

SMALL INTESTINE



Histology of Small intestine

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Small intestine

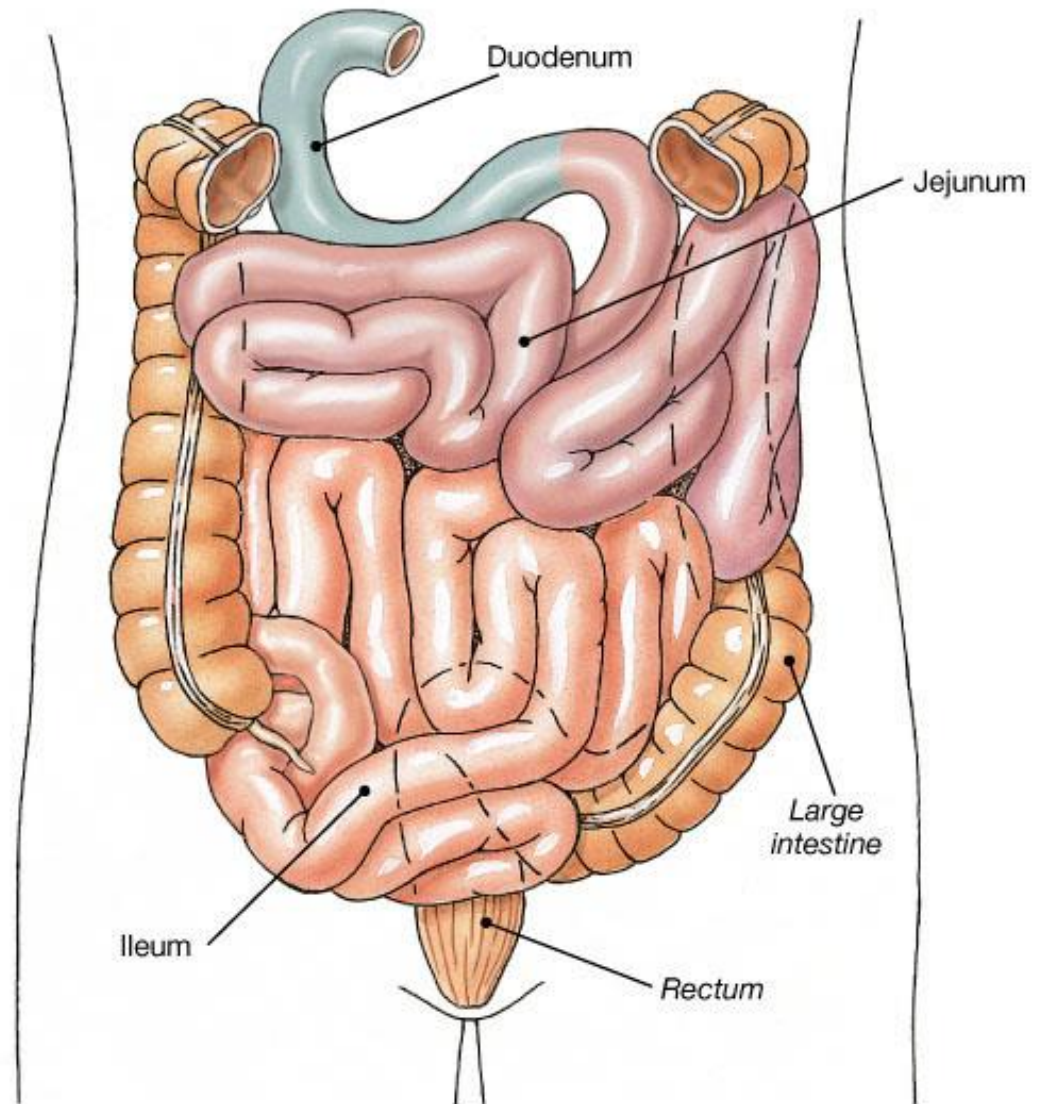
➤ Important digestive and absorptive functions

➤ Three subdivisions:

Duodenum

Jejunum

Ileum

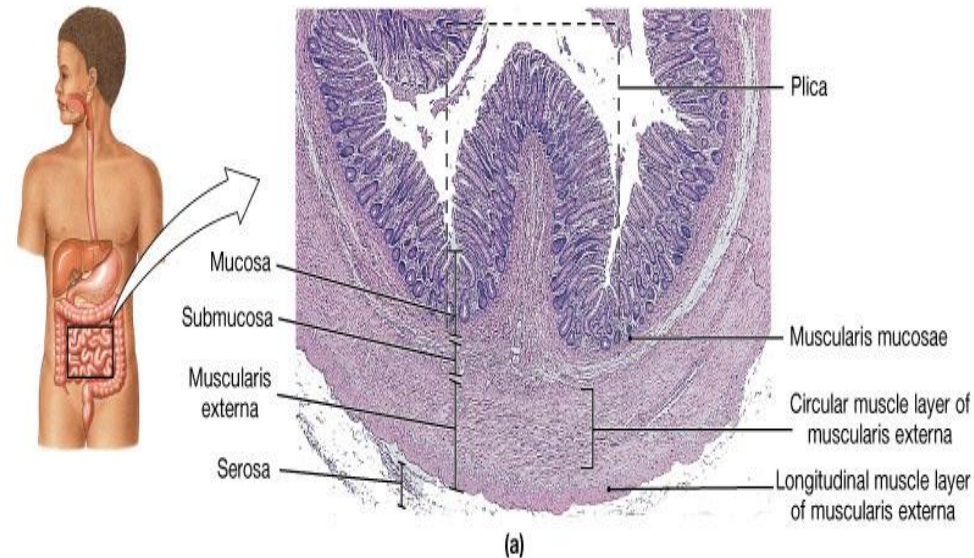


(a)

Surface modification of small intestine

Plicae Circulares.

