

Digestion -- The Foods We Eat

By Sharon Fabian

Our digestive system is pretty incredible. It can process protein, carbohydrates, and fats. It can absorb minerals and vitamins. Foods such as raw carrots, pancakes, pot roast, and banana splits can all be processed through the digestive system. The digestive system can deal with almost anything, from staples like beans and rice, to junk food, to frozen dinners. Maybe that's why we take it for granted.

People around the world eat an amazing variety of foods. In some countries, people depend on a grain product, like rice, for most of their diet. Some people raise most of their own food, and depend on vegetables and other plant foods. People who live on an island, or near the water often eat a diet based on fish and other seafood. In cold lands near the North Pole, people must eat a diet high in fat. In developed countries people often eat packaged food and fast food.

Whatever type of food you eat, it comes from two main sources. Plants and animals are the sources of our food. Plants provide us with grains, like rice and wheat, vegetables, and fruits. Animals provide meat or poultry, eggs, milk, and milk products.

Plants are cheaper and easier to produce, and are the main source of food in many parts of the world where money is scarce, and where people raise much of their own food. A diet based mainly on plants may not always provide enough calories and enough protein to keep a person healthy.

Animals cost more to raise, and are a major source of food in the United States and other developed countries. A diet based on animal products may supply more fat than is healthy. The use of fast foods and packaged foods may add to the problem of a diet that provides too much fat and too many calories.

The average American diet gets over 40% of its calories from fat. Nutritionists believe that we should reduce that amount to 30%. The average American diet also gets about 45% of its calories from carbohydrates, and that amount should be raised to about 55%.

A good diet contains a balance of carbohydrates, fats, proteins, minerals, and vitamins. It also needs to include enough water and fiber. Carbohydrates are broken down by the digestive system into simple sugars, which are burned in the body's cells to produce energy. Fats are broken down into fatty acids and glycerol. Proteins are broken down into amino acids, which in turn produce other proteins that our bodies need. Proteins build up and repair body tissues, including bones and muscles. Only a small amount of minerals and vitamins are necessary, but it is important that we get the ones that we need. There are a variety of minerals and vitamins that do specific jobs in the body. Iron and copper are needed for red blood cells. Calcium, and other minerals found in dairy products help produce strong bones and teeth. A well balanced diet would provide all of the vitamins and minerals necessary, but some people take a vitamin supplement if they feel that their diet may not be providing everything necessary. Fiber, or roughage, is necessary in the diet to help the digestive process. Enough liquid in the diet is important too, and plain water is probably the best.

Luckily we don't have to sit down and figure all of this out every time we eat a meal. Nutritionists have developed a system of four food groups to help us eat a balanced diet. The four groups are fruits and vegetables, bread and cereal, meat, and milk. A healthy diet should contain at least four serving of fruits and vegetables each day. It should contain about four servings from the bread and cereal group, which includes things like pasta too. Two or more servings from the meat group are recommended. This group also includes eggs and beans that are high in protein. The amount of servings from the milk group varies according to the person's age. Younger children need more milk in their diet than adults do. The milk group includes other dairy products too, like cheese, yogurt, and ice cream. These food groups provide the right fuel that the digestive system needs to keep running efficiently.

We can help our digestive system along by providing these foods, and also by not adding in too many things that it doesn't really need, like candy and French fries. Think of your digestive system as a sophisticated machine, like



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your car's engine. You wouldn't throw junk in your car's gas tank; you only feed it the gasoline that it needs. So treat your digestive system the same way. Give it the right fuel, and it should keep running smoothly for a long time.

Digestion -- The Foods We Eat

Questions

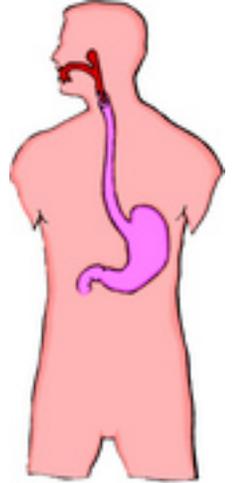
- _____ 1. Foods are processed by the _____.
- A. reproductive system
 - B. circulatory system
 - C. digestive system
 - D. respiratory system
- _____ 2. The four basic food groups are _____.
- A. fruits, vegetables, bread, cereal
 - B. fruits and vegetables, bread and cereal, meat, fiber
 - C. fruits and vegetables, bread and cereal, meat, milk
 - D. fruits and vegetables, bread and meat, water, milk
- _____ 3. Nutritionists recommend a diet that gets _____ of its calories from fat.
- A. 30%
 - B. 55%
 - C. 45%
 - D. 40%
- _____ 4. A balanced diet should get _____ of its calories from carbohydrates.
- A. 55%
 - B. 30%
 - C. 40%
 - D. 45%
- _____ 5. The digestive system breaks down carbohydrates into _____.
- A. water
 - B. proteins
 - C. simple sugars
 - D. fats
- _____ 6. Many Americans have a poor diet because _____.
- A. their diet is too high in carbohydrates
 - B. they don't have enough food
 - C. their diet is too high in fats and calories
 - D. they don't have enough protein
- _____ 7. Everyone should take a vitamin supplement.
- A. true
 - B. false

