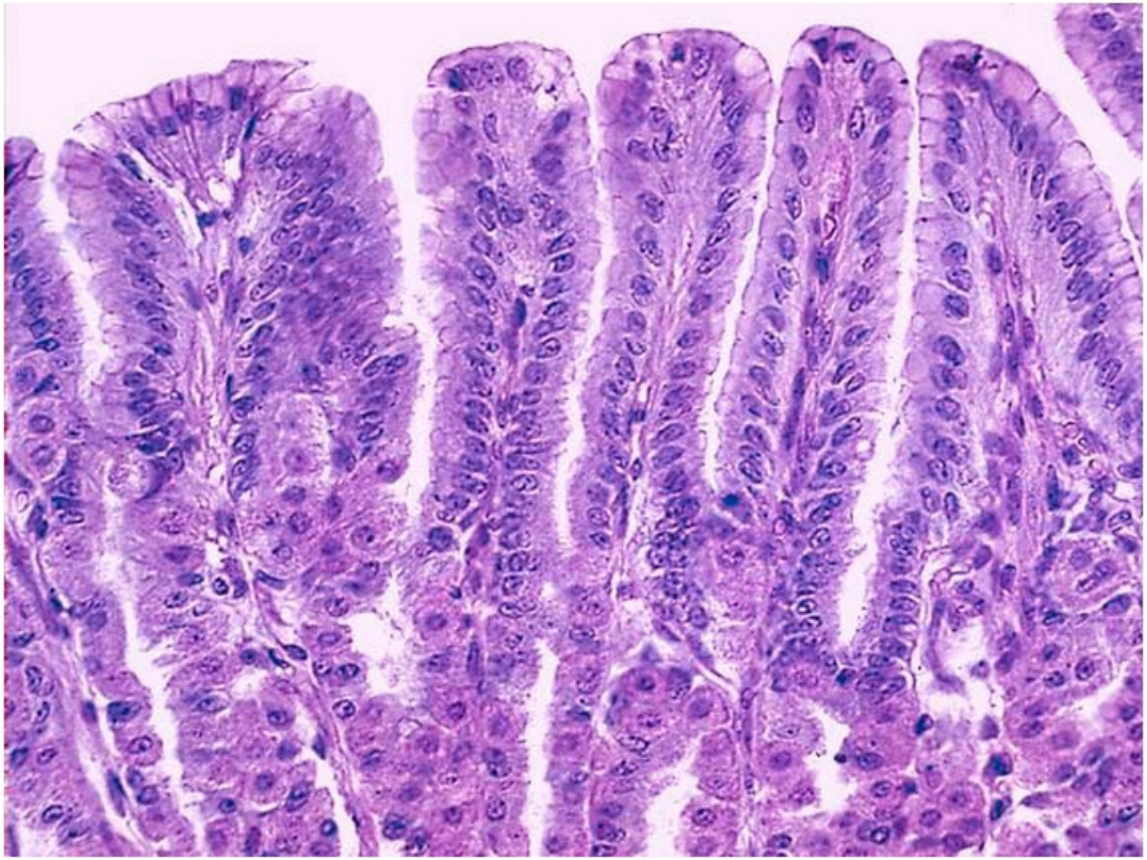


Stomach (Pyloric Region)

