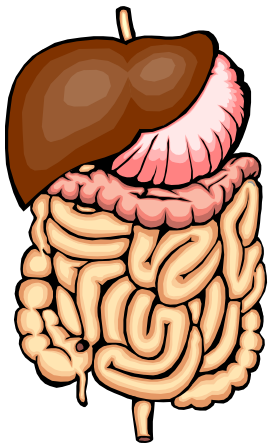
Animal Systems- Nutrient Absorption

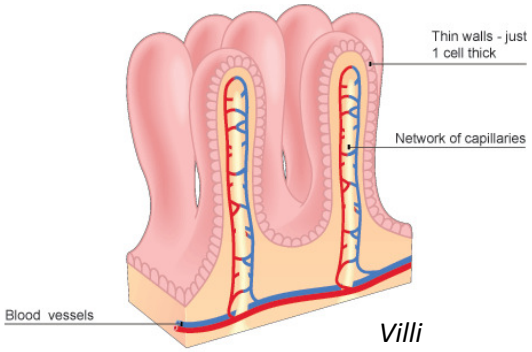


All organisms need energy, and nutrients supply this energy. Nutrients also enable the body to grow and maintain homeostasis. Most multicellular organisms have a **digestive system** made up of organs working together to break down food into simple, useable substances.

The energy of foods is contained in the molecules of lipids, carbohydrates, and proteins, but the molecules are too big to pass through your cells' membranes. The digestive system uses two processes to break down food: mechanical digestion (crushing and mashing) and chemical digestions (using enzymes to break apart bonds).

The muscles in your jaw break food into smaller pieces while enzymes in the mouth start breaking down carbohydrates. The esophagus is a tube that connects your mouth and your stomach. The esophagus uses involuntary muscle contractions to take food to your stomach, which mixes food and breaks it down using digestive enzymes.

Following digestion, the small subunits of food must be absorbed by our cells. The main site of nutrient absorption is the small intestine, which has infoldings called villi that increase the surface area. The greater the surface area, the more nutrients can be absorbed. Each villus has a capillary, a tiny blood vessel that can carry nutrients from the intestines to the rest of the body. (The network of blood vessels in the circulatory system is responsible for transporting substances (such as gases and nutrients) throughout the body.)



Villi

Foods contain substances other then nutrients. Undigested materials are not absorbed, so they pass as wastes through the large intestine, rectum, and anus. Large amounts of water are reabsorbed by the large intestine. Also within the large intestine, E. coli receives nutrients and shelter, and in return produces vitamin K.

Practice

1. In which part of your digestive system are nutrient absorbed?
   a. Mouth
   b. Stomach
   c. Small intestine
   d. Large intestine

2. Antibiotics kill bacteria. What might happen if a person takes so many antibiotics that all the bacteria in the large intestine are killed?
   a. The person may develop a vitamin deficiency
   b. The person sill not be able to absorb nutrients
   c. The person will not be able to store waste in the large intestine
   d. The person will not be able to digest foods

3. Which of the following do the villi of the small intestine reveal about multicellular organisms?
    a. Organs work together to make up an organ system
    b. Different systems work together
    c. Structure and function are related
    d. Villi are unnecessary for absorption to occur

4. Both the stomach and the small intestine secrete large amounts of water to aid in digestion. What happens to this water.
    a. Microorganisms in the large intestine use all of this water
    b. Most of the water is eliminated from the body
    c. This water is changed into nutrients that are absorbed
    d. Most of this water is reabsorbed in the large intestine

5. Capillaries of the circulatory system are responsible for delivering nutrients to all the cells in the body. Where did capillaries first pick up these nutrients?
    a. In a villus
    b. From a bacterium
    c. From undigested materials
    d. In the esophagus

6. Enzymes play an important role in the production of nutrients. What do enzymes do?
    a. They speed up the process of diffusion
    b. They speed up the rates of chemical reactions
    c. The change one type of biomolecule into another type
    d. They slow down the breakdown of macromolecules

7. Digestion involves the changing of proteins into individual amino acids. Which process does the reverse by assembling amino acids to make a protein?
    a. Transcription
    b. Translation
    c. Replication
    d. Mutation