

# Digestive System

Name \_\_\_\_\_ Date \_\_\_\_\_

## 11.1 Introduction

Function: the mechanical and chemical breakdown of foods and the absorption of nutrients by cells

Consists of: alimentary canal ( 9 m from mouth to anus) and accessory organs

## 11.2 General Characteristics of the Alimentary Canal (mouth, pharynx, esophagus, stomach, sm intestine, large intestine, anal canal)

### Structure of the Wall of the Alimentary Canal

1. Mucosa (mucous membrane) – protects tissues, carries out absorption
2. Submucosa - contains glands, blood vessels, lymphatic vessels, nerves
3. Muscular layer – smooth muscle tissue, circular and longitudinal fibers, pushes food
4. Serosa (serous layer) – visceral peritoneum, outer covering of the tube, moistens and lubricates structures

*Around the teeth and through the gums - look out stomach, here it comes.*

### Movements of the Tube

Mixing Movements – rhythmic contractions that mix food with digestive juices

Propelling Movements – rings of muscles contract and relax to push food down the canal (PERISTALSIS)

## 11.3 Mouth

Mouth – begins digestion by reducing size of particles (chewing) and mixing with saliva

Tongue – moves food during chewing, connects to the floor of the mouth via the frenulum, contains papillae (taste buds)

Palate – forms roof of oral cavity (hard and soft), uvula at back of the mouth

Palatine tonsils – back of the mouth/throat, organs that protect against infection

Teeth – primary vs. secondary teeth;  
incisors, cuspids, bicuspid (premolars), molars

### Anatomy of a Tooth

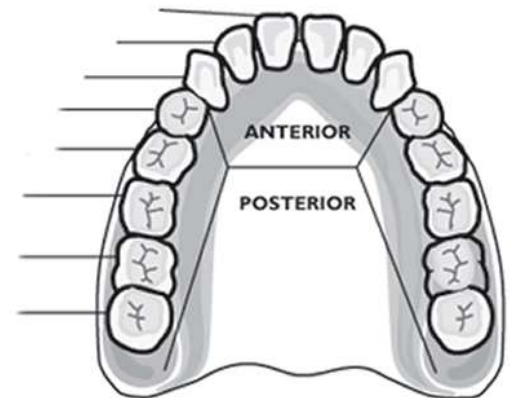
Crown – projects above the gums

Root – anchored to the alveolar process of the jaw

Enamel – made of calcium salts, hardest substance in body (outer surface)

Dentin – similar to bone, surrounds tooth's central cavity

Blood vessels and nerves extend through the tooth via the root canal



## 11.4 Salivary Glands

Serous cells produce amylase – splits starch and glycogen into disaccharides

Mucous cells produce mucus – lubrication during swallowing

1. Parotid Glands
2. Submandibular Glands
3. Sublingual Glands



## 11.5 Pharynx and Esophagus

Pharynx – nasal and oral cavities - nasopharynx, oropharynx, laryngopharynx

Esophagus – moves to the stomach, penetrates the diaphragm at the esophageal hiatus

lower esophageal sphincter (cardiac sphincter) - prevent food and chemicals from moving up out of stomach

## 11.6 Stomach

\*J-shaped, pouchlike organs that hangs inferior to the diaphragm, 1 liter capacity

3 sets of stomach muscles: longitudinal, oblique, circular  
Greater and Lesser Curvature

Four main parts of the stomach

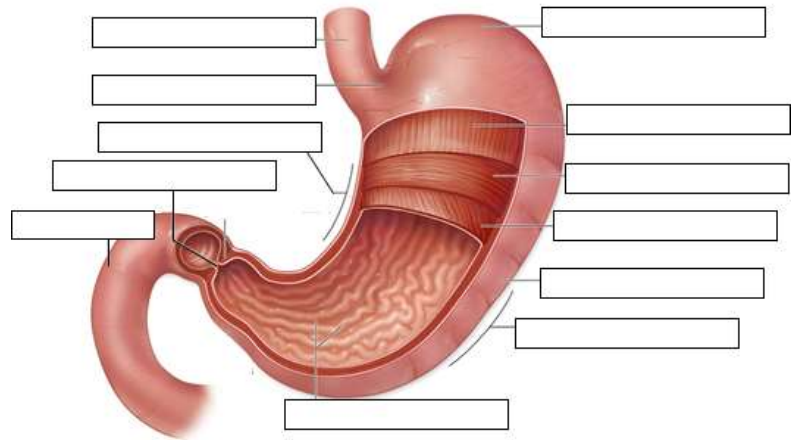
1. Cardiac (esophageal opening, cardiac sphincter)
2. Fundic (temporary storage area, lies slightly above the cardiac region)
3. Body (central area of the stomach)
5. Pyloric (pyloric sphincter, controls emptying of the stomach into the sm. Intestine)

