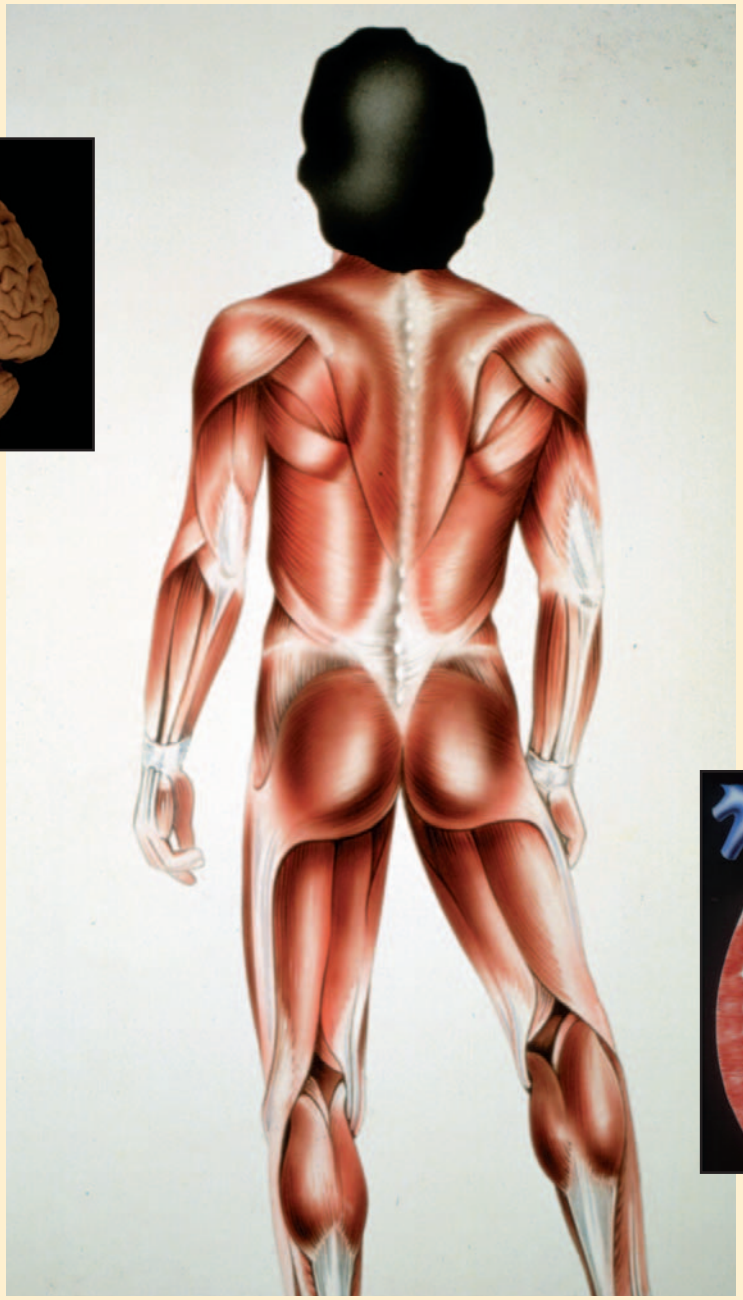

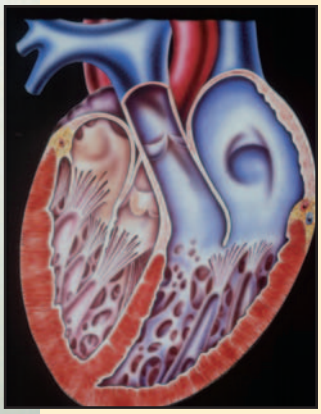

The Living BODY

FILMS FOR THE HUMANITIES & SCIENCES®

Eating to Live

Summary

This program covers the first part of the journey food takes through the digestive tract. A day of sightseeing in Paris by two tourists provides the dramatic framework; as the couple dine on French cuisine, the camera explores the interior spaces of the mouth, esophagus, and stomach.

The sight and scent of food stimulate the salivary glands, located under the back of the jaw and tongue and in the lining of the mouth. Different foods stimulate the production of different kinds of saliva, which helps with digestion but serves mainly to lubricate food before it is swallowed.

Smells are triggered by food molecules that drift up through the back of the throat and come into contact with sensory cells in the nasal passages. Food molecules dissolved in saliva are carried into small pits on the tongue's surface, where the taste buds lie; these taste receptors can only detect four flavors—sweet, sour, bitter, and salty. Taste and smell are experienced simultaneously and together produce the flavor of food.

Food must be broken into very small fragments so that it can be digested. The teeth and jaws accomplish the first phase of this task. Teeth have different shapes for different jobs: incisors hold food and cut it into bite-size chunks; molars grind and chew food.

Swallowing happens automatically once food or drink is at the back of the throat. With food this reflex is only triggered when the skin at the back of the throat senses that food is broken down into small enough particles. When food is swallowed, the epiglottis automatically closes over the windpipe to prevent food from entering the lungs; the food then slides down the esophagus, propelled by waves of muscle contractions.

The major task of the stomach is to break food down into yet smaller particles. Its muscular walls contract about three times per minute, churning food around and mixing it with gastric juices. The sight, smell, and taste of food triggers the production of some of these juices before it arrives in the stomach. The stomach walls contain deep pits with cells that produce digestive juices and mucus. The camera shows a cross-section of these cells producing hydrochloric acid, which aids in the first stage of digestion. The mucus produced by the stomach wall helps protect it from being digested by its own secretions and helps to lubricate food. After being thoroughly mixed by the stomach's movements, food moves into the small intestine where digestion really begins.

Stress can have a detrimental effect on digestion and harm the digestive tract itself, causing inflammation of the stomach lining and, if prolonged, can produce an ulcer as gastric juices eat into the muscles and nerves of the stomach or intestine.

Objectives

1. To explain how the flavor of food is detected by the taste buds and the smell receptors in the nasal passages.
2. To describe how the salivary glands work.
3. To demonstrate the coordination between the teeth, jaws, tongue, and cheek muscles in chewing food.
4. To examine the swallowing reflex and the closing of the epiglottis as this reflex is triggered.
5. To describe the functioning of the stomach and its role in digestion.

Recall Questions

1. Why do scientists think of the digestive tract as being outside the body?
2. Name the components supplied by food intake that are typically needed on an average day.
3. Why is the sense of smell more important than the taste buds in detecting the flavor of food?
4. How is the stomach lining protected from the harmful effects of its own gastric juices?
5. How can emotional stress affect digestion?

Interpretive Questions

1. Why do you think the salivary glands produce different kinds of saliva?
2. What could be a possible physiological cause for overeating?
3. All human beings must eat in order to live, but the amount considered appropriate to eat varies enormously in different societies. What could account for this variability?

Vocabulary Required for Effective Viewing

- digestion
- epiglottis
- esophagus
- gastric juices
- hydrochloric acid
- incisors
- molars
- pepsin
- salivary glands
- smell receptors
- taste buds

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