The Digestive System

Objectives

After studying this chapter, you will be able to:

- **Name the parts of the digestive system and discuss the function of each part**
- **Define combining forms used in building words that relate to the digestive system**
- **Identify the meaning of related abbreviations**
- **Name the common diagnoses, clinical procedures, and laboratory tests used in treating the digestive system**

Objectives cont'd

- **List and define the major pathological conditions of the digestive system**

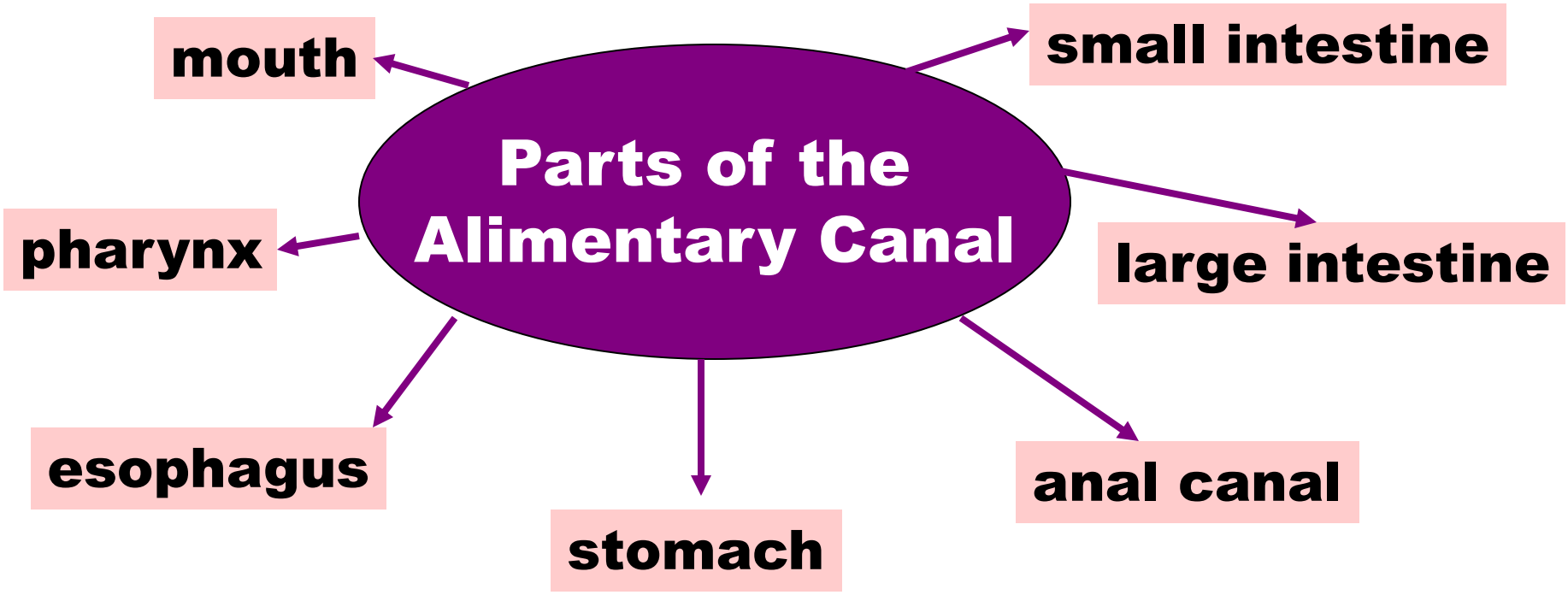
- **Explain the meaning of surgical terms related to the digestive system**

- **Recognize common pharmacological agents used in treating disorders of the digestive system**

Structure and Function

The Digestive System

Consists of the alimentary canal and several accessory organs.



Structure and Function

The Alimentary Canal

- A tube that extends from the mouth to the anus

- Consists of four layers:
  - outer layer (protects)

  - second layer (muscular; contracts and expands in wavelike motions called peristalsis)

  - third layer (vessels, nerves and glands that nourish and carry away waste)

  - innermost layer (mucous membrane that secretes mucus and digestive enzymes)

Structure and Function

Digestive Enzymes

Break down complex substances into simpler substances that can be absorbed by the body

