Digestive System: Stomach

Chapter 14

Goals for this class
- Be able to describe and identify the major components of the stomach's anatomy
- Be able to describe the functions of the stomach and its anatomical structures
- Be able to explain the overall process of chemical digestion in the stomach

Innervation of GI Tract
- Submucosal nerve plexus
- Myenteric nerve plexus
- Subserous nerve plexus
  - These help regulate the mobility and secretory activity of GI organs

Structure of the stomach
- Cardiac - surrounds junction between esophagus & stomach
- Fundus - lateral to cardiac region
- Body - midportion; lined with folded walls called rugae that disappear when stomach is full
- Pylorus - terminal portion; funnel shaped

Valves or Sphincters
- Cardioresophageal (cardiac) - leads food into stomach
- Pyloric - leads partially digested food (chyme) from body into small intestine
- Curvatures:
  - Greater - outer (lateral) curve
  - Lesser - inner (medial) curve
Mechanical Digestion

- 3 muscle layers
  - segmentation of food
- 1st - longitudinal
- 2nd - circular
- 3rd - oblique

Chemical Digestion

- Walls lined with gastric pits that lead to the gastric gland which contains 3 types of cells
  - 1. Mucus neck cells - secrete alkaline sticky mucus to protect stomach walls
  - 2. Parietal cells - produce HCl which activates enzyme production
  - 3. Chief cells - produce protein digestive enzymes called pepsinogen (inactive form of pepsin)

Process of Chemical Digestion

1. Food enters stomach
2. Parietal cells secrete HCl which lowers pH
3. Low pH triggers chief cells to produce pepsinogen
4. Pepsinogen converted to its active form of pepsin

Digestive Activities: Stomach

- Gastric juice secreted
- Gastrin is produced when food enters and pH falls
- Gastrin causes glands to produce pepsinogens, mucus, and HCl
- Mucus protects from acid (ulcers can occur)
- Acid environment activates pepsinogen to pepsin (enzyme that digests protein)
- Rennin is produced and breaks down milk protein (in infants)

Propulsion

- Peristaltic waves move toward the pylorus
- Pyloric sphincter lets 3 mL or less of chyme into small intestine every time the stomach contracts
- Duodenum is stretched and the enterogastric reflex inhibits emptying of the stomach
- 4-6 hrs to empty a meal
Heartburn
- Cardioesophageal sphincter fails to close
- Gastric juice backs up into esophagus
- Can lead to inflammation or ulceration of the esophagus
- Common cause is hiatal hernia (stomach protrudes above the diaphragm)

Vomiting
- Local irritation activates the emetic center of brain
- Can also be activated by disturbance in the inner ear (equilibrium)
- Reverse peristalsis

Key Questions
- Why are the rugae present in the stomach?
- Where are the gastric juices produced?
- How does the stomach mechanically digest food?