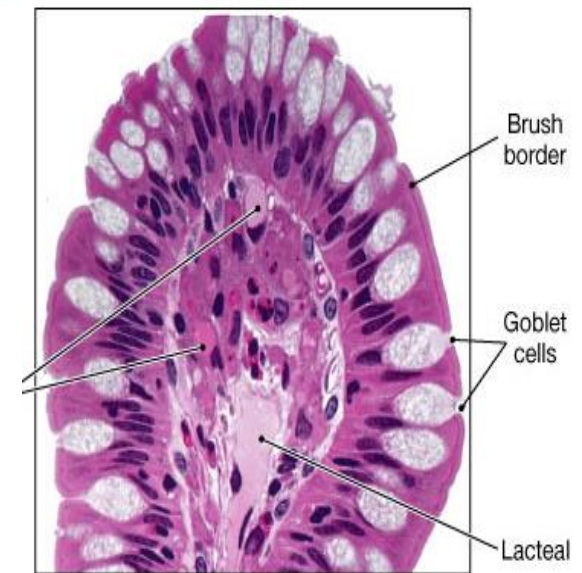
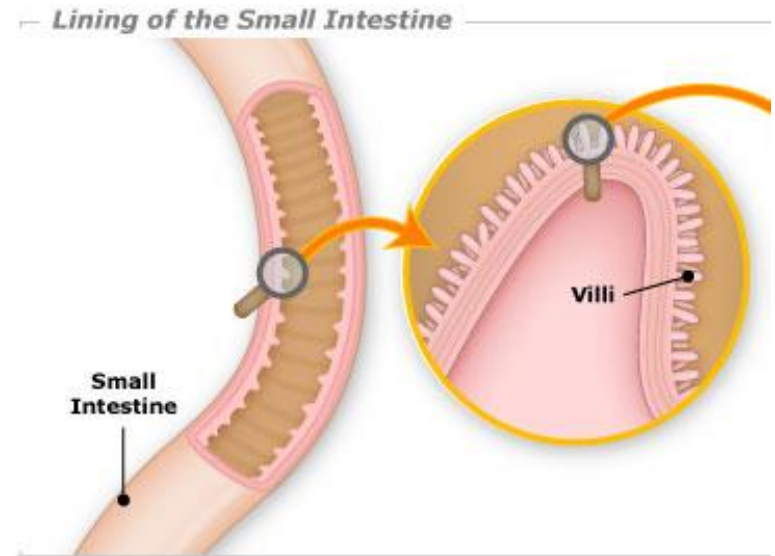
- Transverse fold of Semicircular to helical elevation of mucosa with submucosal core
- As large 8mm tall and 5mm long
- Present in duodenum , jejunum and proximal part of ileum.
- Surface area increase by factor 2 to 3
- Also decrease the velocity of the chyme along the alimentary canal
- Prominent in proximal portion of small intestine than distal portion