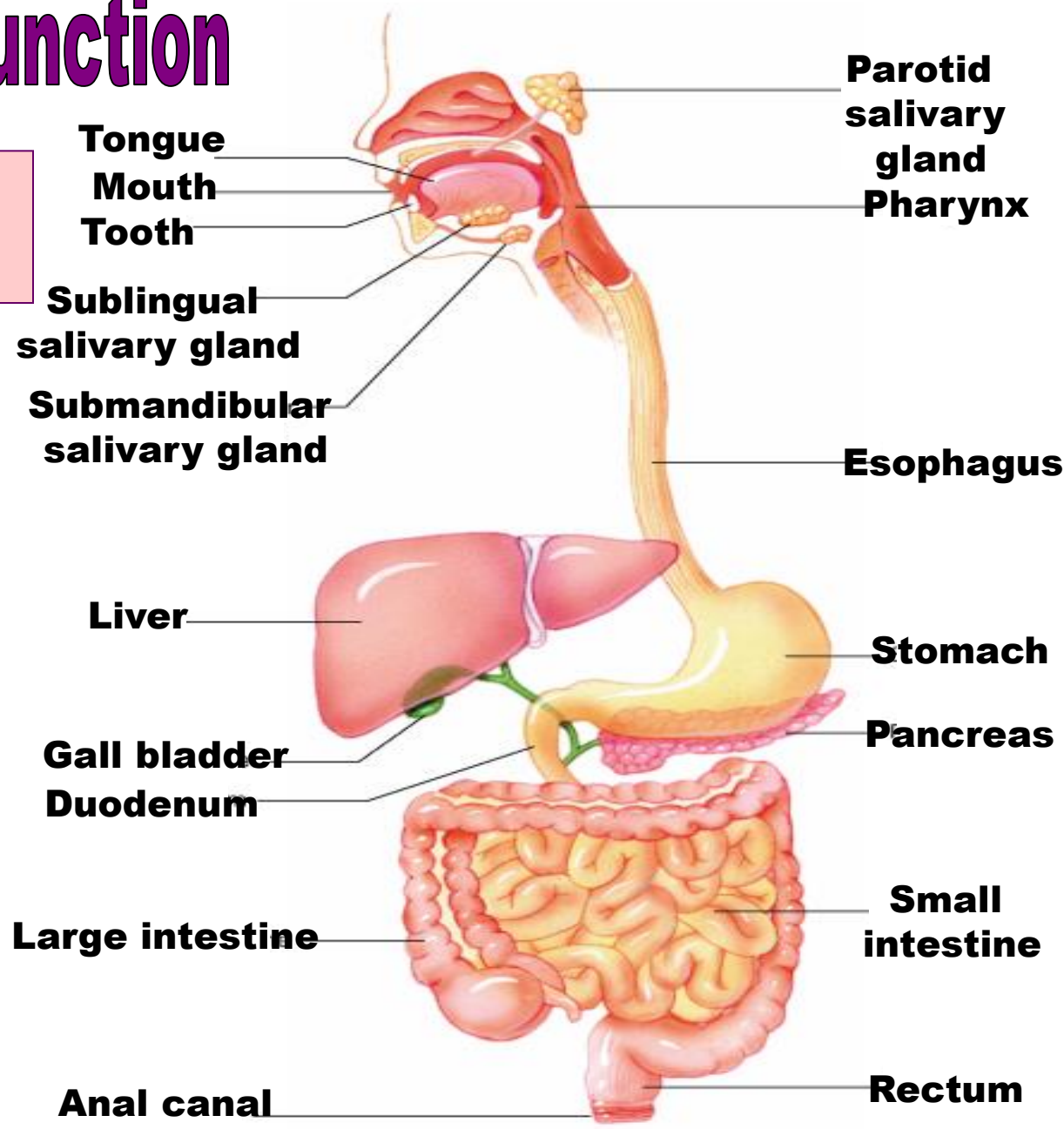
Complex proteins → **Amino acids**

Complex sugars → **Glucose**

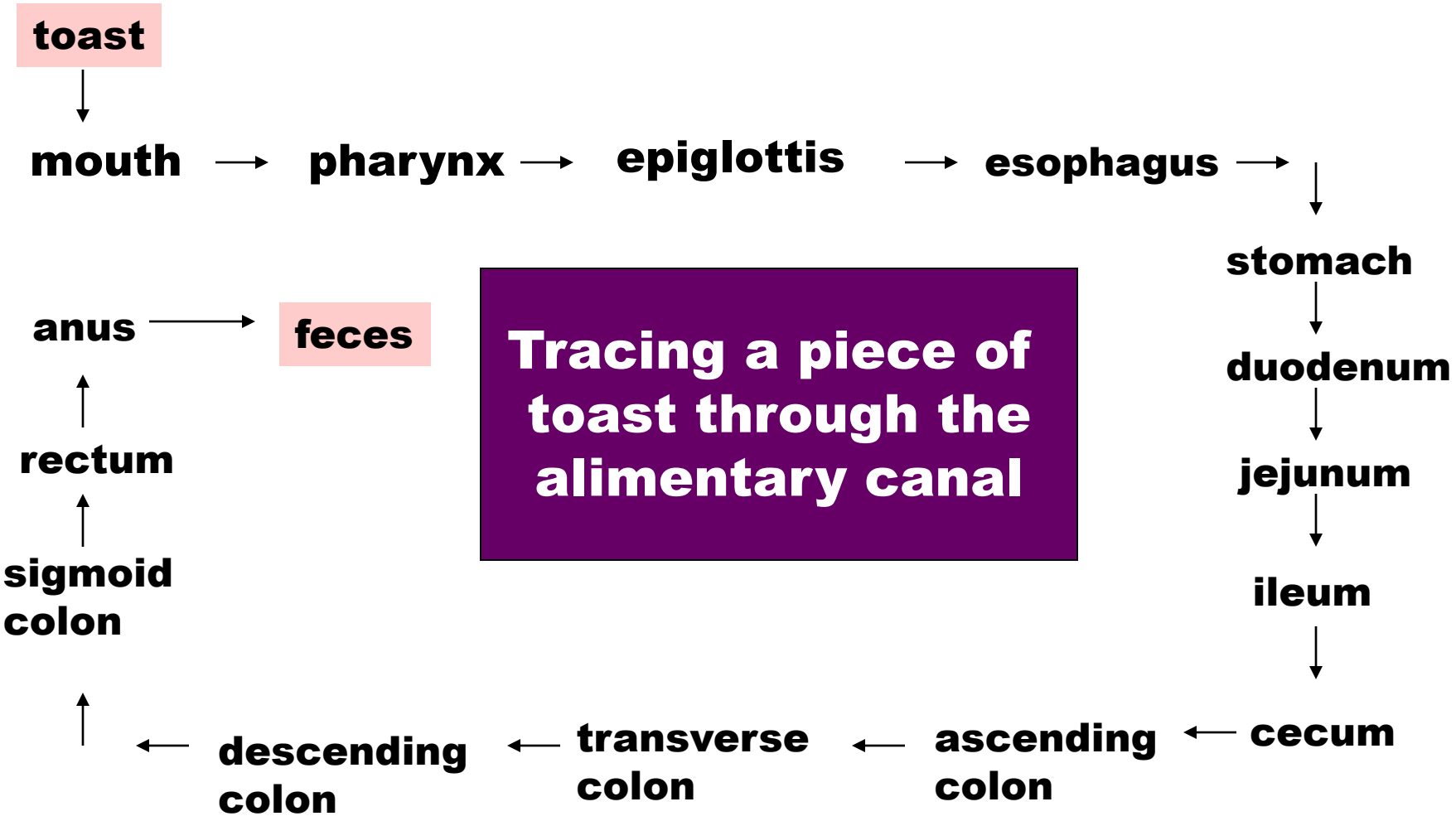
Fat molecules → **Fatty acids**

Structure and Function

Organs of the Digestive System



Structure and Function



Structure and Function

Mouth

lips

The lips protect the mouth from receiving food that is too hot or too rough on the surface.

- **The mouth is also called the oral cavity**
- **Food is taken into the mouth and chewed with the assistance of the cheek muscles**

Structure and Function

- Process of chewing is called **mastication**
- The tongue moves the food around to prepare it for **deglutition** (swallowing)
- Small raised areas called **papillae** are located on the tongue and they contain taste buds.
- The **frenulum** connects the tongue to the floor of the mouth.

Structure and Function

Mouth (cont'd)

Hard palate

- Hard anterior portion of the palate with irregular ridges of mucous membranes called rugae

Soft palate

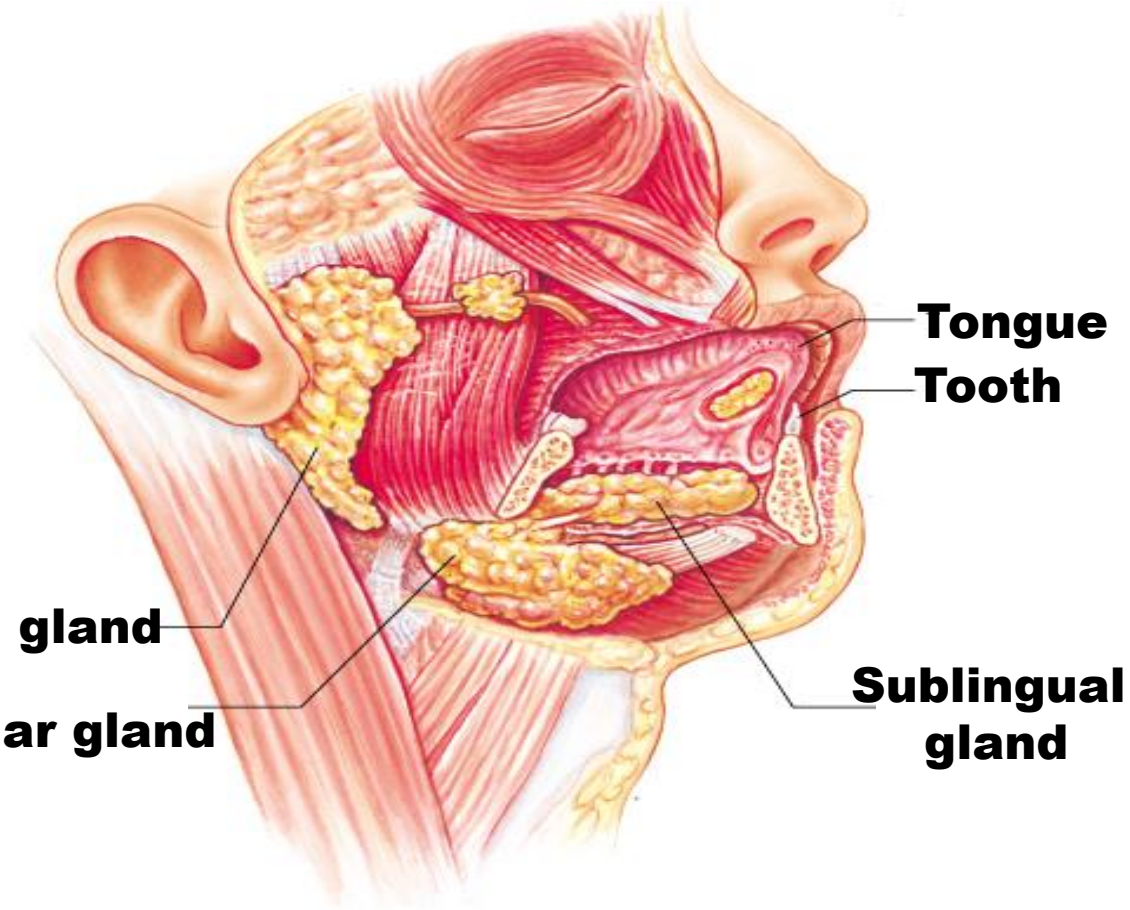
- Soft posterior portion of the palate. A downward cone shaped projection called the uvula is located at the back of the soft palate