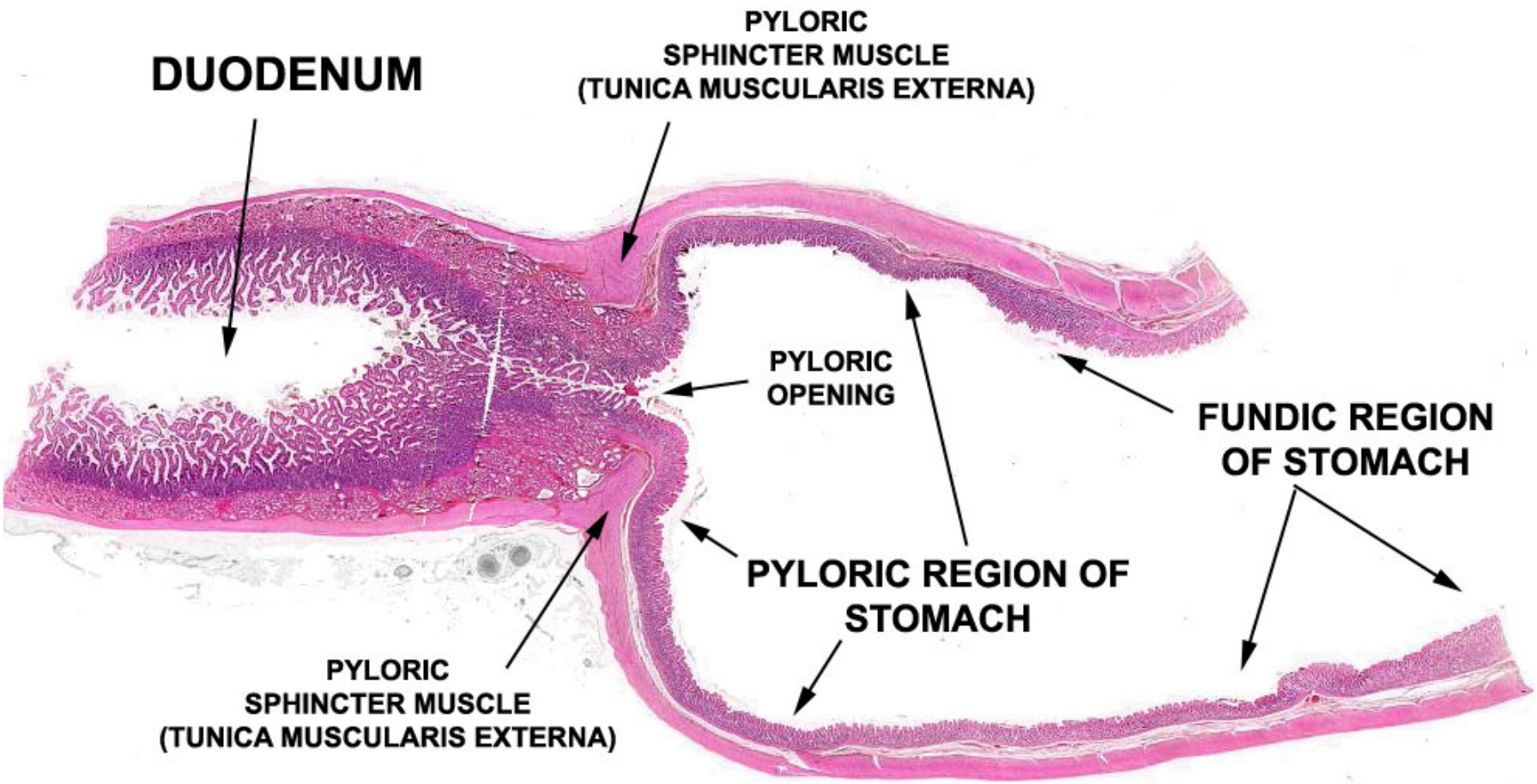
- **Mucosa**: pyloric glands in lamina propria & **deeper gastric pits extending half the thickness of mucosa.**
- **Muscularis Externa**: inner circular **(thickened to form pyloric sphincter)** and outer longitudinal layer.
- **Submucosa & Serosa**: same as in fundic part.



Stomach (Pyloric Region)



Pyloric Glands



Small Intestine

It is divided into duodenum, jejunum and ileum.

- **Mucosa:** characteristic features-

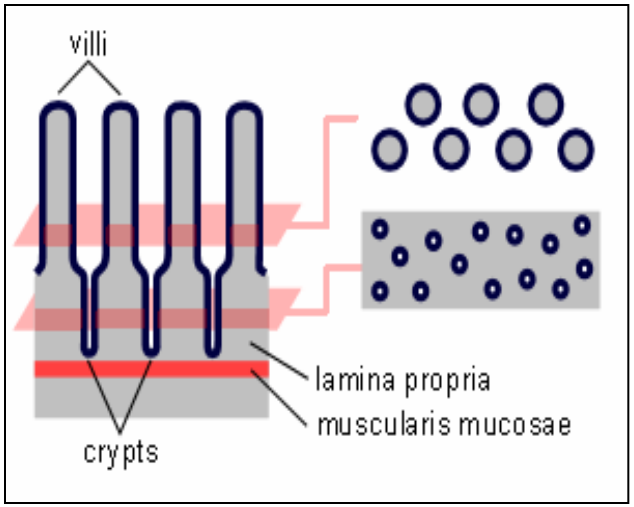
✓Plicae circularis (valves of Kerkring)