Surface modification of small intestine

Villi

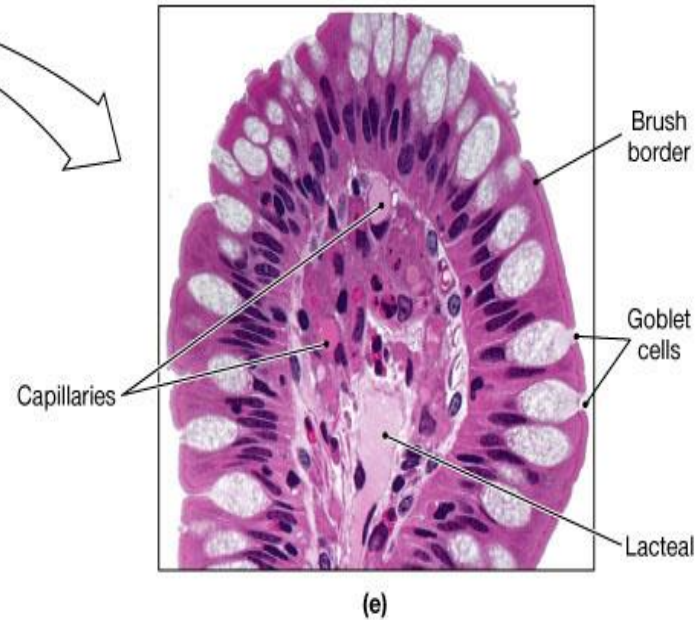
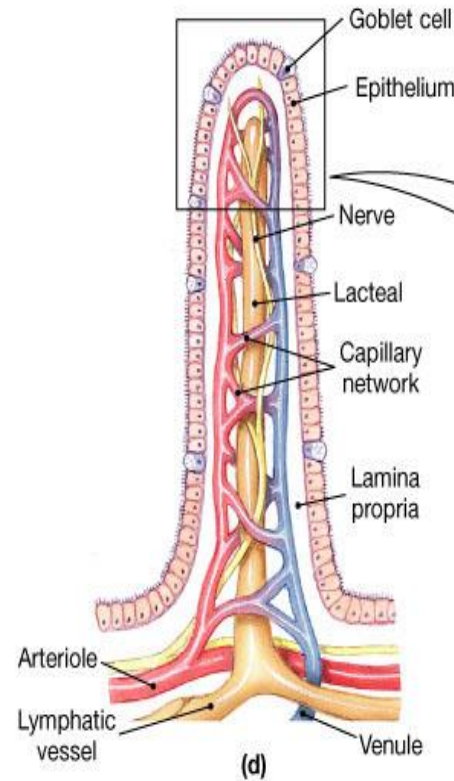
- Fingerlike Oak leaf like protrusion of the lamina propria of mucosa
- Covered by simple columnar epithelium.
- Prominent in proximal portion of small intestine.
- Height decrease toward distal portion .
- Number are greater in duodenum than jejunum or the ileum
- Height :-Decrease from 1.5 mm in duodenum to about 0.5 mm in the ileum
- Increase surface area by factor 10



(e)

Lacteal system

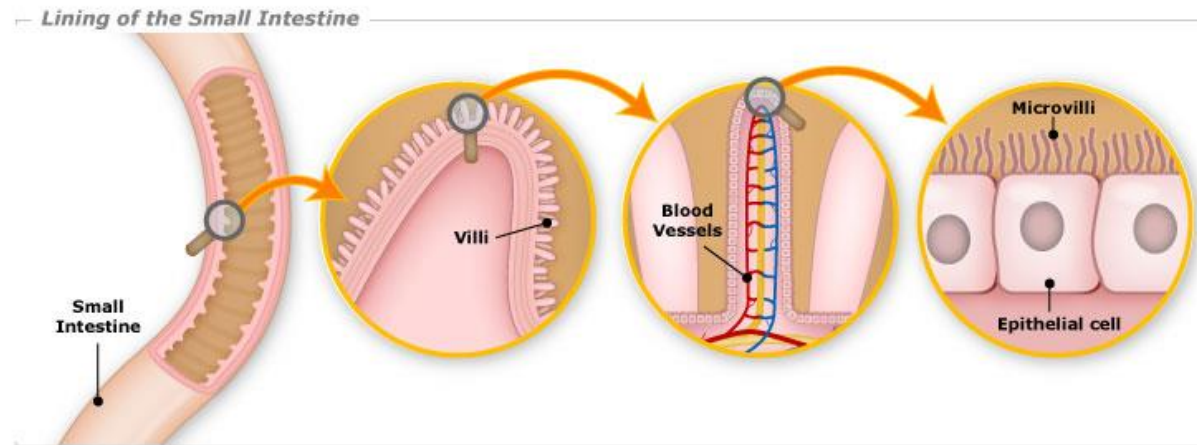
Each villi core contain a lymphatic capillaries loop called a lacteal with blood capillaries and strands of smooth muscle