Both the lingual tonsils and the palatine tonsils are located in the oral cavity and these play an important role in the immune system.

Structure and Function

Salivary Glands

- **parotid**
- **submandibular**
- **sublingual**



- **Digestion of food begins in the mouth with mastication.**
- **Teeth are held in place by the fleshy sockets called gums.**

Structure and Function

Pharynx

- Muscular tube about 5 inches long in adults
- Also known as the throat
- Transmits food into the esophagus
- The epiglottis (a flap of tissue) covers the trachea to prevent food from entering the larynx during swallowing which causes choking

Structure and Function

Esophagus

- **Muscular tube about 9 to10 inches long in the adult that contracts rhythmically (peristalsis) to propel food toward the stomach**

- **Contains a group of muscles called the lower esophageal sphincter that closes off the entrance to the stomach to prevent reflux of food, emesis or regurgitation (vomiting).**

Structure and Function

Stomach

- Pouchlike organ located in the left hypochondriac region of the abdominal cavity
- Receives food from the esophagus and mixes it with gastric juices to form a semifluid mass called chyme

Gastric Juice	Function
pepsin	digests most proteins
hydrochloric acid	provides acidic environment for the action of pepsin
mucus	protects inside of stomach wall by providing an alkaline layer

Structure and Function

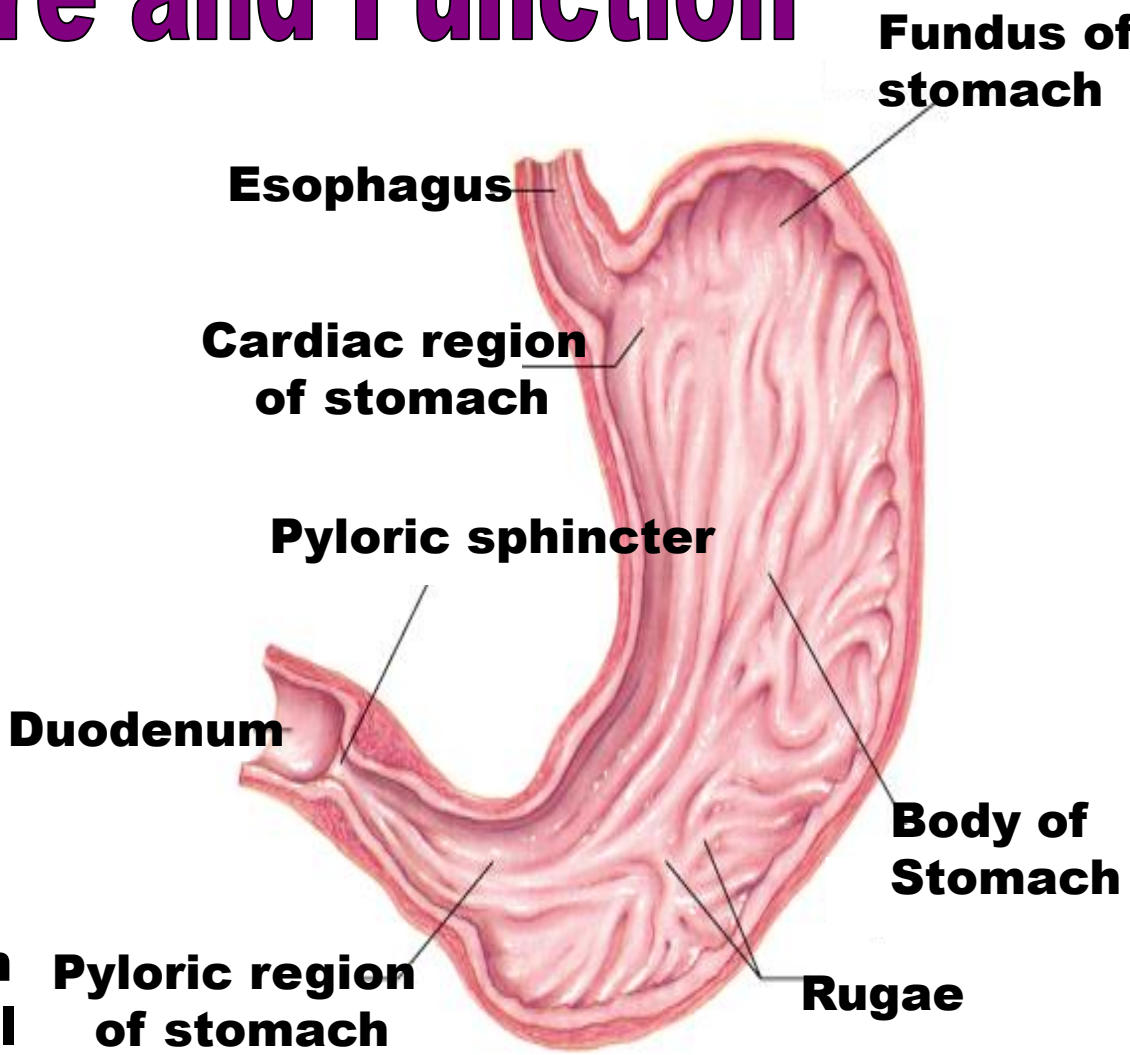
Stomach Regions

- **Cardiac Region**
  -region closest to the heart

- **Fundus**
  -upper rounded portion

- **Body**
  -middle portion

- **Pylorus**
  -narrowed bottom portion that empties into the small intestine. The pyloric sphincter controls the emptying of the stomach.



