

Chapter 9-17: The Digestive System

The function of the digestive system is to break down large food particles into smaller ones that can be absorbed into the membranes of cells. Two main groups of organs comprise the digestive system. The first group is made up of the organs of the gastrointestinal (GI) tract, also known as the alimentary canal. This is a tube that extends from mouth to anus and is open at each end. The second group is made up of accessory structures such as the teeth, tongue, and glands that line the GI tract. These aid in the mechanical and chemical breakdown of foods.

This plate gives a view of the digestive system and focuses on the two groups mentioned above. Be prepared to use bold colors in this plate, since the structures and regions are easy to see and distinguish.

Then note that we are presenting the complete digestive system, including the organs of the GI tract and their accessory organs. Dark colors such as reds, oranges, greens, and blues may be used. As you read about the organs, locate and color them in the plate.

The process of digestion begins when food enters the digestive system at the **oral cavity (A)**. Here the food is broken down mechanically and moistened with secretions. It is shaped into a foodball known as a bolus by the tongue, and then enters the next part of the GI tract, the **pharynx (B)**, which starts at the rear of the mouth. A color that blends with the one used for the oral cavity should be used.

The organ that transports food to the stomach is the muscular **esophagus (C)**. This tube passes through the thoracic cavity and pierces the diaphragm before entering the pouch-like **stomach (D)**. Here food mixes with acid and protein-digesting enzymes. Passing from the stomach, food enters the twenty-foot long **small intestine (E)**. A great portion of the abdominal cavity is taken up by the numerous folds and twists of this organ, and the main processes of digestion and absorption occur here.

At the lower left portion of the plate (the anatomical right), the small intestine leads into the **large intestine (F)**. This tube can be seen ascending along the anatomical right side, passing along the midline, then turning and descending. Undigested material is dehydrated and compacted in this organ. Prior to defecation, indigestible waste is stored in the **rectum (G)**. After a certain

amount of feces has accumulated, it passes through the **anus (H)**. A spot of color should be used to designate this opening.

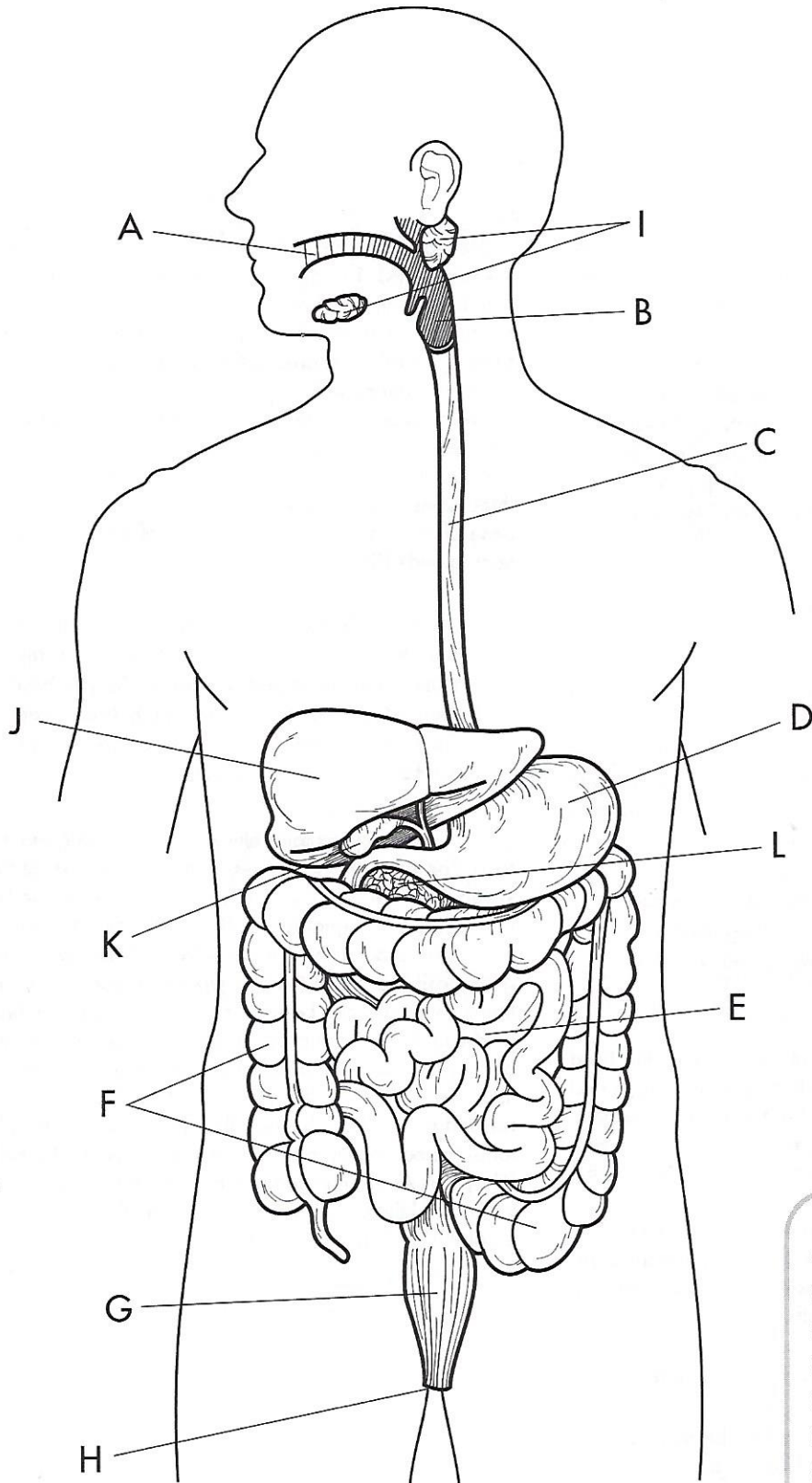
The digestive process is aided by several organs that lie along the GI tract and contribute secretions. Three of these organs are mentioned briefly in this section, and we recommend the use of dark colors to indicate their location.

Three sets of **salivary glands (I)** supply enzymes that digest carbohydrate in the oral cavity. In the abdominal cavity, the **liver (J)** secretes bile that participates in fat digestion, and the liver processes some of the products of digestion before sending them to the tissue cells. Beneath the liver is the **gallbladder (K)**. Bile from the liver is stored here before it is delivered to the intestine.

An important contributor of enzymes to the digestive process is the **pancreas (L)**. Exocrine cells of this gland deliver their secretions into the first part of the small intestine.

In the final portion of this plate, we will mention the important digestive enzymes, in the order in which they are encountered by food passing through the digestive system.

Present in salivary secretions is the enzyme salivary amylase. This enzyme breaks down starch through the process of hydrolysis, producing the disaccharide maltose. The next digestive enzymes encountered by the food are present in the stomach. The stomach contains gastric juice, which has a pH of about 2, and this gastric juice contains the enzyme pepsin, which breaks down proteins. Chemical breakdown of food continues in the small intestine, where a pancreatic amylase continues to hydrolyze starch; and trypsin, chymotrypsin, carboxypeptidase, and aminopeptidase are all responsible for breaking down proteins.



- The Digestive System
- Oral Cavity.....A
 - Pharynx.....B
 - Esophagus.....C
 - Stomach.....D
 - Small Intestine.....E
 - Large Intestine.....F
 - RectumG
 - AnusH
 - Salivary GlandsI
 - Liver.....J
 - Gallbladder.....K
 - PancreasL