

**DIGESTION** The human digestive system has two important functions: breaking down large food molecules into smaller, usable molecules and absorbing these smaller molecules. Diarrhea—an inadequate amount of water is absorbed back into body Rectum

- o Egestion—removal of undigested waste
- o Last 7 to 8 inches of the gastrointestinal tract stores feces until their release through the anus

**Pancreas**

- o Secretes peptidases, protein-digesting enzymes, into small intestine

**Large Intestine or Colon**

- o No digestion occurs here
- o Has three major digestive functions: egestion, vitamin production, reabsorption of water
- o Egestion—removal of undigested waste
- o Vitamin production—bacteria symbionts living in the colon produce the B vitamins, vitamin K, and folic acid
- o Reabsorption of water—

1. Each villus contains capillaries, which absorb amino acids, vitamins, and monosaccharides directly into the bloodstream, and a lacteal, which absorbs fatty acids and glycerol into the lymphatic system.

Produces the nitrogenous waste urea from protein metabolism

**Gallbladder**

- o Stores bile that is produced in liver
- o Bile emulsifies fats in small intestine
- o Body can function well without a gallbladder

**REMEMBER** Bile is not an enzyme but it breaks down fats. Fats get broken down into glycerol and fatty acids, starch into monosaccharides, nucleic acids into nucleotides, and proteins into amino acids.

- o The stomach's thick, muscular wall churns food mechanically and secretes gastric juice, which contains hydrochloric acid and enzymes that digest proteins.
- o After swallowing, food is directed into the esophagus and away from the windpipe by the epiglottis, a flap of cartilage in the back of the pharynx (throat).
- o Hydrochloric acid begins the breakdown of muscle (meat) and activates the inactive enzyme pepsinogen to become pepsin, which digests protein.
- o Millions of fingerlike projections called villi line the small intestine and absorb all nutrients that were previously released from digested food.
- o Bile = pH 11; neutralizes chyme (acidified food from stomach) entering small intestine
- o Sends bile to the gallbladder until its release into the small intestine
- o Has other functions besides digestion

1. The cardiac sphincter at the top of the stomach keeps acidified food in the stomach from backing up into the esophagus and burning it. The pyloric sphincter at the bottom of the stomach keeps the food in the stomach long enough to be digested.

We now know that a common cause of ulcers is a particular bacterium, *Helicobacter pylori*, which can be effectively treated with antibiotics.

- o The intestinal enzymes are amylases, proteases, lipases, and nucleases.
- o Pancreatic amylases, which digest starch, are secreted into the small intestine.
- o Villi have microscopic appendages called microvilli that further enhance the rate of absorption.

The digestive tract is about 30 feet long and made of smooth (involuntary) muscle that pushes the food along the digestive tract by a process called peristalsis.