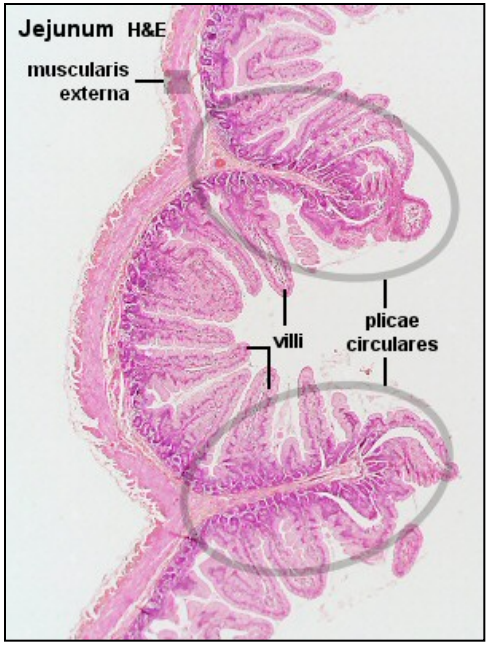
✓Villi & Microvilli

✓Goblet cells (few)

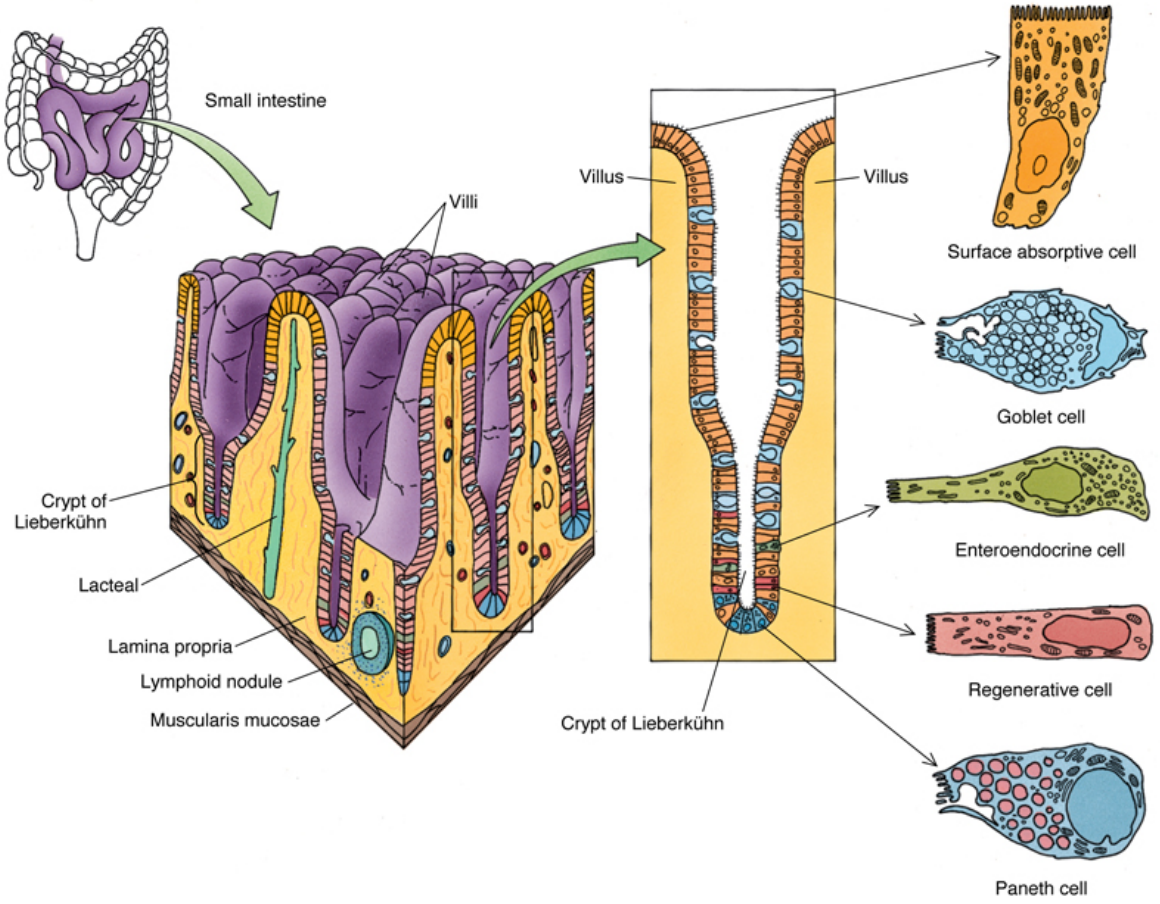
✓Crypts of Lieberkuhn (intestinal glands)

