

14

PART B

The Digestive System and Body Metabolism

PowerPoint® Lecture Slide Presentation by Jerry L. Cook, Sam Houston University



ESSENTIALS OF HUMAN ANATOMY & PHYSIOLOGY

EIGHTH EDITION

ELAINE N. MARIEB

Stomach Anatomy

- Located on the left side of the abdominal cavity
- Food enters at the cardioesophageal sphincter

Stomach Anatomy

- Regions of the stomach
 - Cardiac region – near the heart
 - Fundus
 - Body
 - Pylorus – funnel-shaped terminal end
- Food empties into the small intestine at the pyloric sphincter

Stomach Anatomy

- Rugae – internal folds of the mucosa
- External regions
 - Lesser curvature
 - Greater curvature

Stomach Anatomy

- Layers of peritoneum attached to the stomach
 - Lesser omentum – attaches the liver to the lesser curvature
 - Greater omentum – attaches the greater curvature to the posterior body wall
 - Contains fat to insulate, cushion, and protect abdominal organs

Stomach Anatomy

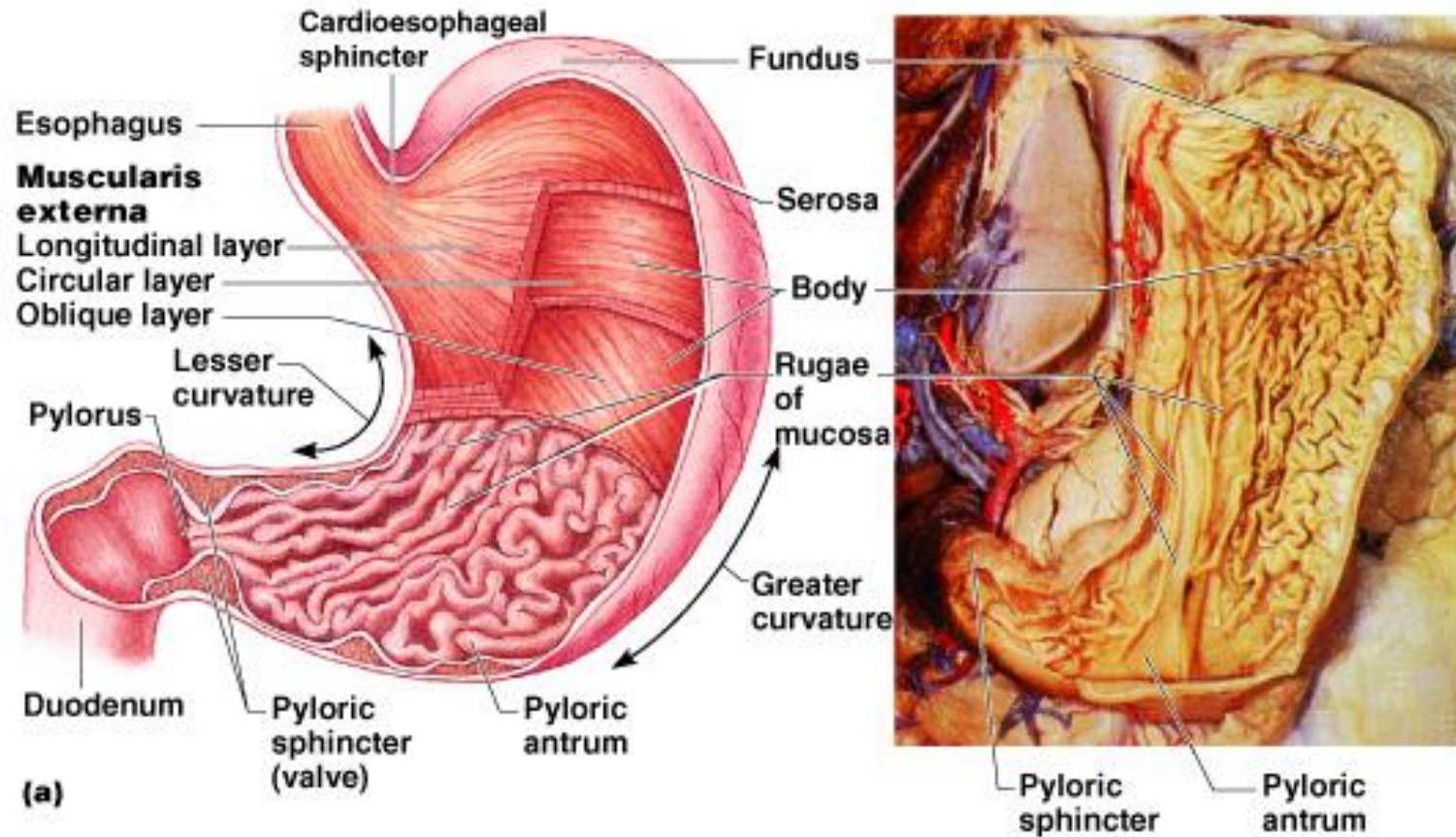


Figure 14.4a

Stomach Functions

- Acts as a storage tank for food
- Site of food breakdown
- Chemical breakdown of protein begins
- Delivers chyme (processed food) to the small intestine

Specialized Mucosa of the Stomach

- Simple columnar epithelium
 - Mucous neck cells – produce a sticky alkaline mucus
 - Gastric glands – secrete gastric juice
 - Chief cells – produce protein-digesting enzymes (pepsinogens)
 - Parietal cells – produce hydrochloric acid
 - Endocrine cells – produce gastrin

Structure of the Stomach Mucosa

- Gastric pits formed by folded mucosa
- Glands and specialized cells are in the gastric gland region