Surface modification of small intestine

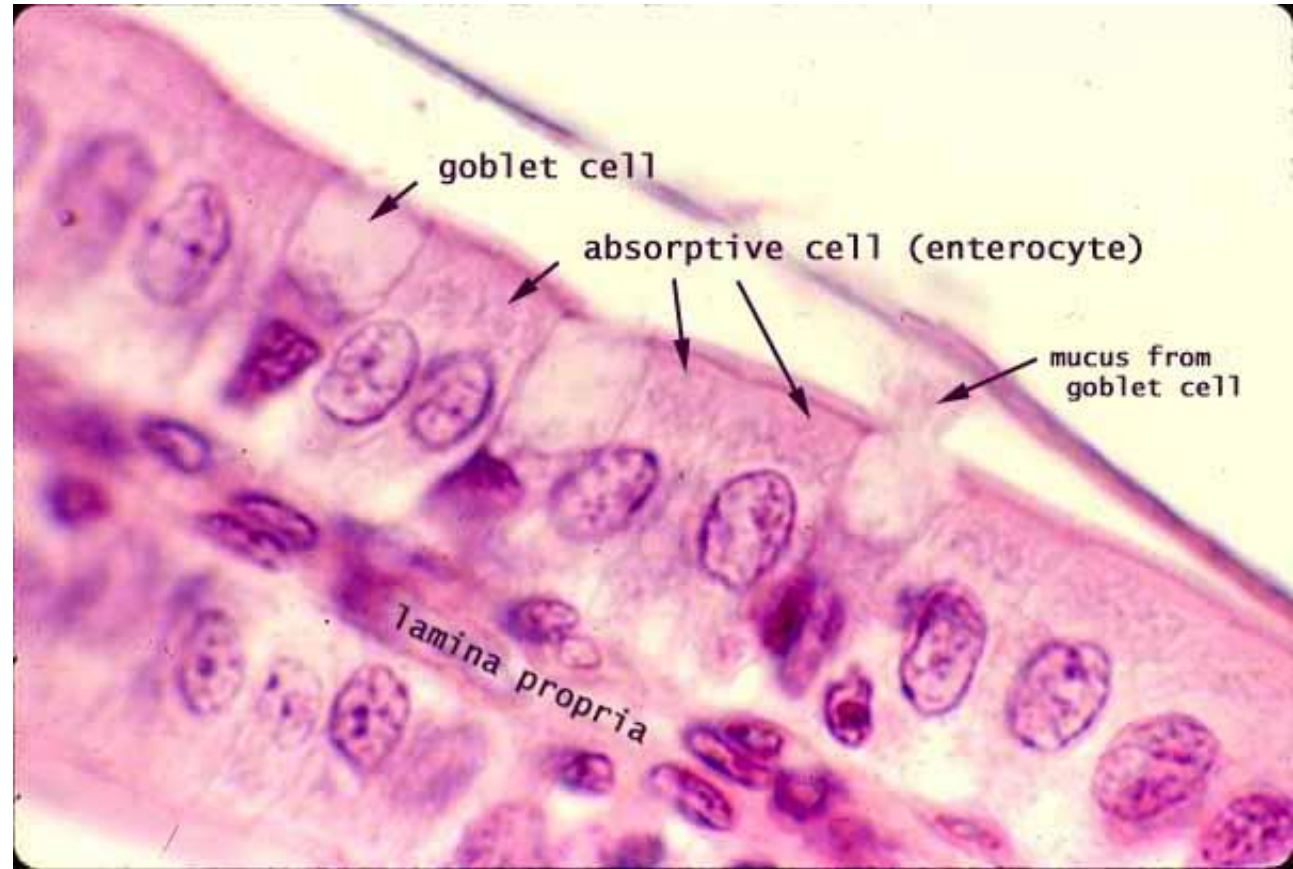
Microvilli

- Cytoplasmic extension or modification of apical plasmalemma.
- Cover the apices of intestinal Epithelium
- Striated (brush) border.
- Coated by glycoprotein coat glycocalyx
- Help Contraction of villus
- Increase surface area by factor 20



Small intestine Cells

- Cell types:
 - Mostly absorptive cells
 - Goblet (mucous) cells increase in number as the small intestine progresses
 - Enteroendocrine cells
 - T-Lymphocytes
 - M cells



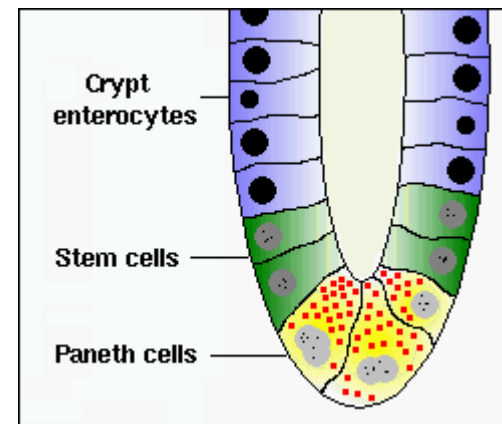
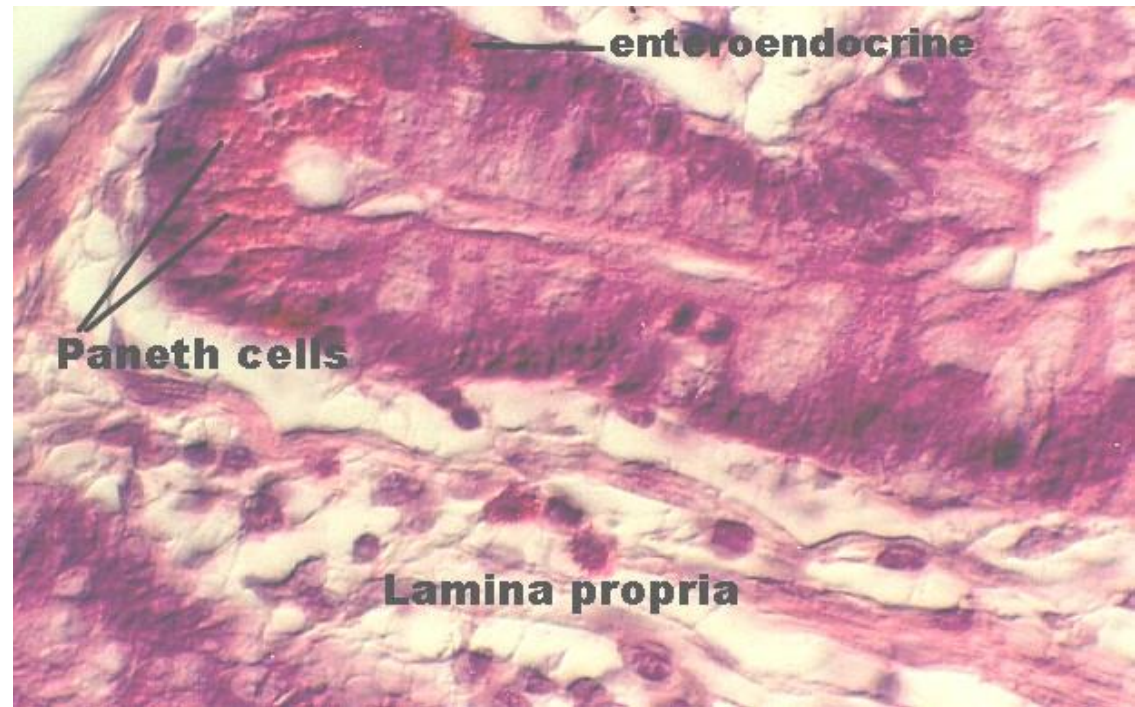
Small Intestine Cells