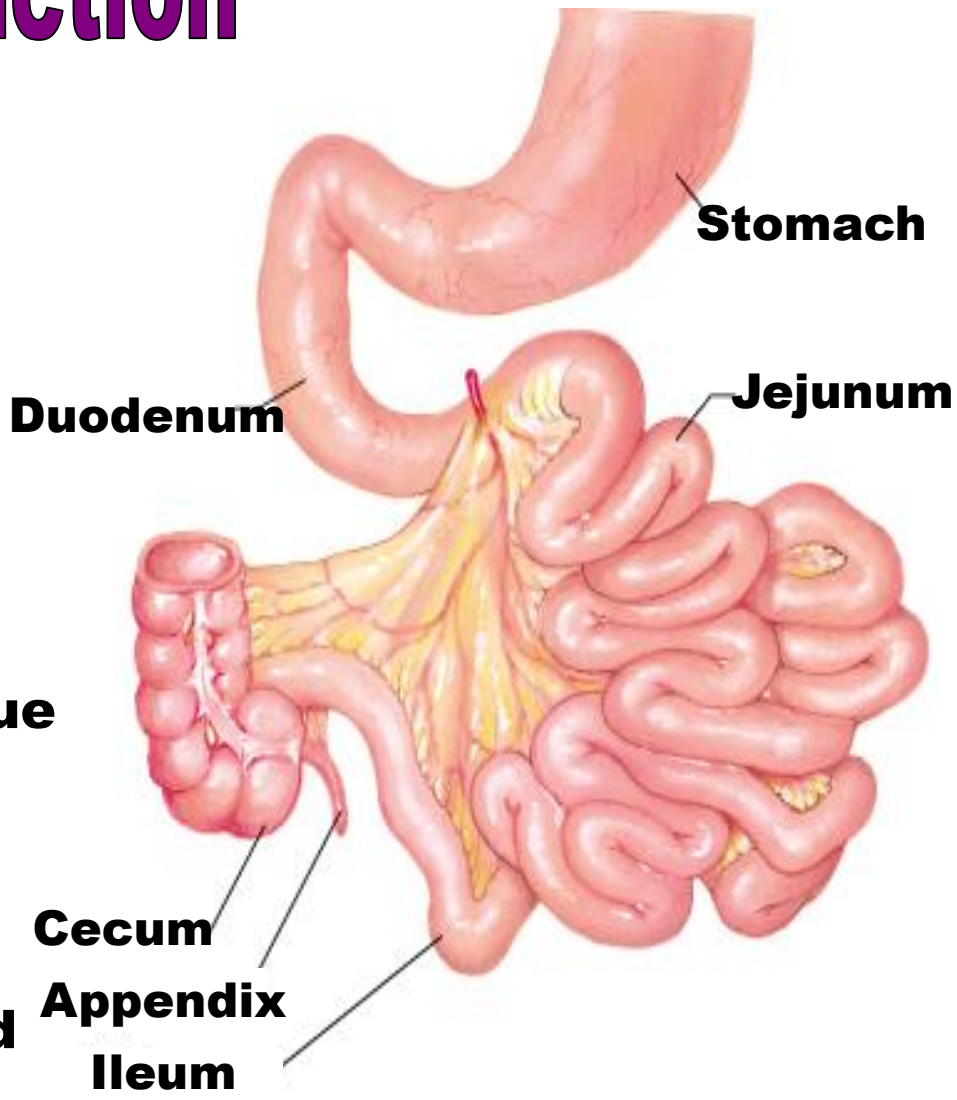
Structure and Function

Small Intestine

- Consists of three parts:
  - -duodenum
  - -jejunum
  - -ileum

- Held in place by the **mesentery** which is a muscular membranous tissue that anchors both the small and large intestines to the abdominal wall

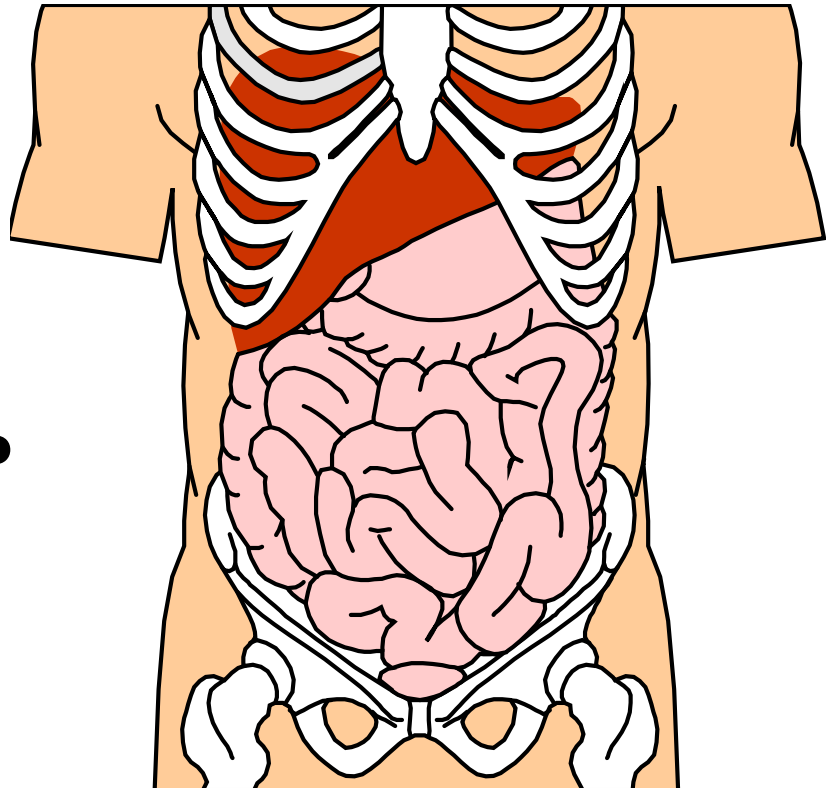
- First site of **absorption** and nutrients pass from the intestinal walls and into the bloodstream through the **villi**



Structure and Function

Large Intestine

- **Consists of four parts:**
  - **-cecum**
  - **-colon**
  - **-sigmoid colon**
  - **-rectum**



- **Undigested waste may remain in the large intestine from 12 to 24 hours**

- **A wormlike pouch (appendix) filled with lymphatic tissue extends from the cecum**

- **Process of turning waste material into a semisolid waste (feces) begins in the cecum**