Structure of the Stomach Mucosa

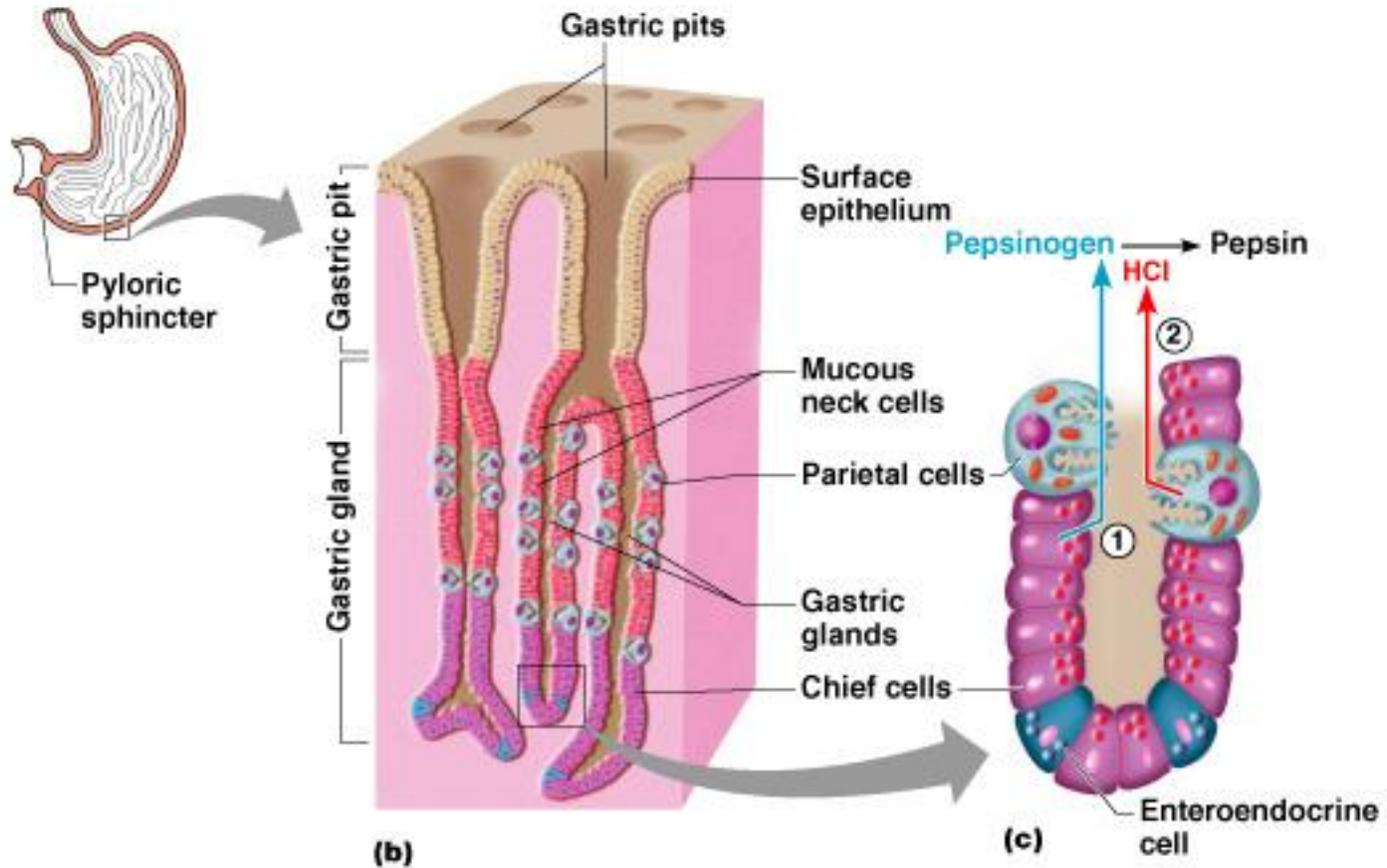


Figure 14.4b-c

Small Intestine

- The body's major digestive organ
- Site of nutrient absorption into the blood
- Muscular tube extending from the pyloric sphincter to the ileocecal valve
- Suspended from the posterior abdominal wall by the mesentery

Subdivisions of the Small Intestine

- Duodenum
 - Attached to the stomach
 - Curves around the head of the pancreas
- Jejunum
 - Attaches anteriorly to the duodenum
- Ileum
 - Extends from jejunum to large intestine

Chemical Digestion in the Small Intestine

- Source of enzymes that are mixed with chyme
 - Intestinal cells
 - Pancreas
- Bile enters from the gall bladder