Paneth cells

- Deep to Intestinal crypts contain Paneth cells that secrete protective lysozyme (antibacterial)
- Deep staining eosinophilic granules

Peyer's Patches:

- lymphoid follicle (Nodules)in submucosa
- Found terminal portion of small intestine, the ileum



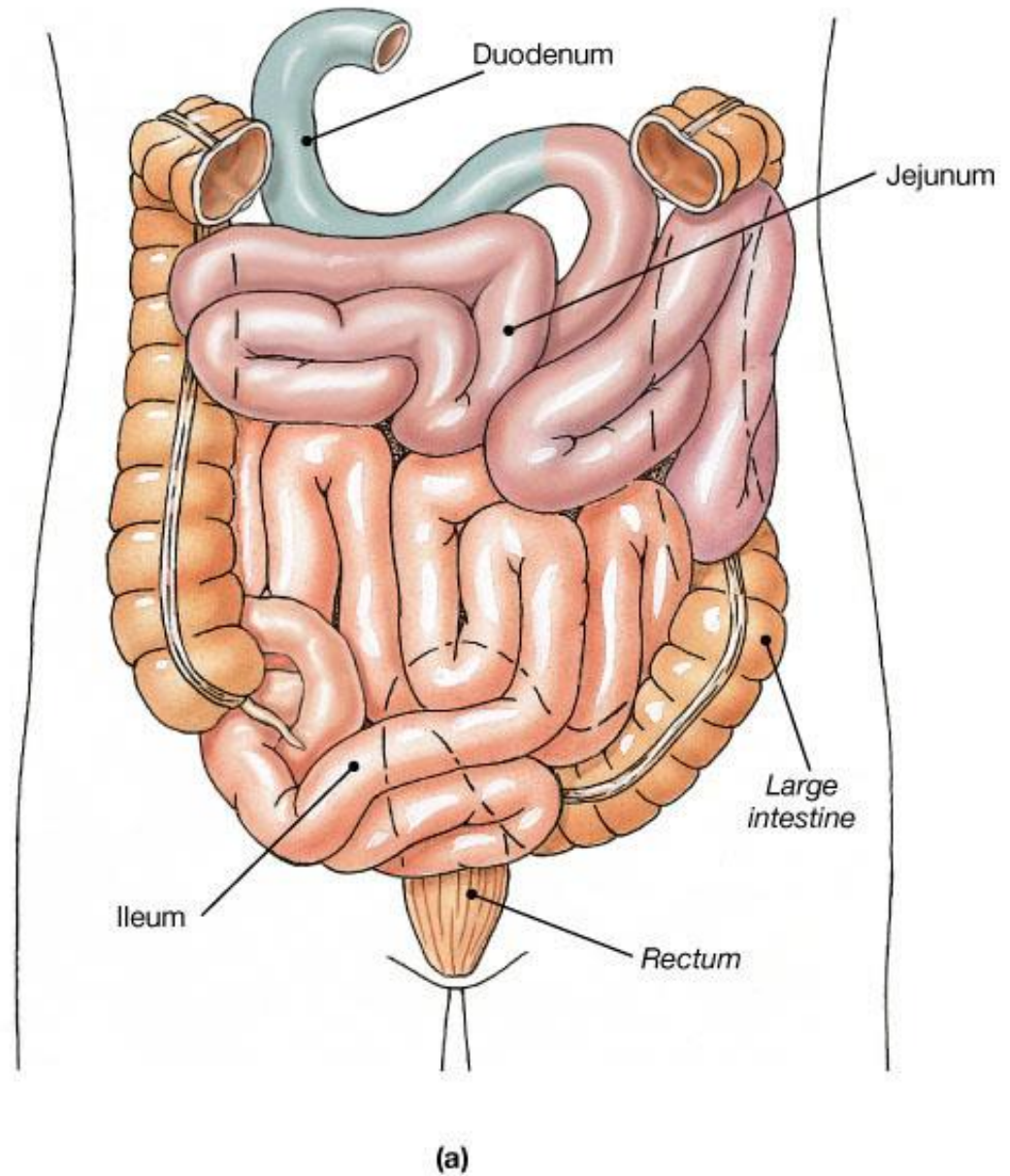
Small intestine

➤ Three subdivisions:

✓ Duodenum

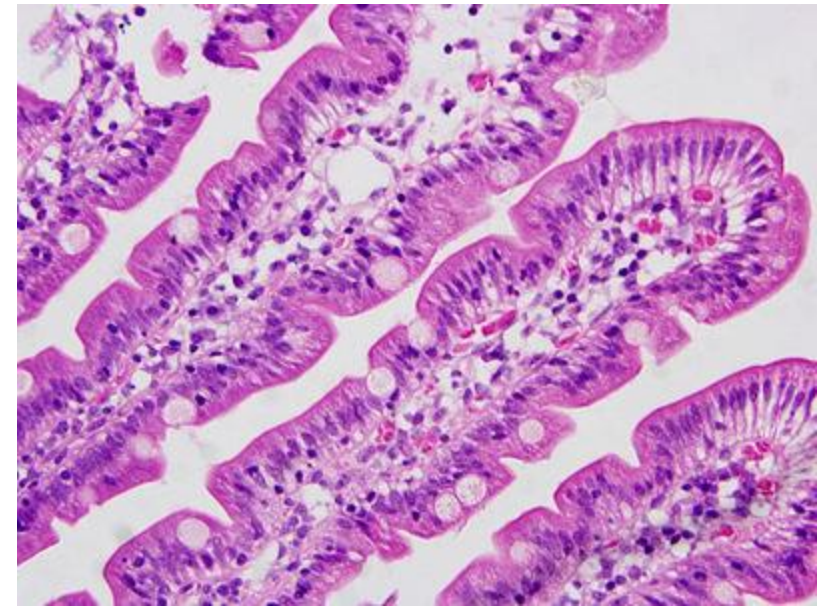
Jejunum

Ileum



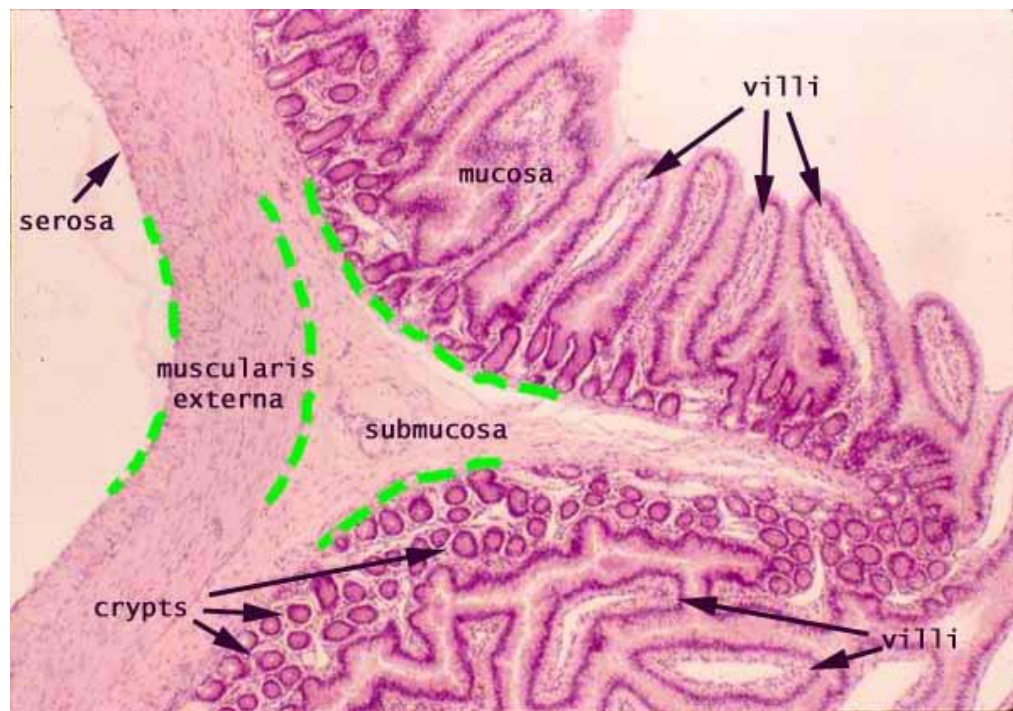
Duodenum

- Contain Four layer
- Duodenal (brunner) gland in submucosa. Penetrate the m.mucosa and secretion of hormone called urogastrone.
- Villi
- Microvilli forming brush border
- Goblet cell .
- Light stain interspead among absorptive cell of intestinal epithelium.
- More in distal portion.
- Intestinal gland (crypt of lieberkuhn) in lumina propria.open into intervillous space
- Intervillous space.
- Lacteal
- Myenteric plexus