Structure and Function

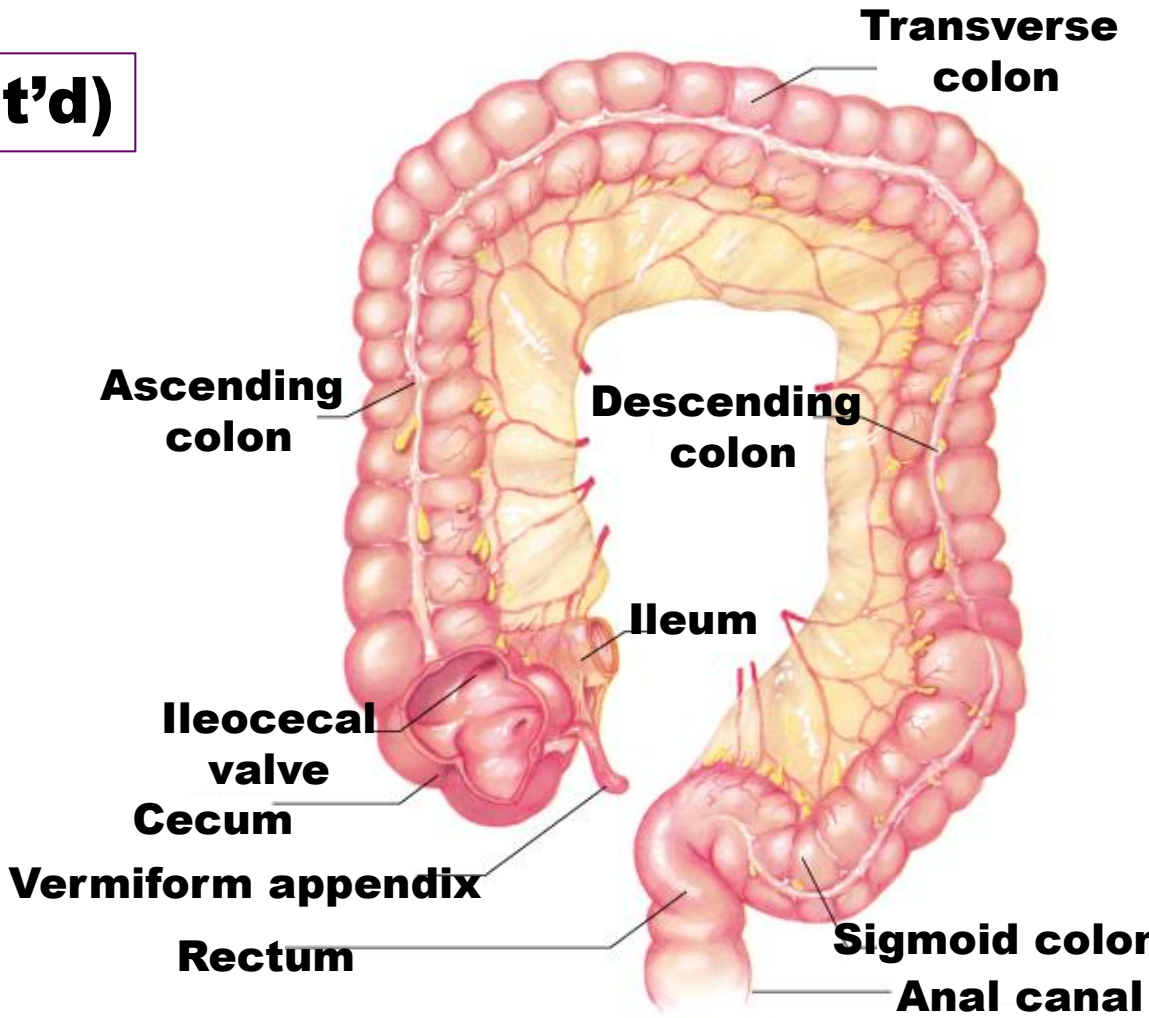
Large Intestine (cont'd)

- Colon consists of three parts:
  - -ascending colon
  - -transverse colon
  - -descending colon

- **Sigmoid colon** is an s-shaped structure that connects to the rectum

- **Rectum** connects to the anal canal

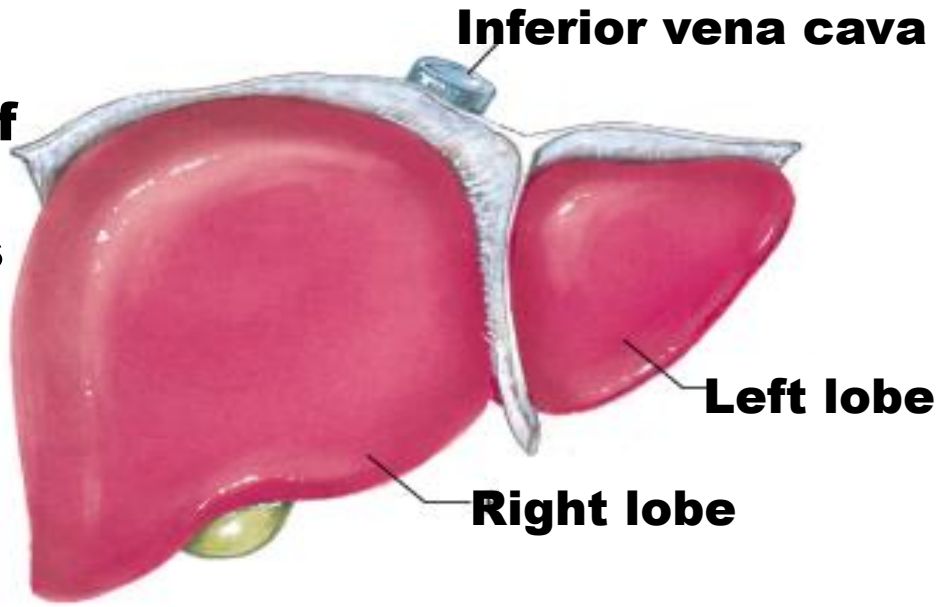
- Release of feces from the body is called **defecation**



Structure and Function

Liver

- Located in the right quadrant of the abdominal cavity
- Divided into right and left lobes
- Converts food nutrients into usable substances
- Secretes a yellowish-brown to greenish substance called **bile** which is stored in the gall bladder
- Stores glucose in the form of **glycogen**
- Secretes **bilirubin**, a bile pigment that is combined with bile and excreted into the duodenum



Structure and Function

Gallbladder

- Stores bile from the liver
- Three ducts connect the liver, gallbladder, and duodenum for the flow of bile (hepatic duct, cystic duct, and common bile duct)
- Releases bile when it is needed for the emulsification (breakdown) of fat

Pancreas

- Secretes a pancreatic juice that includes various enzymes such as amylase and lipase
- Also an endocrine gland

Combining Forms and Abbreviations

Combining Form	Meaning
an(o)	anus
append(o)	appendix
bil(o)	bile
bucc(o)	cheek
cec(o)	cecum
celi(o)	abdomen
chol(e)	bile

Combining Forms and Abbreviations

Combining Form	Meaning
cholangi(o)	bile vessel
cholecyst(o)	gallbladder
choledoch(o)	common bile duct
col(o)	colon
duoden(o)	duodenum
enter(o)	intestines
esophag(o)	esophagus

Combining Forms and Abbreviations

Combining Form	Meaning
gastr(o)	stomach
gloss(o)	tongue
gluc(o)	glucose
glyc(o)	sugar
glycogen(o)	glycogen
hepat(o)	liver
ile(o)	ileum

Combining Forms and Abbreviations

Combining Form	Meaning
jejun(o)	jejunum
labi(o)	lip
lingu(o)	tongue
or(o)	mouth
pancreat(o)	pancreas
periton(eo)	peritoneum
pharyng(o)	pharynx

Combining Forms and Abbreviations

Combining Form	Meaning
proct(o)	anus, rectum
pylor(o)	pylorus
rect(o)	rectum
sial(o)	saliva, salivary gland
sialaden(o)	salivary gland
sigmoid(o)	sigmoid colon
steat(o)	fats
stomat(o)	mouth

Combining Forms and Abbreviations

Abbreviation	Meaning
ALT, AT	alanine transaminase
AST	aspartic acid transaminase
BE	barium enema
BM	bowel movement
EGD	esophagogastroduodenoscopy
ERCP	endoscopic retrograde cholangiopancreatography
GERD	gastroesophageal reflux disease
GI	gastrointestinal