✓Glands are lined by columnar cells, goblet cells, Paneth cells & enteroendocrine cells



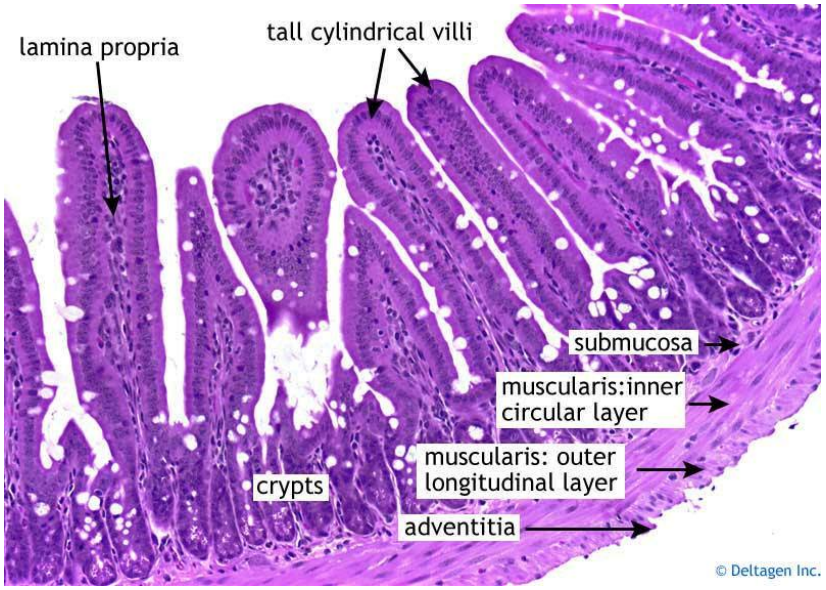


Small Intestine



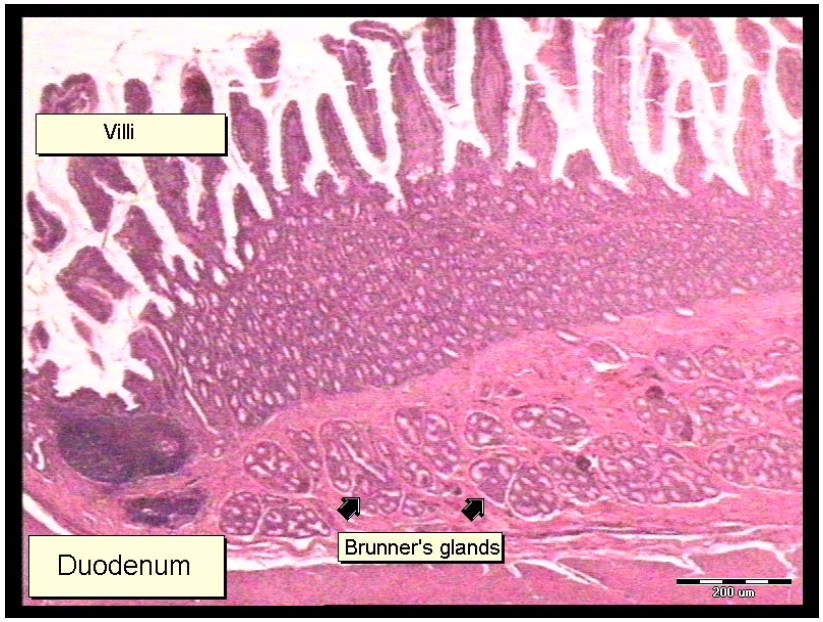
Small Intestine

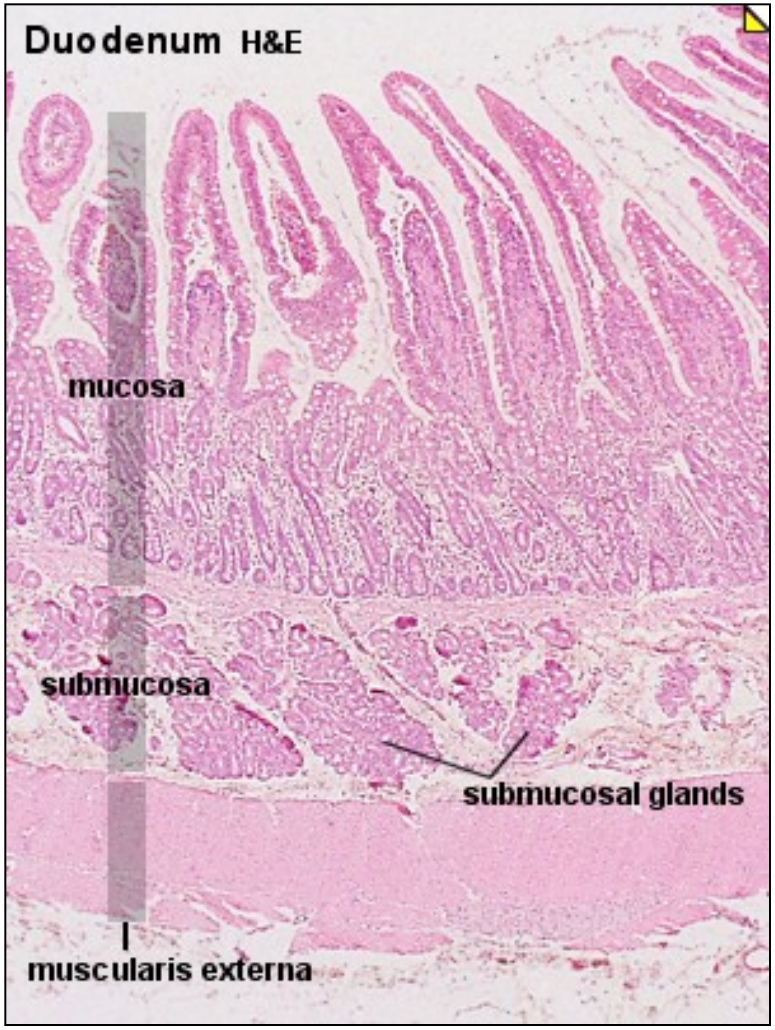
- **Submucosa:** contains blood vessels, lymphatics and Meissner's plexus.
- **Muscularis externa:** Outer longitudinal and inner circular layers of smooth muscle.
- **Serosa/Adventitia**