Lining of the stomach is a mucous membrane – with small openings called gastric pits, containing gastric glands

Gastric Juice - pepsin / intrinsic factor

Chyme – paste of food molecules after its been broken down by the movement of stomach and gastric juices, it is released from the pyloric sphincter valve into the first portion of the small intestine – duodenum

Rugae – folds within the stomach, increase surface area



## 11.7 Pancreas

has endocrine and exocrine functions - secretes pancreatic juice

Pancreatic juice – digests fats, breaks down nucleic acids into nucleotides

## 11.8 Liver

BILIARY SYSTEM – functions to create bile used in digestion; liver, gall bladder and ducts

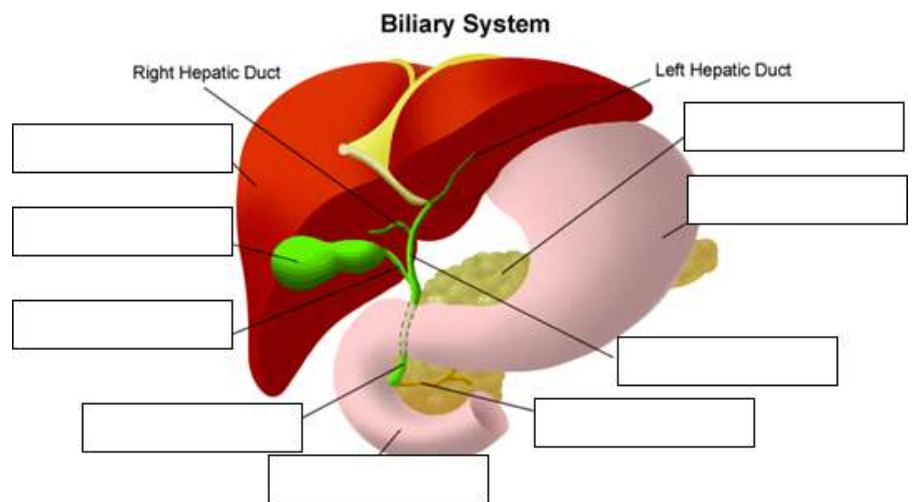
LIVER- has large right lobe and small left lobe

Hepatic portal vein – delivers blood to the liver

Functions: maintains normal concentration of blood glucose, breakdown of lipids and fats, protein metabolism (forming urea, synthesizing plasma proteins such as clotting factors, converting amino acids); stores iron and vitamins, destroys damaged red blood cells, removes toxic substances from the blood, secretes bile

Bile – yellowish-green liquid secreted from hepatic cells (when bile pigments build up in blood, skin turns green, a condition called jaundice). The hepatic duct joins the cystic duct to form the common bile duct, which empties into the duodenum

Bile aids in digestion, bile salts break down fat globules into smaller droplets – emulsification



## 11.9 Small Intestine

\*tubular organ that extends from the pyloric sphincter, many loops and coils, fills much of the abdominal cavity

\*receives secretions from the pancreas and liver, completes digestion of nutrients and chyme, absorbs

1. Duodenum - first part of the small intestine
  2. Jejunum – second part, ~2.2 m
  3. Ilium – third part, longest ~3.3 m
- \*jejunum and ilium are continuous

Mesentery – supports the coils of the small intestine, contains blood vessels to carry nutrients away

Greater Omentum – peritoneum membrane that drapes like an apron over parts of the system

Intestinal Villi – increase surface area for absorption

\*the main function of the small intestine is to secrete chemicals to break down food and carry away these nutrients in the blood (absorption)

## 11.10 Large Intestine (named because its diameter is greater than the small intestine)

1. Cecum – beginning of the large intestine, pouchlike, closed end called the vermiform appendix (ileocecal valve)
2. Colon – ascending / transverse / descending / sigmoid
3. Rectum – stores waste before it is expelled from the body
4. Anal canal - ends in the anus, muscular sphincter which controls the exit of waste

Functions – secretes mucus to protect the wall against abrasion; re-absorbs water and passes along material that was not digested; contains intestinal flora (bacteria to break down cellulose, also produce intestinal gas)

Mass movements – large portions of the colon contract to move material through it, 2-3 times a day usually after eating

## 11.11 Nutrition and Nutrients

Carbohydrates, lipids, proteins, vitamins, minerals / Food Pyramid

### Disorders of the Digestive System

1. GERD (gastroesophageal reflux disease) / Heartburn
2. Diarrhea or Dysentery
3. Hepatitis (A, B, C)
4. Crohn's Disease
5. Irritable Bowel Syndrome
6. Stomach Ulcers
7. Lactose Intolerance
8. Appendicitis
9. Hernia
10. Gallstones
11. Celiac Disease

LABEL THE DIGESTIVE SYSTEM