Combining Forms and Abbreviations

Abbreviation	Meaning
IBD	inflammatory bowel disease
IBS	irritable bowel syndrome
NG	nasogastric
NPO	nothing by mouth
SGOT	serum glutamic oxaloacetic transaminase
SGPT	serum glutamic pyruvic transaminase
TPN	total parenteral nutrition
UGI	upper gastrointestinal (series)

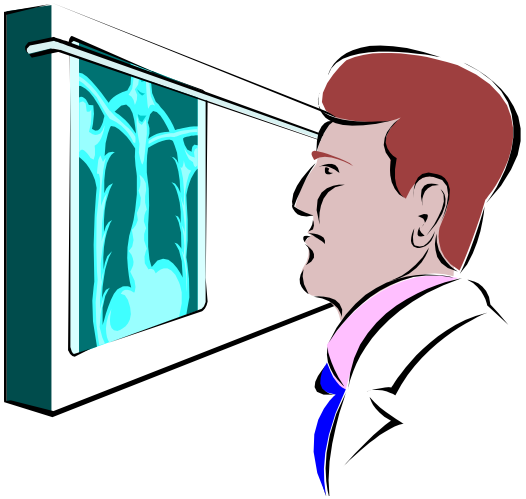
Diagnostic, Procedural, and Laboratory Terms

Gastroenterologists are physicians that specialize in treating the digestive system

Common Tests

- **Stool culture and sensitivity**
  -identifies the disease-causing organism and what medications will effectively destroy the organism

- **Hemoccult test (stool guaiac)**
  -chemical test done to indicate the presence of bleeding in the digestive tract



Diagnostic, Procedural, and Laboratory Terms

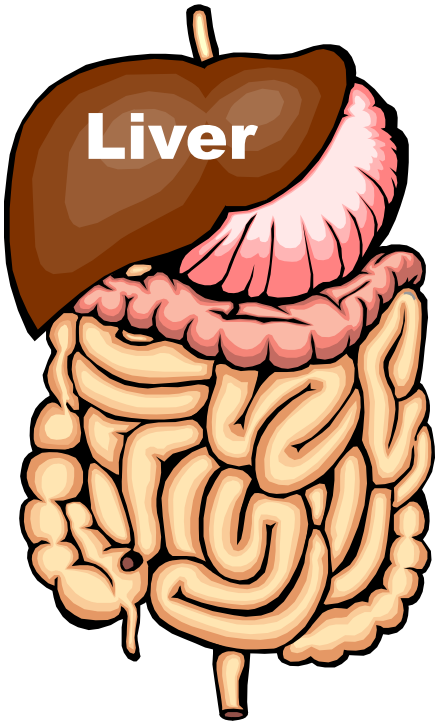
Types of Endoscopes

- esophagoscopy
- gastroscopy
- colonoscopy
- proctoscopy
- sigmoidoscopy
- peritoneoscopy

X-rays and other Imaging Techniques

- MRI
- CAT scan
- Barium swallow
- Barium enema
- Upper GI Series
- Cholangiography
- Cholecystography
- Liver scan
- Ultrasound

Diagnostic, Procedural, and Laboratory Terms



Serum Tests for Liver Functioning

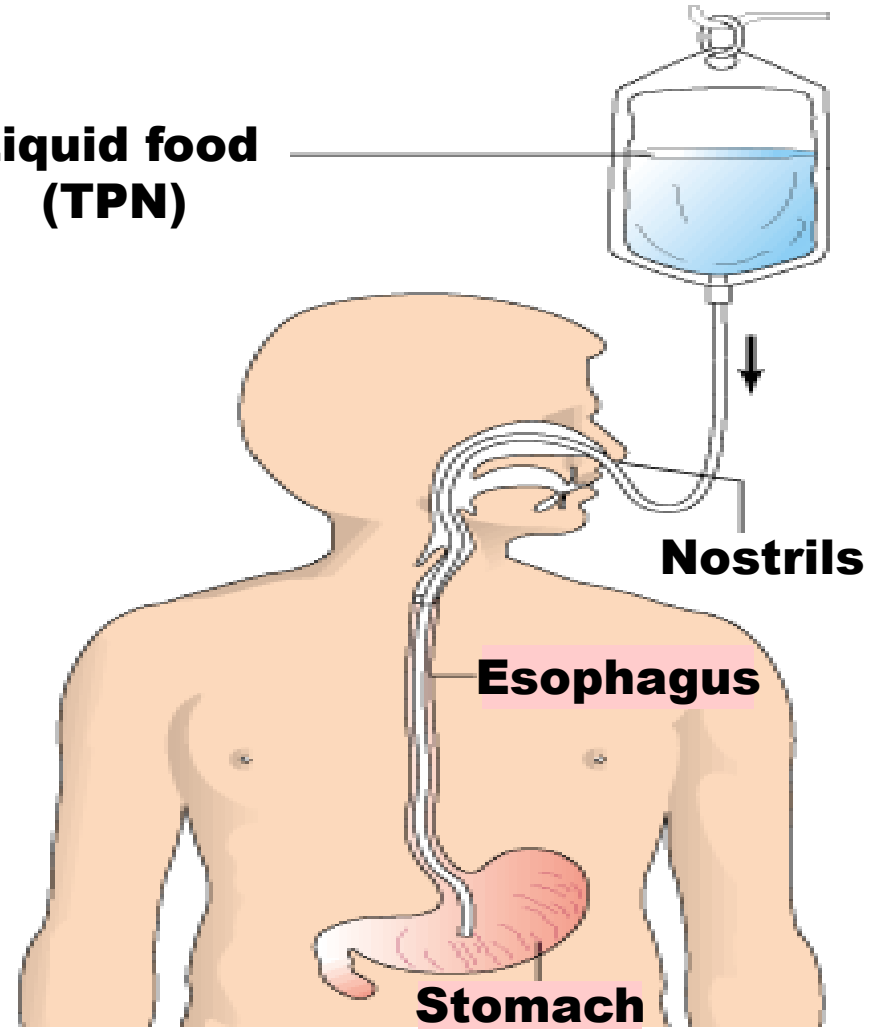
- **Serum glutamic oxaloacetic transaminase (SGOT) measures enzyme levels that have leaked from damaged liver cells**
- **Serum glutamic pyruvic transaminase (SGPT) also known as an alanine transaminase (ALT), measures for damaged cells**
- **Serum bilirubin measures bilirubin in the blood as an indicator of jaundice**
- **Alkaline phosphatase indicator of liver disease, especially liver cancer**

Diagnostic, Procedural, and Laboratory Terms

Nasogastric Tube

- Also referred to as NG tube

- Used for the following purposes:
  - -to relieve fluid buildup
  - -to take stomach content samples
  - -to provide liquid nourishment