Duodenum

Presence of Brunner's glands in submucosa

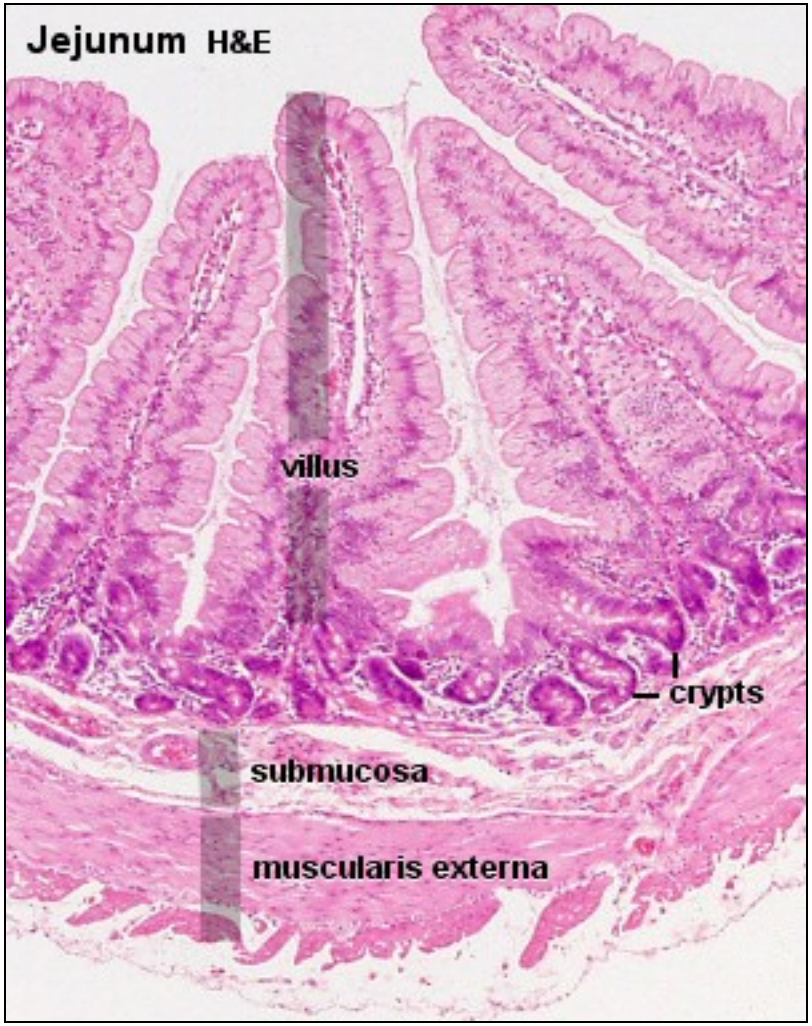




High power view of the Duodenal Mucosa

Jejunum

- Villi are tongue shaped.
- Absence of Brunner's glands.



Ileum

- Presence of lymphoid aggregations in lamina propria known as **Peyer's patches.**
- Villi are short & finger like.

Large Intestine

- It consists of: appendix, colon, rectum and anal canal.
- Mucosa: Absence of Plicae circulares and villi