Chemical Digestion in the Small Intestine

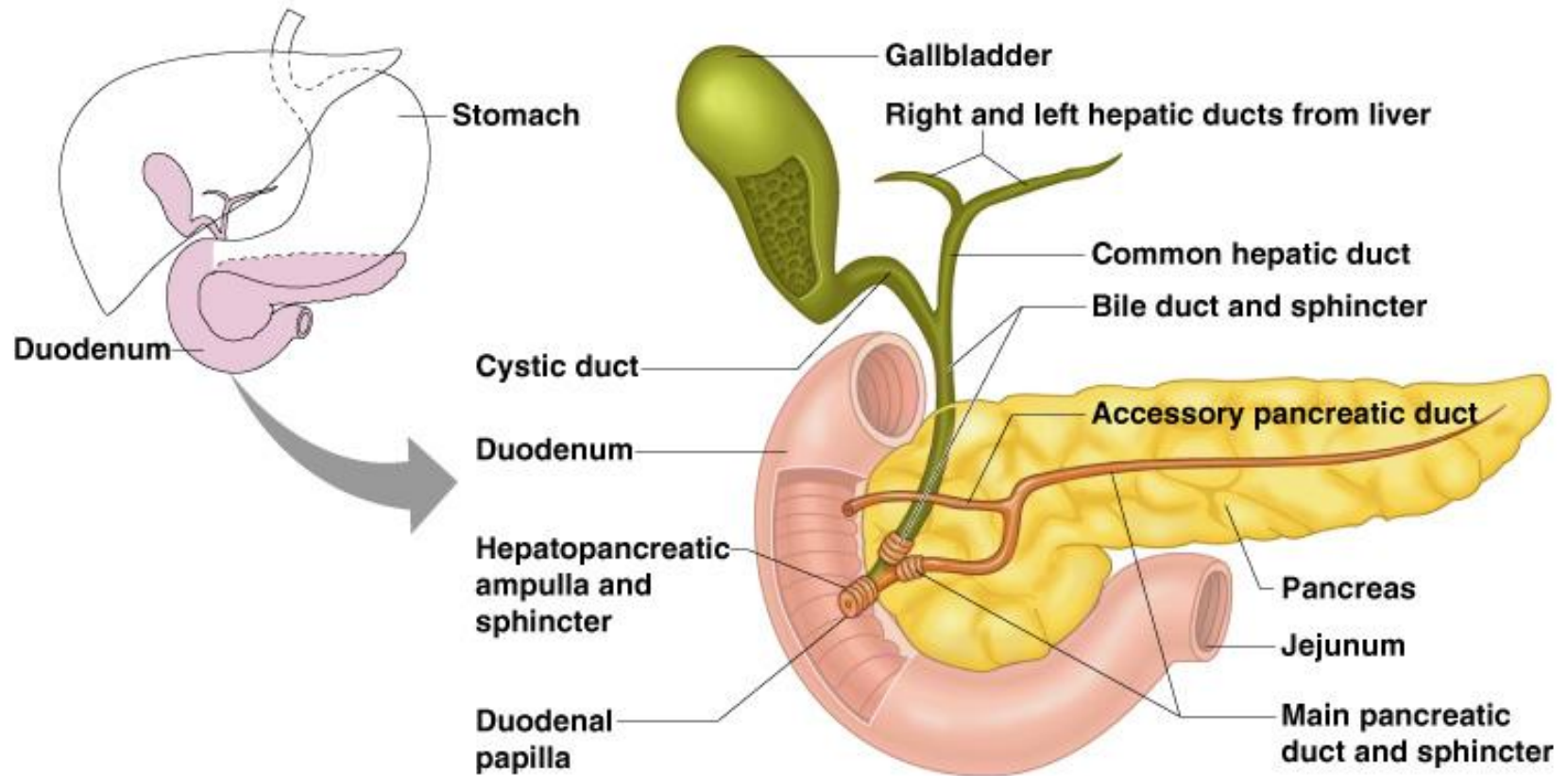


Figure 14.6

Villi of the Small Intestine

- Fingerlike structures formed by the mucosa
