

Duodenum

1. Mucosa:

Show villi and crypts.

A- Epithelium: simple **columnar** epithelium with goblet cells.

B- Lamina propria: C.T.

C- Muscularis mucosae: 2 layers of smooth muscle cells.

Intestinal villus

Finger-like projection formed of

I- Central core of loose C.T.

containing:

- Lymphocytes.
- Fibroblasts.
- Smooth muscle cells.
- Capillary loops.
- lacteal (blindly ending lymphatic channels)

II- Villus covering epithelium.

Cells covering the Villi

1- Surface absorptive cells:

They have brush border (microvilli).

They are covered with thick glycocalyx that has digestive enzymes. They have Junction complex (tight, adhering & desmosome junctions)

2- Goblet cells:

↑ toward the ileum.

3- Enteroendocrine cells (DNES cells).

✓ **M cells** (microfold cells):

They phagocytose & transport antigens present in the intestinal lumen.

They are mainly found within epithelium overlying lymphatic nodules of lamina propria.

Intestinal Glands (Crypts)

Simple tubular glands that open between villi.

Composed of 5 cell types:

1. Columnar absorptive cells.

2. Goblet cells: secrete mucus.

3. Paneth cells: secrete **Lysozymes** (antibacterial).

4. Enteroendocrine cells: secrete hormones.

5. Stem cells: regenerative cells.

2. Submucosa:

C.T containing blood vessels & nerves.

Contains **Brunner's glands** (secrete mucus).

3. Muscularis Externa:

2 smooth muscle layers:

Inner circular layer.

Outer longitudinal layer.

4. Serosa or Adventitia:

Except for the 2nd & 3rd parts of the duodenum, which have adventitia,

The entire small intestine is invested by a serosa.

- ✓ **Duodenum:** Its **submucosa** has **Brunner's glands**.
- ✓ **Jejunum:** **No** Brunner's glands nor Peyer's patches.
- ✓ **Ileum:** Its lamina propria, opposite the attachment of the mesentery, has lymphoid nodules (**Peyer's patches**) that extends to the submucosa.

Colon

1. Mucosa:

Only crypts (**NO villi**).

Epithelium: simple columnar epithelium with numerous goblet cells.

Lamina propria: C.T. containing numerous crypts.

Cells of the crypts are the same as in small intestine but **NO Paneth cells**.

Lymphatic nodules: frequent.

Muscularis mucosae:

2 layers of smooth muscle.

2. Submucosa:

NO glands.

3. Muscularis Externa:

Inner circular & outer longitudinal smooth muscle layers.

The longitudinal layer is not continuous but in the form of 3 ribbons (**teniae coli**).

4. Serosa:

C.T. covered by mesothelium.

Has fat-filled pouches called **appendices epiploicae**.

✓ Vermiform Appendix

Smaller diameter, shallow crypts, more lymphoid nodules, & more DNES cells.

Esophagus

1. Mucosa
Epithelial Lining: Non-Keratinized Str. Squamous Epith.
Lamina propria: C.T.
Muscularis mucosae: Few layers of smooth muscle fibers.

2. Submucosa:
 C.T containing blood vessels, nerves, glands & Meissner's plexus of nerve fibers & nerve cells.

3. Muscularis Externa:
 Usually 2 smooth muscle layers:
 Inner circular layer.
 Outer longitudinal layer.
Auerbach's (myenteric) plexus in between the 2 layers.

4. Serosa or adventitia:
Serosa is C.T. covered by mesothelium (simple squamous epithelium) in the abdominal part of the esophagus. or **adventitia** if there is **no mesothelium**.

Fundus of Stomach

Mucosa: modify to form **fundic glands**. The surface epithelium is simple **columnar** mucus-secreting cells. It is composed of
 1. Surface Epithelium.
 2. Fundic glands.
 3. Lamina propria: invaded by numerous fundic glands.
 4. Muscularis mucosae.

Submucosa:
 C.T containing blood vessels & nerves.
NO glands.

Muscularis Externa:
Three smooth muscle layers:
Inner oblique.
 Middle circular.
 Outer longitudinal.

Serosa:
 C.T. covered by mesothelium.

Fundic Glands

Short pits—one forth of mucosa.
 Simple or branched tubular glands.
 Are rich in parietal & chief cells.
 Composed of 5 cell types:
 1. **Parietal cells:** secrete HCl and gastric intrinsic factor that helps absorption of vitamin B₁₂.
 2. **Peptic (chief) cells:** secrete pepsin.
 3. **Mucous neck cells:** secrete mucus.
 4. **Enteroendocrine (DNES) cells:** secrete hormones.
 5. **Stem cells:** regenerative cells.

Stomach

PYLORUS OF STOMACH

Mucosa:
 Modify to form **pyloric glands**. The surface epithelium is simple **columnar** mucus-secreting cells.
 Pyloric glands:
 Their pits are deep, about half the length of mucosa.
 They are branched & convoluted, many cross sections.
 The predominant cells are mucous neck cells that secrete mucus & G cells that secrete gastrin.

Submucosa:
 C.T containing blood vessels & nerves.
NO glands.

Muscularis Externa:
 Two smooth muscle layers:
 Inner circular.
 Outer longitudinal.

Serosa:
 C.T. covered by mesothelium.