

CHAPTER 18: DIGESTION

- I. **Pathway**
 - A. **Mouth – forming bolus**
 1. **mechanical**
 1. **mastication – incr. SA for enzymes**
 2. **chemical**
 1. **saliva – 1 to 1.5 L per day**
 - a. **Amylase – begin starch dig.**
 - b. **Lingual lipase – begins fat (stomach)**
 - c. **Mucus – swallowing**
 - d. **Lysozyme – antibacterial**
 - e. **Immunoglobulin A – inhibits bacterial growth**
 - f. **Electrolytes**
 - g. **pH of 6.8 to 7.0**
 2. **glands – have ducts**
 - a. **parotid**
 - b. **submandibular**
 - c. **sublingual**
 - B. **pharynx**
 1. **oro – soft palate**
 2. **naso – back of throat, leads to nose**
 3. **laryngo – going to trachea, blocked by epiglottis**
 - C. **esophagus – swallowing (deglutition)**
 - D. **stomach – grinds, liquefies food (chyme), begins chemical of protein & fat; 50 mL to 4 L full; NO ABSORPTION**
 1. **regions**
 1. **cardiac orifice (sphincter)**
 2. **fundus – greater & lesser curvature**
 3. **body -**
 4. **pyloric canal (sphincter)**
 2. **secretions**
 1. **mucous cells – mucus**
 2. **parietal cells – HCl (activates pepsin, lingual lipase) and intrinsic factor**
 - a. **pepsin - protein**
 - b. **Intrinsic factor – allows sm intestine to absorb B₁₂**
 3. **chief cells – chymosin, lipase (infant), pepsinogen (inactive pepsin)**
 - a. **Lipase – milk butterfat (infant)**
 - b. **Chymosin – coagulates protein in milk - curdling**
 4. **hormones, paracrine messengers**
 3. **emetic center – vomiting**
 1. **stretching, psychological, chemical irritants**

E. liver, gallbladder, pancreas

1. liver

- 1. 4 lobes – right, left, quadrate, caudate**
- 2. blood in via hepatic portal vein/artery**
- 3. common hepatic duct collects bile from canaliculi in hepatocytes**
- 4. bile - emulsify fats, aid in their digestion**

2. gallbladder

- 1. sac on liver**
- 2. stores & concentrates bile (20X)**
- 3. cystic duct – joins hepatic duct = bile duct**

3. pancreas

- 1. pancreatic duct joins bile duct = hepatopancreatic ampulla; empties into duodenum**
- 2. retroperitoneal gland, behind stomach**
 - a. endocrine – insulin, glucagon into blood**
 - b. exocrine – pancreatic juice into duodenum**
- 3. secretions**
 - a. water**
 - b. enzymes**
 - i. amylase**
 - ii. lipase**
 - iii. ribo/deoxyribonuclease**
 - c. zymogens – proteases**
 - i. trypsinogen**
 - ii. chymotrypsinogen**
 - iii. procarboxypeptidase**
 - d. sodium bicarbonate**

F. small intestine – 3 parts (in order of appearance)

1. duodenum – 10 in.

- 1. receives chyme, bile, pancreatic juice**
- 2. neutralized by NaHCO_3**
- 3. emulsifies fats, pepsin inactivated, enzymes act**

2. jejunum – 8 ft.

3. ileum – 12 ft.

- 1. ends at ileocecal valve**

4. all contain folds, villi, microvilli – absorption

- 1. carbohydrates – amylase = glucose, galactose, maltose, sucrose, lactose, fructose**
- 2. proteins – pepsin = peptides, amino acids**
- 3. vitamins – A, D, E, K, lipids, B complex, C, B₁₂ if bound by intrinsic factor, ions, water (diarrhea disorder)**

G. large intestine – 5 ft., 2.5 inches diameter

- 1. begins as cecum, appendix lower rt corner**
- 2. ascending, transverse, descending**
- 3. sigmoid (S-shaped) leading into pelvis**

4. rectum
 1. all contain crypts – mucus; haustra - pouches
 2. bacteria ferments cellulose, carbs, make B & K
 3. absorbs water
 4. fecal movement via haustral contractions
5. anus – 3 cm
 1. feces falls away as rectum stretches, sphincters relax, anal canal lifted upward

II. Digestive functions

- A. Ingestion
- B. Digestion
- C. Absorption
- D. Defecation

III. Regulation

- A. Neural
 1. reflex action – swallowing
 2. brain impulse
- B. Hormonal
 1. secreted into blood, distant target
- C. Paracrine
 1. secreted directly into target