- Give the small intestine more surface area

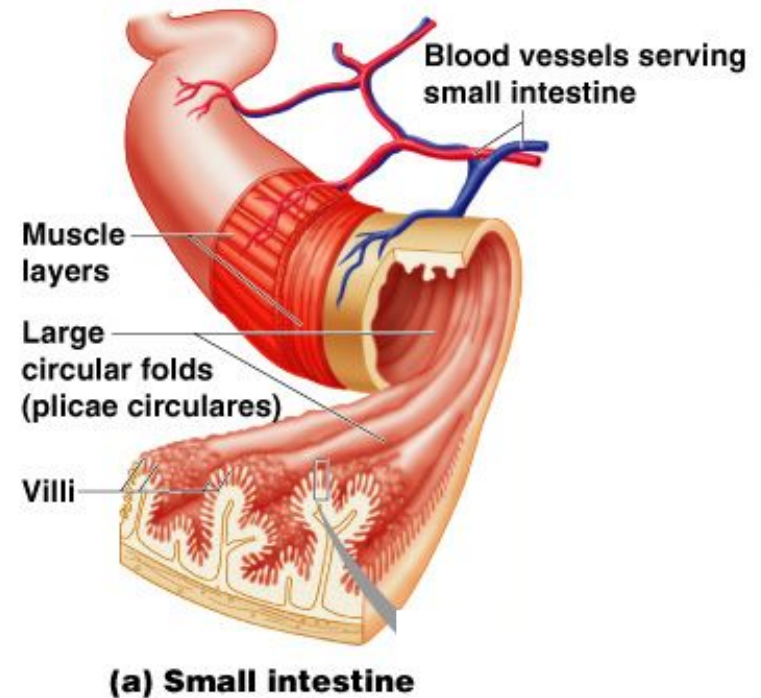
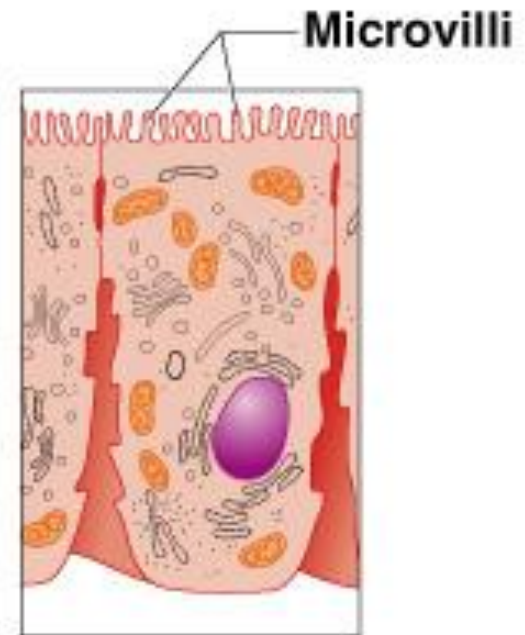