Pathological Terms

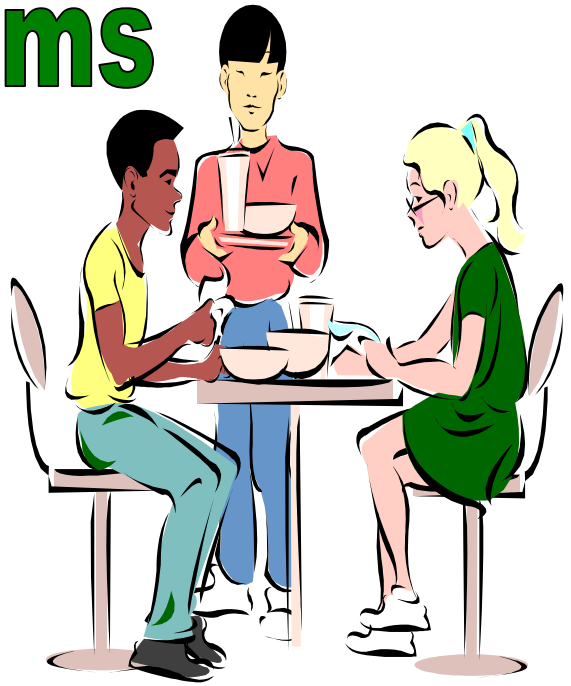
Eating Disorders

Anorexia

•A morbid refusal to eat because the person wants to be dangerously thin

Bulimia

•Eating, then purposefully purging or vomiting to achieve weight loss



Obesity

• Excessive body weight that often results from overeating

Pathological Terms

cheilitis

sialoadenitis

aphagia

Oral Inflammatory Conditions

dysphagia

glossitis

parotitis

halitosis

Pathological Terms

Diseases of the Pharynx

Esophageal varices
- twisted veins in the esophagus that are prone to hemorrhage and ulcers

Esophagitis
- any inflammation of the esophagus

Gastroesophageal reflux
- malfunctioning of the sphincter muscle at the bottom of the esophagus

Achalasia
- failure of the sphincter muscle at the bottom of the esophagus to relax during swallowing

Pathological Terms

Disorders of the Stomach

Achlorhydria

- Lack of hydrochloric acid in the stomach

Dyspepsia

- Difficulty with digesting food

Gastritis

- Any stomach inflammation

Gastroenteritis

- Inflammation of both the stomach and small intestine

Flatulence

- Accumulation of gas in the stomach or intestines

Eructation

- Belching to release gas

Hematemesis

- Vomiting of blood from the stomach

Hiatal hernia

- Protrusion of the stomach through an opening in the diaphragm

Pathological Terms

Liver Disorders

Hyperbilirubinemia

Excessive bilirubin in the blood causing a yellow discoloration of the skin

Cirrhosis

Chronic liver disease caused by poor nutrition and excessive alcohol consumption

Hepatomegaly

Enlarged liver

Hepatitis

Term for several types of contagious diseases of the liver

Pathological Terms

Conditions of the Gallbladder

Cholelithiasis

-another term for gall stones

Cholangitis

-any inflammation of the bile ducts

Cholecystitis

-any inflammation of the gallbladder

Pathological Terms

Disorders of the Intestines

Duodenal ulcers

- A form of peptic ulcer thought to be bacterial in origin

Appendicitis

- Inflammation of the appendix, which lies on the side of the duodenum, and becomes inflamed if gastric substances leak into it from the duodenum

Ileus

- An intestinal blockage

Colitis

General term for inflammation in the small intestine

Ulcerative colitis

A chronic type of irritable bowel disease

Pathological Terms

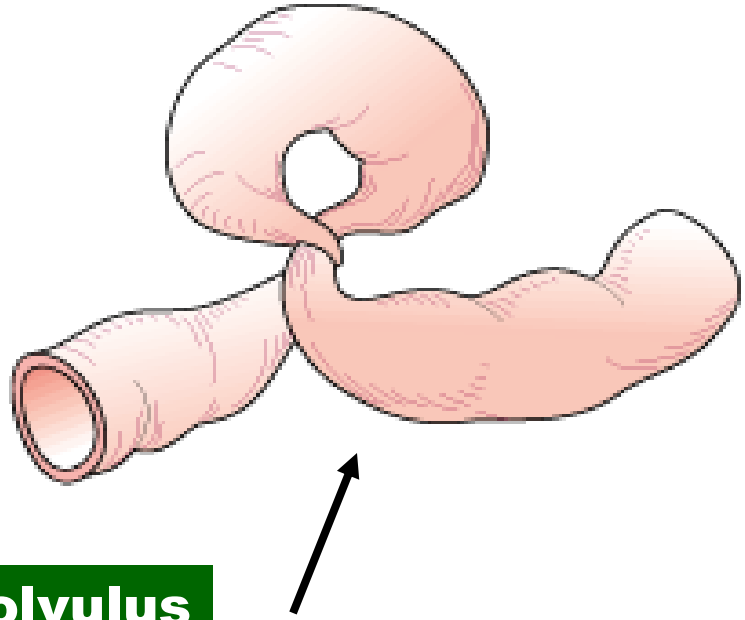
Other Intestinal Conditions

Diverticulosis

Presence of small pouches in the intestinal wall that trap food or bacteria

Dysentery

General term for inflammation of the intestinal tract with loose stools and other symptoms such as abdominal pain and weakness



Volvulus

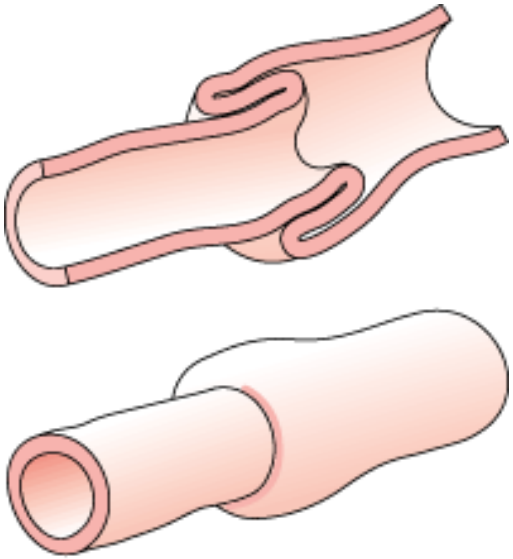
Twisting of the intestine that causes a blockage

Pathological Terms

Intestinal Conditions (cont'd)

Intussusception

Prolapse of an intestinal part into a neighboring part



Other Terms

- ascites
- peritonitis
- proctitis
- constipation

- diarrhea
- flatus
- melena

- hemorrhoids
- anal fistula
- steatorrhea

Surgical Terms

Abdominocentesis

Incision into the intestinal tract to relieve fluid pressure as in ascites

Cholelithotripsy

Crushing of gallstones using sound waves

Cholelithotomy

Incision for the removal of stones

Surgical Repair Procedures

- **Cheiloplasty**
- **Glossorrhaphy**
- **Esophagoplasty**
- **Proctoplasty**

Surgical Terms

Procedures Requiring Removal

Term	Part (s) Removed
glossectomy	tongue
polypectomy	polyps
appendectomy	appendix
cholecystectomy	gallbladder
gastrectomy	stomach
colectomy	colon
hemorrhoidectomy	hemorrhoids
pancreatectomy	pancreas

Surgical Terms

Openings may be made in the gastrointestinal tract for temporary or permanent alternatives to waste elimination.

