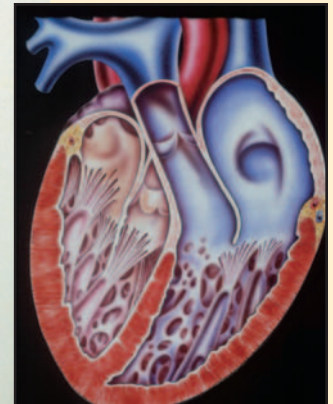
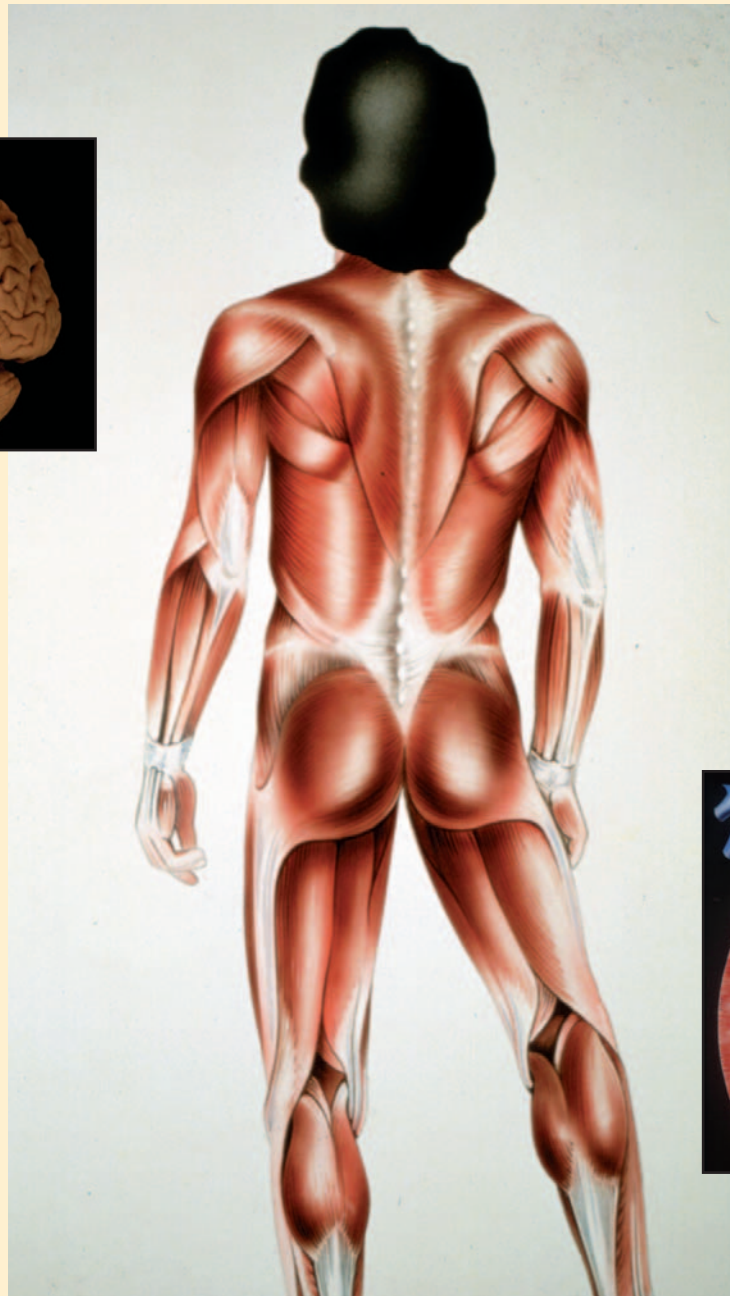




The Living **BODY**

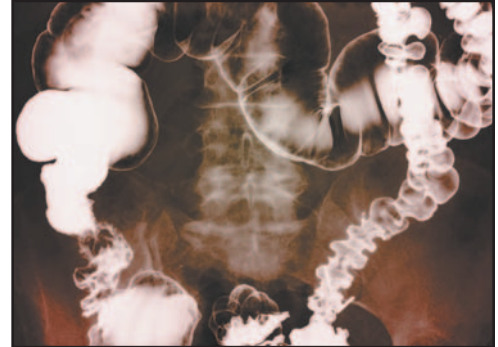
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Breakdown

Summary

Food is initially broken down in the mouth, passes down the esophagus and into the stomach where it is pummeled into smaller fragments, and is then pushed, a small portion at a time, into the duodenum. The main chemical breakdown of food begins in the first section of the small intestine, where it is smothered in digestive juices containing enzymes specialized to break down one particular food component. Clustered around the digestive tract are several organs that produce digestive chemicals, including the pancreas, liver, and gall bladder. A resin cast illustrates these organs. Bile, produced by the liver, is stored in the gall bladder, which releases it into the duodenum; bile digests fats and is released when food, especially fatty food, enters the duodenum.



The intestine is a complex organ whose muscular walls ceaselessly and involuntarily contract to squeeze food and press it onward through the tract and into contact with the intestinal wall where food molecules are carried away in the blood. The intestinal walls are lined with millions of villi, which vastly increase the surface area to make food absorption more efficient. Close-up shots of a carpet of undulating villi show them constantly sweeping back and forth to absorb food molecules passing over them. Fat molecules are carried into the lymphatic system and then pumped away to be stored in fat cells around the body. Other food molecules pass from the villi into the bloodstream.

The liver—the largest organ in the body—receives many of the food molecules absorbed from the intestine; it stores glucose, iron, and vitamins for later use; synthesizes substances such as blood clotting proteins; produces bile for digestion; and produces heat as a by-product of its manufacturing activity.

Bacteria in the colon help to synthesize vitamins from the fibers and cells that remain; the colon also absorbs back much of the moisture in food residue. At the end of the colon, waste matter is eliminated by a series of muscle contractions in the rectum that expel it from the body.

Objectives

1. To describe the principal food groups and how they are digested and used for different purposes.
2. To demonstrate the major chemical breakdown of food in the duodenum by enzymes secreted by cells in the intestinal walls and organs such as the liver and pancreas.
3. To examine peristalsis and the absorption of food molecules by villi that line the intestinal tract.
4. To explain the many functions of the liver in processing and storing elements of food.
5. To describe the functioning of the colon.

Recall Questions

1. What is the source of energy in food?
2. What are gallstones?
3. What is peristalsis? Can it be consciously controlled?
4. Name four of the many tasks performed by the liver.
5. Some of the elements of food are stored in different parts of the body for future use, while others are used almost immediately. Give an example of each case.

Interpretive Questions

1. Why do you think fat is absorbed differently from other food molecules?
2. What do you predict would happen if peristalsis came to a halt? Would digestion be possible without it?
3. Considering the location of the appendix, explain how appendicitis could develop. If the appendix serves no useful physiological purpose, why does it exist?
4. Describe the condition of the adipose cells of an obese person.

Vocabulary Required for Effective Viewing

- | | | |
|-----------------|-------------|--------------------|
| • adipose cells | • digestion | • glycogen |
| • amino acids | • duodenum | • lymphatic system |
| • bacteria | • enzymes | • peristalsis |
| • bile | • glucose | • villi |



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