Figure 14.7a

Microvilli of the Small Intestine

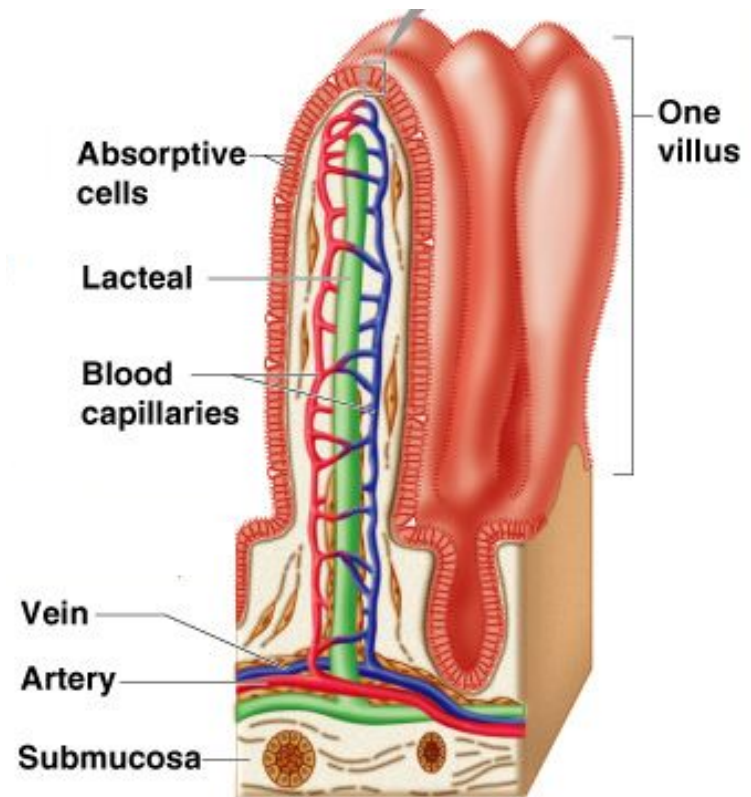
- Small projections of the plasma membrane
- Found on absorptive cells



(c) Absorptive cells

Structures Involved in Absorption of Nutrients

- Absorptive cells
- Blood capillaries
- Lacteals (specialized lymphatic capillaries)



(b) Villi

Figure 14.7b

Folds of the Small Intestine

- Called circular folds or plicae circulares
- Deep folds of the mucosa and submucosa
- Do not disappear when filled with food
- The submucosa has Peyer's patches (collections of lymphatic tissue)

Large Intestine

- Larger in diameter, but shorter than the small intestine
- Frames the internal abdomen