  Presence of **Microvilli**

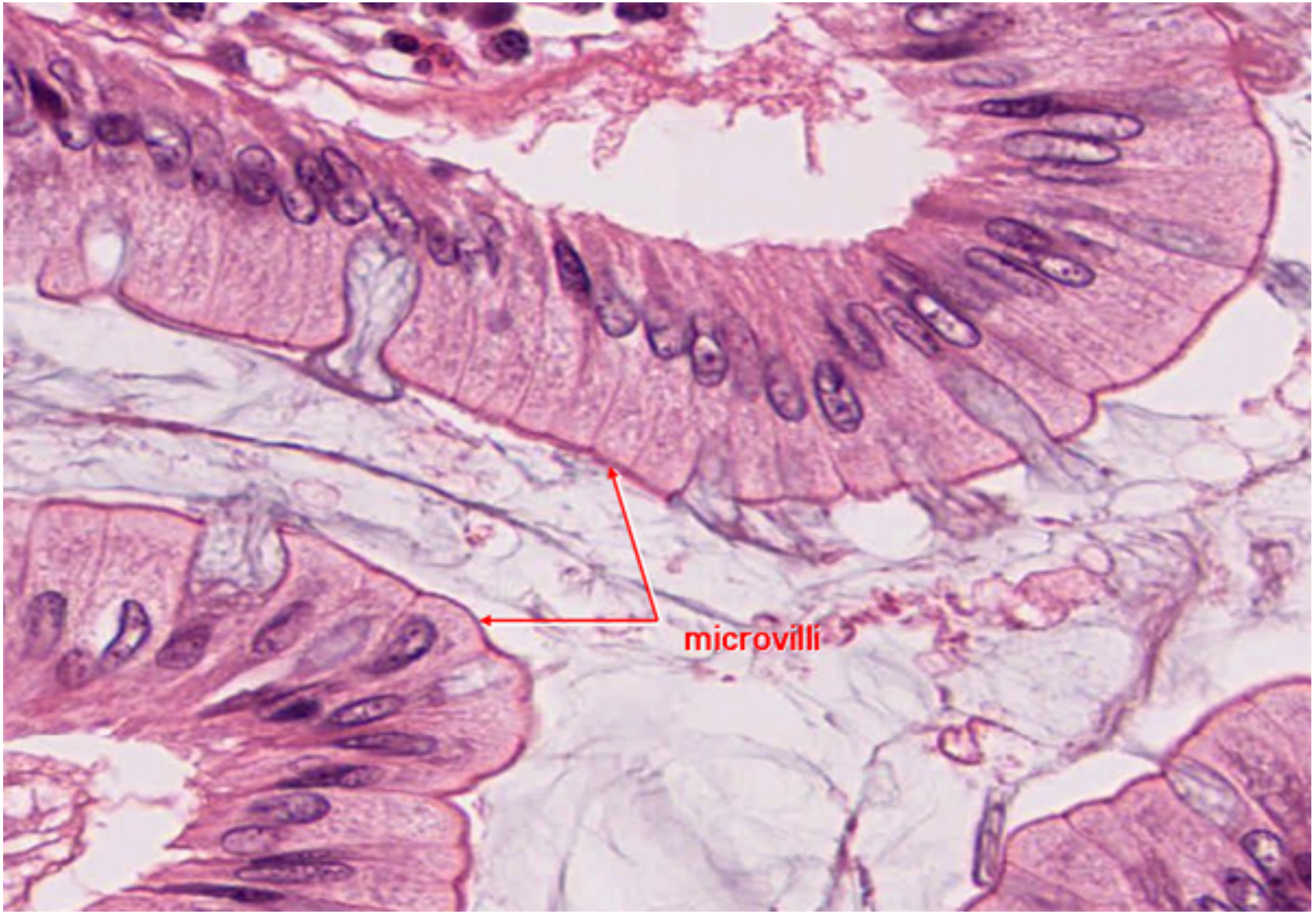
  Presence of **Crypts of Lieberkuhn**

  Presence of **Goblet cells** in large number