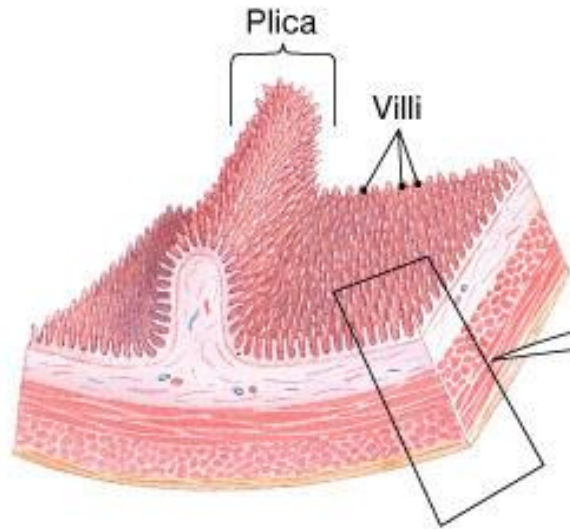


Jejunum

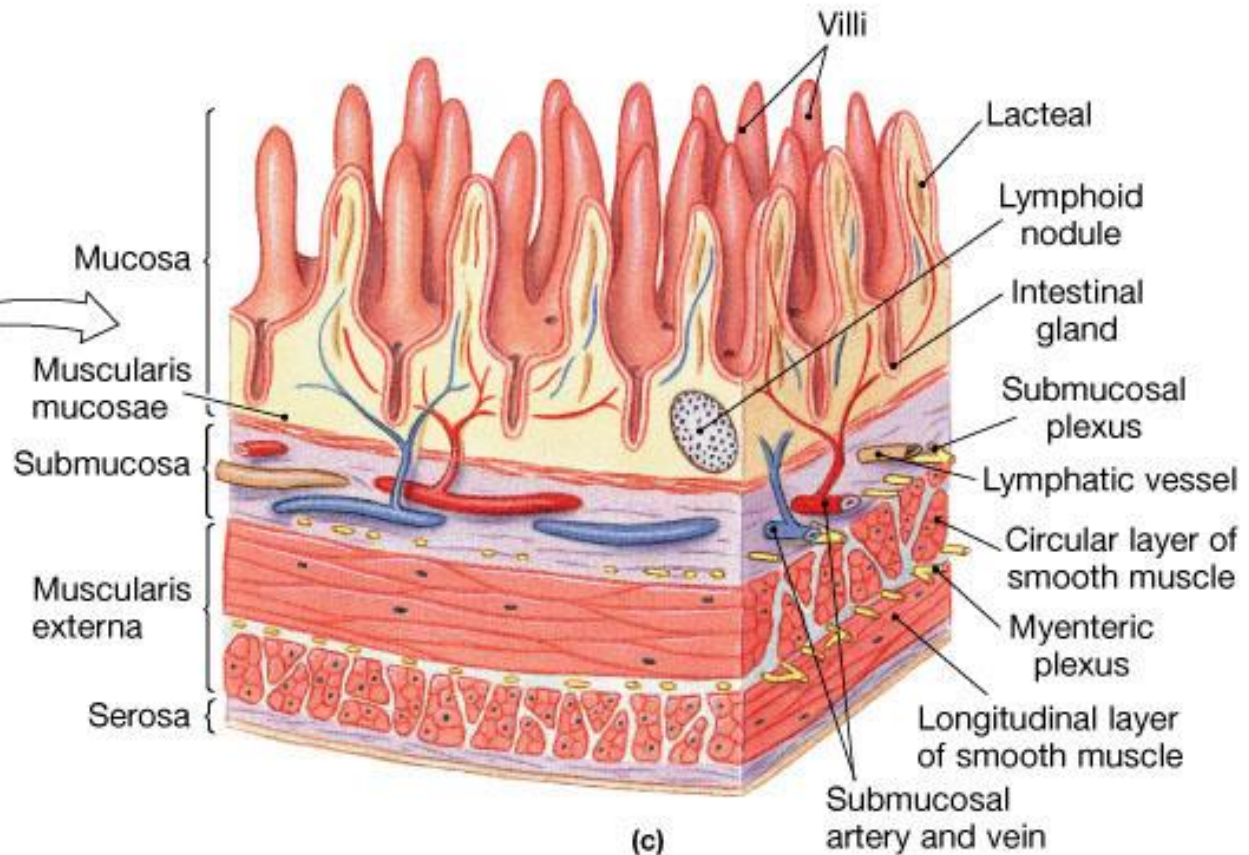
- Plica circularis.
 - core contain submucosa.
- villi covers the plica
- Intestinal gland in luminal propria
- Lucteal
- Goblet cells



The Intestinal Wall (plica circularis)