- **ileostomy**
  -opening made in the ileum to allow fecal material to discharge into a bag outside the body

- **colostomy**
  -opening in the colon to create a place for waste to exit the body other than through the anus

Pharmacological Terms

Medications Used to Treat the Digestive System

Antacid

- Neutralizes stomach acid (ex. Pepcid®)

Antidiarrheal

- Controls loose stools (ex. Kaopectate®)

Antiemetic

- Prevents regurgitation (ex. Tigan®)

Antispasmodic

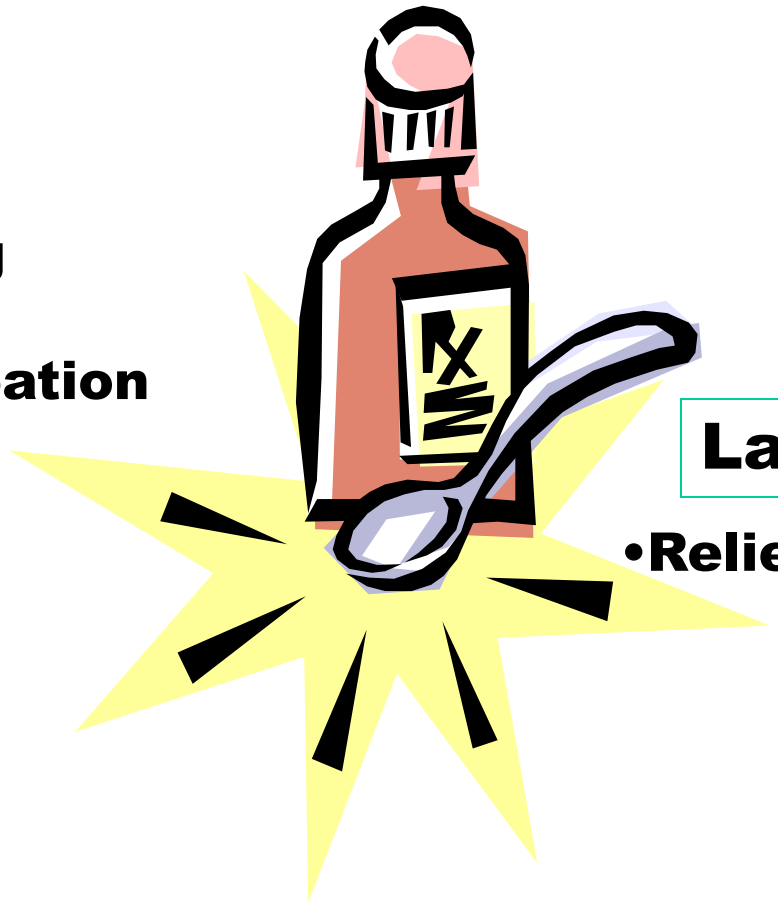
- Calms spasms of the GI tract
- (ex. Robinul®)

Pharmacological Terms

Medications Used to Treat the Digestive System (cont'd)

Cathartic

- Causes vomiting
- Relieves constipation



Laxative

- Relieves constipation

Apply Your Knowledge

Which of the following structures is a part of the small intestine?

A. cecum

B. sigmoid colon

C. ileum

Answer: C. ileum

Apply Your Knowledge

Which of the following is the site where digestion begins?

A. mouth

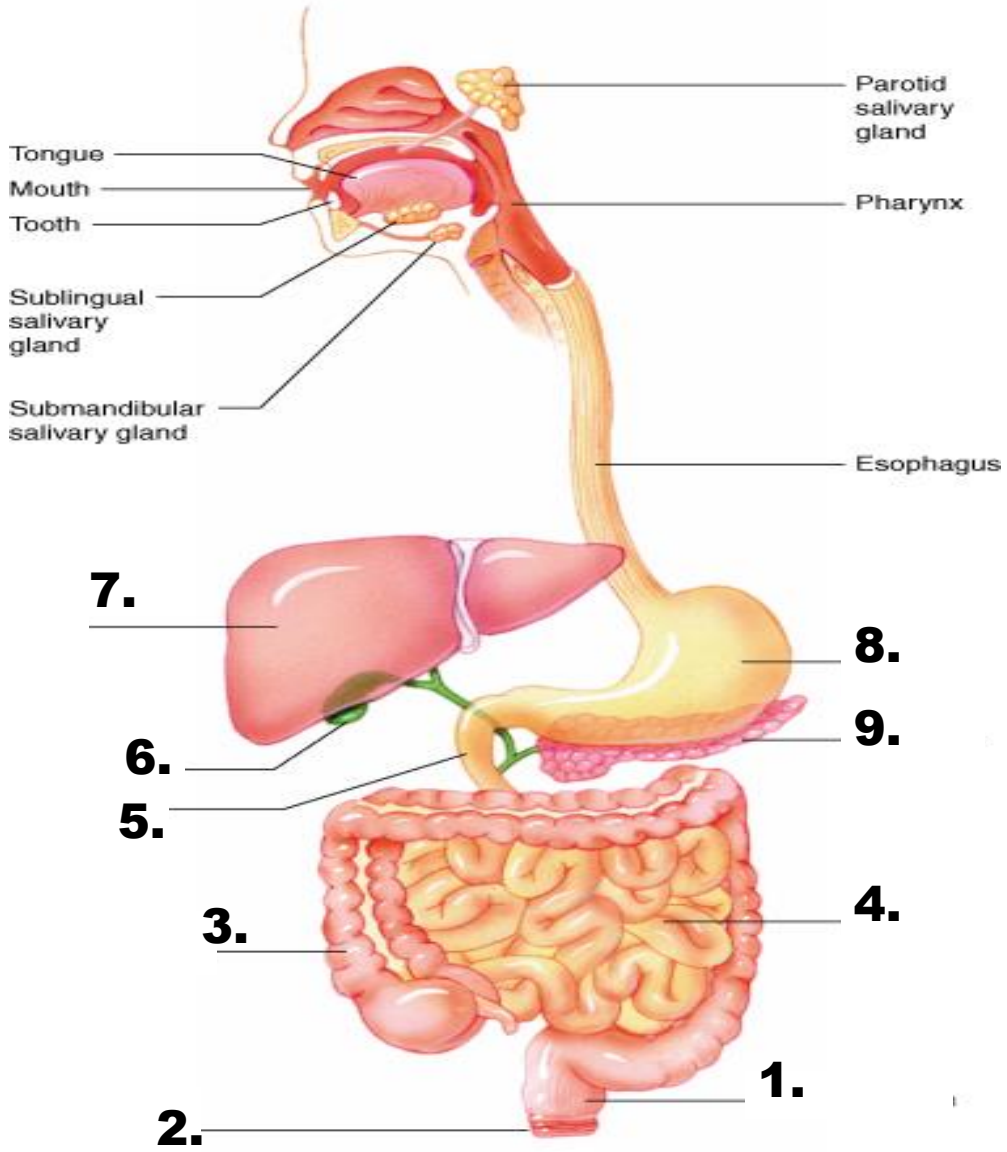
B. stomach

C. duodenum

Answer: A. mouth

Apply Your Knowledge

Locate the following structures on this diagram:
stomach, liver, gallbladder, large intestine, small intestines, anus, pancreas, duodenum and rectum



Answers:

1. rectum
2. anal canal
3. large intestine
4. small intestine
5. duodenum
6. gall bladder
7. liver
8. stomach
9. pancreas

Apply Your Knowledge

Mrs. Jones has recently had a cholecystectomy and she receives specific dietary instructions from her physician. Which of the following food types might she be instructed to avoid?

A. fatty foods

B. meats

C. sweets

Answer: A. fatty foods because she will have limited bile which is needed to breakdown the fats

Apply Your Knowledge

James has been vomiting off and on for the past 8 hours. He goes to the local emergency room for treatment. Which of the following medications might he receive?

A. antiemetic

B. cathartic

C. antacid

Answer: A. antiemetic