- Submucosa
- Muscularis externa:

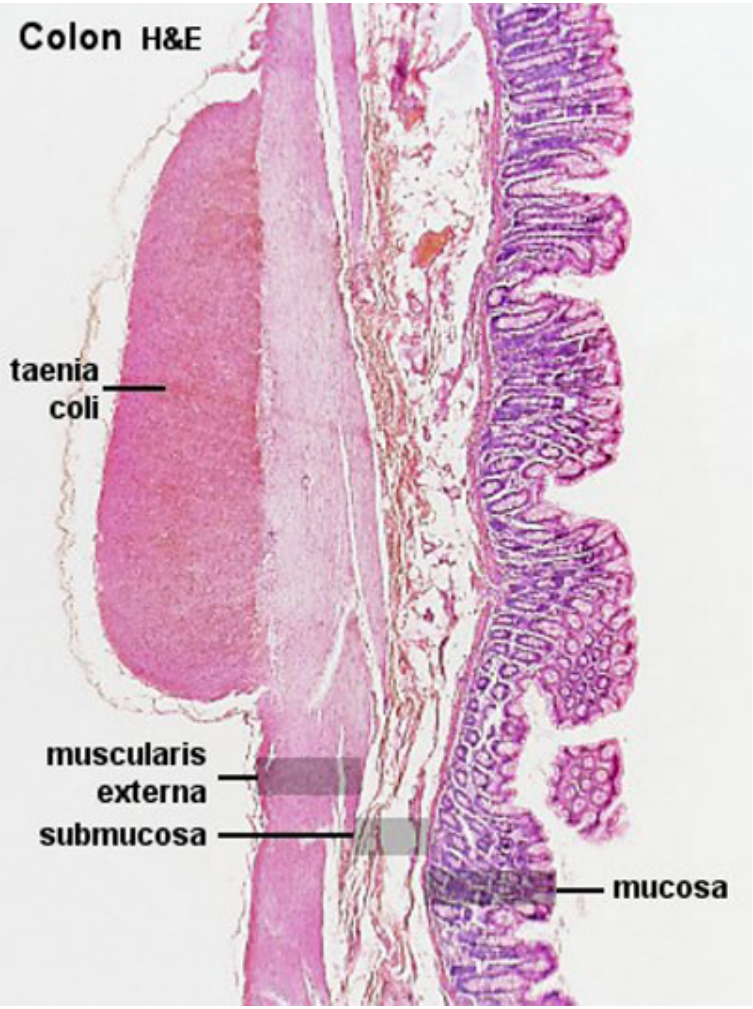
  Inner circular layer - thin compared to small intestine.