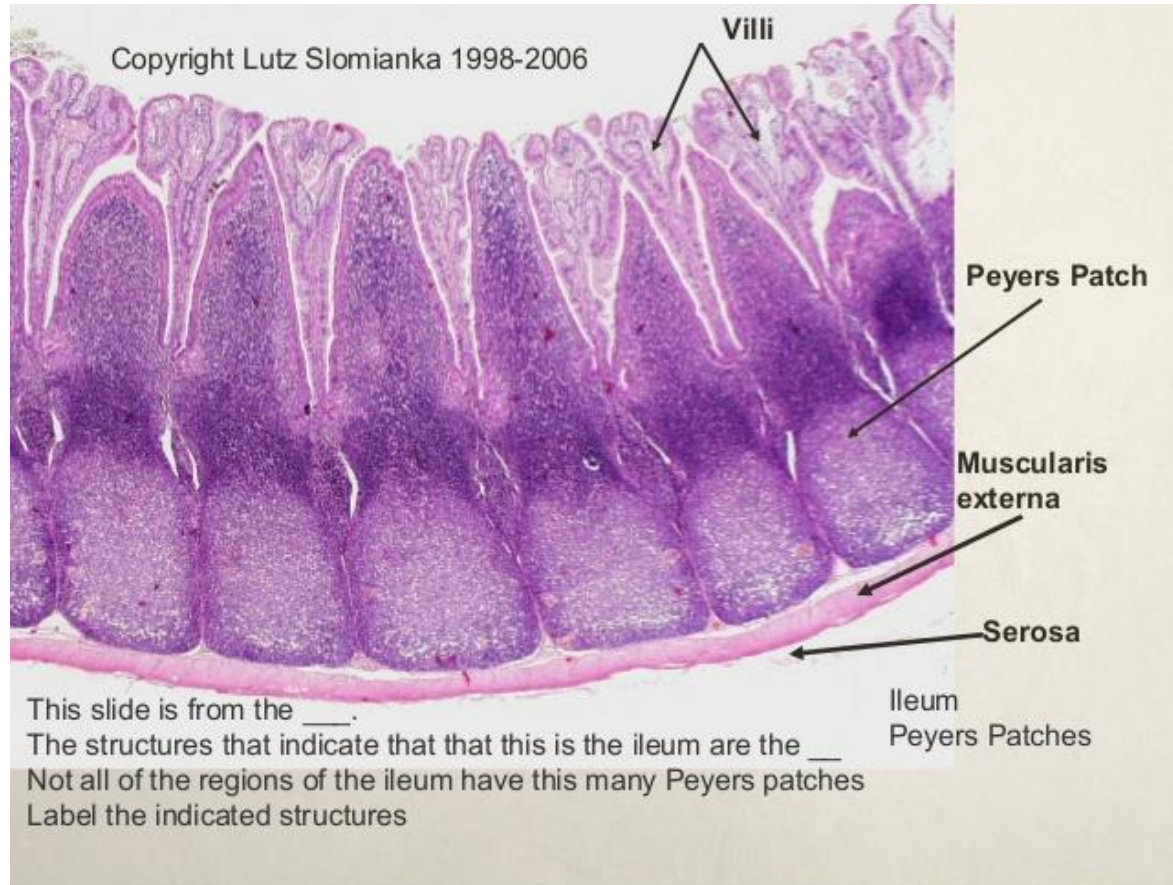
(b)



(c)

ILEUM

- Aggregation Lymphatic nodules called peyer patches.
 - Villi absent at surface of l.nodules
 - M CELLS.
- Specialized epithelium cover the l.nodules.contain antigen



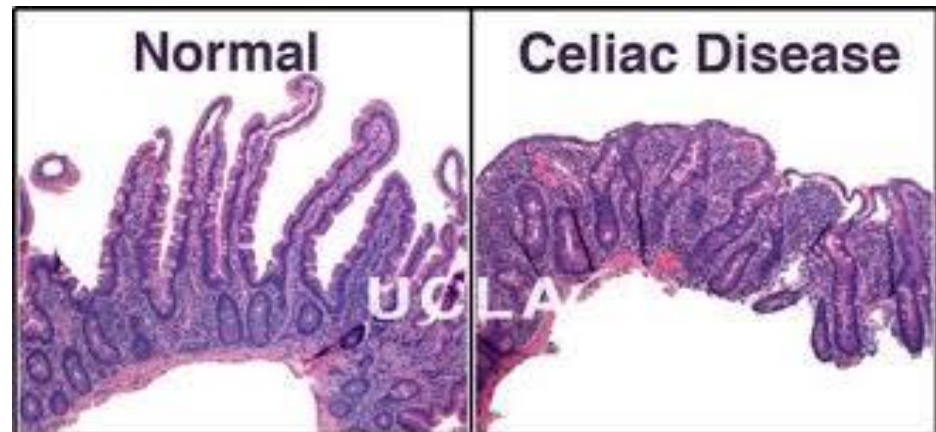
MEDICAL APPLICATION

Celiac disease (celiac sprue)

- Is a disorder of the small intestine mucosa
- And can lead to damage or destruction of the villi.

Cause

- An immune reaction against gluten or other proteins present in wheat and certain other types of grain.
- The resulting inflammation affects the enterocytes, leading to reduced nutrient absorption .
(Causes malabsorption)



Crohn disease

- Is a chronic inflammatory bowel disease
- Most common in the ileum or colon
- Resulting from a poorly understood combination of immune, environmental, and genetic factors.
- Excessive lymphocytic activity and inflammation occur in any or all layers of the tract wall, producing pain, localized bleeding, malabsorption, and diarrhea.



>> MEDICAL APPLICATION

Leiomyomas:-

- Benign tumors of smooth muscle cells
- Are the most common type of tumor in the stomach and small intestine and may become large.
- Autopsy records suggest that the muscularis of the stomach may include leiomyomas in up to 50% of the population older than 50yr old

Thank you