Lesson 45 Digestion and Excretory Systems

Key Words

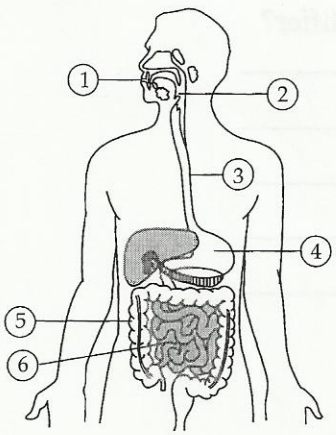
mechanical digestion: breaking down of food into smaller pieces by physical means

chemical digestion: breaking down of food into simple molecules by enzymes

KEY IDEAS

The digestive system changes food into a form that body cells can use. Mechanical digestion and chemical digestion take place in the organs of the digestive system. The excretory system removes waste products from the body.

Fig. 45-1



1. Mouth
2. Pharynx
3. Esophagus
4. Stomach
5. Large intestine
6. Small intestine

Did you ever wonder who chooses the food served in your school cafeteria? Dietitians plan menus and supervise the cooking of food. They work in schools, hospitals, and company lunchrooms. Dietitians make sure the meals provide a balanced diet.

Digestive System. Think about the different foods you ate yesterday. Although foods contain many nutrients, your body must change the food before it can be used. The food must be broken down into different forms by the digestive system. The digestive system includes the mouth, pharynx, esophagus, stomach, large intestine, and small intestine. See Fig. 45-1.

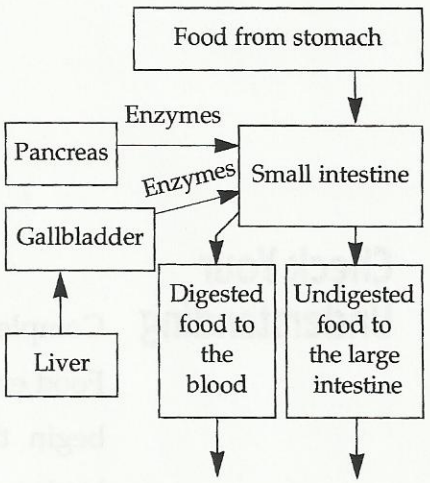
Food enters your digestive system through the mouth. The teeth tear and crush the food into smaller pieces. The physical breakdown of food is called **mechanical digestion** (muh-KAN-ih-kuhl dih-JEHS-chuhn). Saliva mixes with the food in the mouth. Saliva contains enzymes that break down certain food molecules. The breaking down of food into simpler molecules by enzymes is called **chemical digestion** (KEHM-ih-kuhl dih-JEHS-chuhn).

From the mouth, the partly digested food enters the pharynx. Recall from Lesson 44 that the pharynx splits into two tubes. One side leads to the windpipe, or trachea. Air goes down this tube. When you swallow, a flap of tissue closes off the trachea. This ensures that food goes down the other tube, called the esophagus. The esophagus is a muscular tube that contracts. The wavelike contractions of the esophagus push food into the stomach.

The Stomach. Both mechanical and chemical digestion take place in the stomach. The stomach walls secrete gastric juices containing enzymes. The gastric juices continue the chemical digestion of food. Contractions of the muscular stomach walls mix food with the juices. This mechanically breaks down the food. As a result of these processes, food is turned into a thick liquid.

The Intestines. The stomach muscles push the liquid from the stomach into the small intestine. Most of the chemical digestion of food occurs in the small intestine. In this organ, food mixes with a variety of enzymes. The cells that line the walls of the small intestine release some of the enzymes. Other enzymes in the small intestine are made in the pancreas and liver. The gallbladder stores the enzyme from the liver until it is needed.

Fig. 45-2



Digestion in the small intestine changes food into substances that the body can use. These substances are ready to be absorbed into the bloodstream. Digested food passes through fingerlike projections that cover the inner lining of the small intestine. The food moves into the bloodstream, where it is carried to body cells. See Fig. 45-2.

Undigested food and water pass out of the small intestine into the large intestine. Water and minerals are absorbed through the lining of the large intestine into the blood. Solid wastes move into the lower part of the large intestine, or rectum. These wastes pass out of the rectum and are eliminated from the body.

Excretory System. Waste products from cells are removed from the body by the excretory system. The lungs are part of the excretory system. They remove carbon dioxide from the body. However, the major organs of the excretory system are the kidneys. The main job of the kidneys is to filter the blood. To filter the blood, the kidneys reabsorb any substances needed by the body and get rid of the cells' waste products.

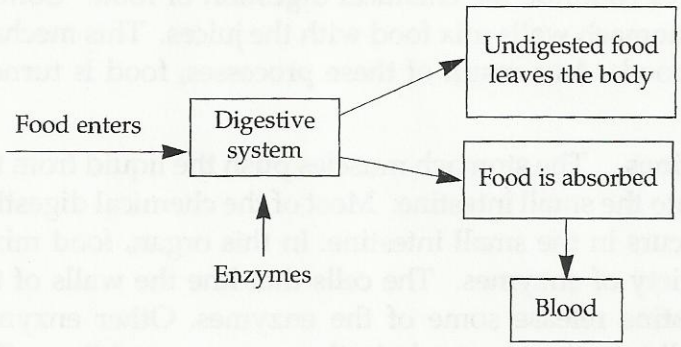
Arteries carry blood to the kidneys. The arteries lead to tiny clusters of capillaries inside the kidneys. Nutrients, water, salts, and waste products in the blood pass through the tiny capillary walls into cuplike sacs. From the sacs, all the substances move through a long, winding tube. The nutrients

and most of the water pass back into the blood to be used by the body. The wastes that are left, called urine, move to the end of the tube. The urine moves out of the kidneys into a sac of tissue called the urinary bladder. When the urinary bladder is full, the bladder's muscles contract. This push sends the urine from the body.

TAKE ANOTHER LOOK

Fig. 45-3 summarizes how food is digested.

Fig. 45-3



Check Your Understanding

Complete the following paragraphs.

Food enters the digestive system through the **(1)**_____. Teeth begin the **(2)**_____ digestion of food. Chemical digestion begins when **(3)**_____ mixes with the food in the mouth. The partially digested food passes through the **(4)**_____ on the way to the esophagus. Contractions of the esophagus move the food to the **(5)**_____. It then passes into the **(6)**_____ intestine. Enzymes produced by the liver and **(7)**_____ continue the chemical digestion of food. When digestion is completed, food passes through fingerlike projections in the intestine's lining into the **(8)**_____. Undigested food passes into the **(9)**_____ intestine. These wastes are then eliminated from the body.

Waste products from cells are removed by the **(10)**_____ system. The main job of the **(11)**_____ is to filter the blood by absorbing nutrients and eliminating waste. The wastes are called **(12)**_____. When the **(13)**_____ contracts, urine is eliminated from the body.

14. How does the esophagus help move food through the digestive system?

15. How does mechanical digestion occur in the stomach?

16. How does the liver aid in the digestion of food?

17. How do body cells obtain nutrients from food in the small intestine?

18. What is the job of the kidneys?

19. How do nutrients get into and out of the kidneys?

20. To speak, you need to breathe in and out. Why is it dangerous to speak and eat at the same time? (Hint: Think about the way food enters the esophagus.)