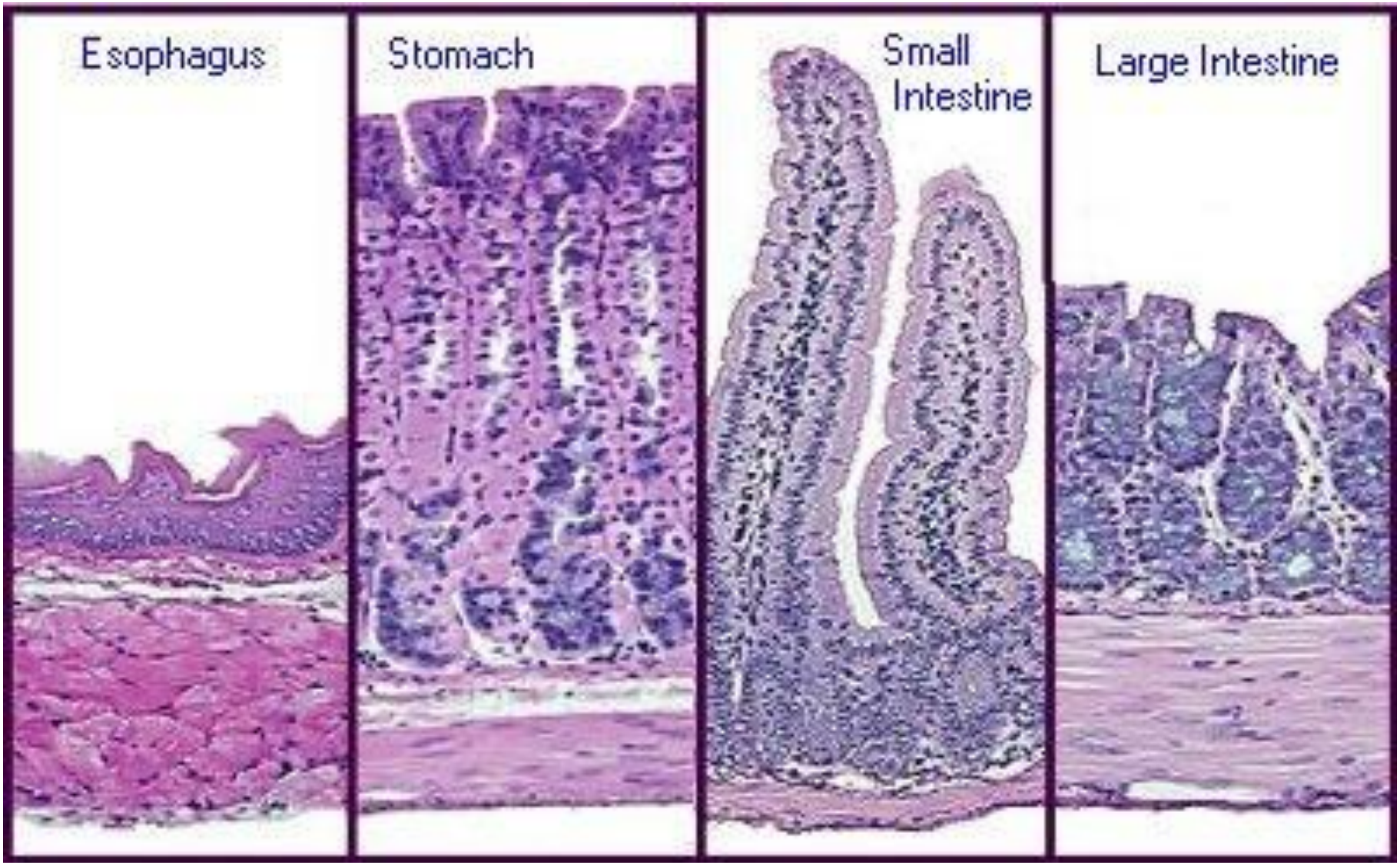
  Outer longitudinal layer- forms **Taenia coli**.
- Adventitia: **Appendices epiploicae** (peritoneum forms pouch like processes filled with fat)

Magnified view of a villus



Large Intestine




Esophagus
Stomach
Small Intestine
Large Intestine

liver

- ❖ The liver, the largest gland in the body weighing as much as 1.5 kg, is composed ofa single type of parenchymal cell, the hepatocyte.
- ✓ The central vein (CV) of the liver is lined by endothelial cells, that are continuous with those lining the liver sinusoid where these sinusoids open IOI into the central vein.
- ✓ Observe the bile duct IBDI and a branch of the portal vein IHVI in a relatively large portal area.