Large Intestine

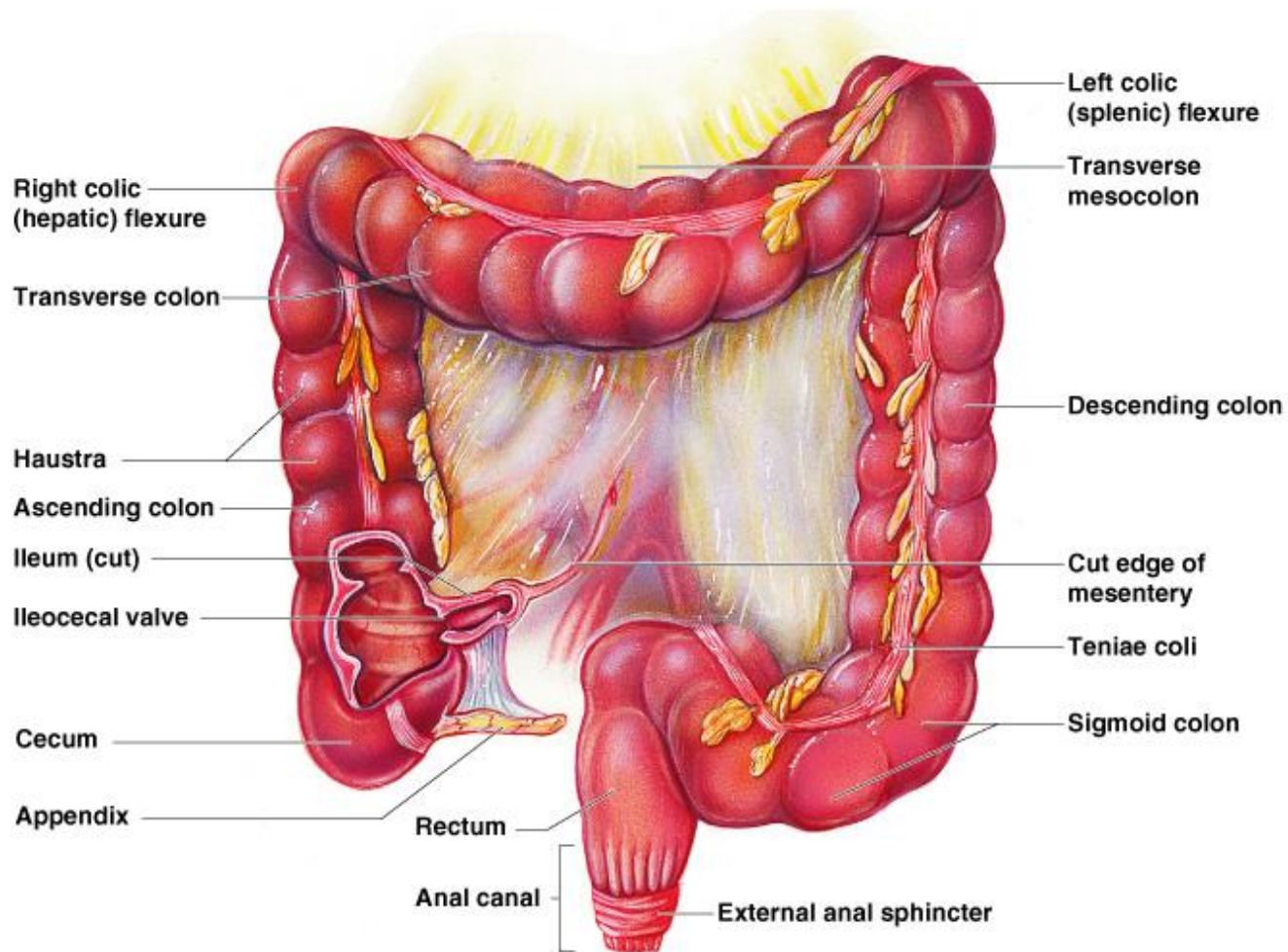


Figure 14.8

Functions of the Large Intestine

- Absorption of water
- Eliminates indigestible food from the body as feces
- Does not participate in digestion of food
- Goblet cells produce mucus to act as a lubricant

Structures of the Large Intestine

- Cecum – saclike first part of the large intestine
- Appendix
 - Accumulation of lymphatic tissue that sometimes becomes inflamed (appendicitis)
 - Hangs from the cecum

Structures of the Large Intestine

- Colon
 - Ascending
 - Transverse
 - Descending
 - S-shaped sigmoidal
- Rectum
- Anus – external body opening

Modifications to the Muscularis Externa in the Large Intestine

- Smooth muscle is reduced to three bands (teniae coli)
- Muscle bands have some degree of tone
- Walls are formed into pocketlike sacs called haustra

Accessory Digestive Organs

- Salivary glands
- Teeth
- Pancreas
- Liver
- Gall bladder