The Stomach

By Brandi Waters

The stomach is the most famous part of the digestive system. It is where your food goes after you swallow it. The stomach makes sure that the food you have eaten is broken down into small pieces that your body can use. The foods that we eat are made up of many things. Sugars, proteins, fats, starches, vitamins, minerals, fiber, water, and many other things make up the foods that we eat. Our bodies cannot use these nutrients unless the food is broken down to a simpler form. We start to break down food when we chew it in our mouths. This makes it easier for the stomach to handle.

The stomach has three important jobs. One is to store the food that you have eaten. The stomach is like a stretchy bag. It gets bigger when you have eaten a lot of food. The second job of the stomach is to get your food ready for the small intestine. In order for the small intestine to get nutrients out of the food, the food must be broken down into a thick liquid. The stomach contains acid and digestive juices that help to break the food down. Muscles in the stomach mix the food, acid, and digestive juices together. This helps to break the food down. When the food has been broken down enough, the stomach's final job is to slowly empty the thick liquid into the small intestine.



The Stomach

The Stomach

Questions

- _____ 1. The stomach gets food ready for _____.
 - A. the liver
 - B. the small intestine
 - C. the large intestine
 - D. the esophagus
- _____ 2. Whole foods are made up of many things. Which of the following is not something that makes up the food that we eat?
 - A. water
 - B. digestive juices
 - C. vitamins and minerals
 - D. sugar
- _____ 3. We start to break down food _____.
 - A. in our intestines
 - B. in our stomachs
 - C. in our esophagus
 - D. in our mouths
4. Muscles in the stomach mix _____ together.



The Esophagus

By Jennifer Kenny

Digestion begins in the mouth. After food is broken down into small pieces, the tongue pushes these pieces into a round lump called a bolus so it is ready to travel from your mouth to your stomach.

Well, when the time is right, the epiglottis, a flap of tissue, closes to prevent food from going down your trachea. The trachea is also called the windpipe. Therefore, the food can go down the tube it needs to enter, the esophagus, and not your windpipe, which would cause you to choke.

The esophagus, the tube that goes from the mouth to the stomach, can be found behind the windpipe and heart. The esophagus is made of muscular walls and is about ten inches long in an adult.

The outer layer of the esophagus is called the serosa. It is thin and it is a layer of connective tissue. Then comes a layer of longitudinal muscles, followed by a layer of circular muscles. Underneath the circular muscles is the submucosa. It is a tough, elastic layer and contains blood vessels and nerves. The inner layer is known as the mucosa. It is coated with a slimy liquid called mucus.

The rhythmic contractions of the muscular walls in the esophagus push the food bolus toward the stomach. This process is called peristalsis. Picture this process like you would the process of squeezing toothpaste out of its tube. The ring of muscle in the esophagus behind the food bolus contracts and the ring of muscle in front of it relaxes. The bolus gets pushed to where the muscles are relaxed and keeps getting pushed this way. This peristaltic wave travels at about 1.6 inches per second.

At the bottom of the esophagus is the esophageal sphincter. It is actually a ring of muscle. This muscle is usually tightly shut. When food arrives, though, the muscles relax to allow food to enter the stomach. Then the muscles contract and close the entrance. If the esophageal sphincter doesn't close properly, heartburn, which is a burning sensation, can occur. This is because the stomach acids can move into the esophagus where they don't belong.

Can you imagine how quickly this all occurs? The food is able to go from the mouth to the stomach in five to six seconds!

The Esophagus

Questions

- _____ 1. Digestion begins in the _____.
- A. stomach
 - B. esophagus
 - C. mouth
- _____ 2. When it is time to swallow your food, the _____ closes to prevent it from going down the trachea.
- A. esophagus
 - B. sphincter
 - C. epiglottis
- _____ 3. The outer layer of the esophagus is called the _____.
- A. serosa
 - B. mucosa
 - C. submucosa

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_____ 4. The process in which the contracting and relaxing of the muscular walls of the esophagus push food from the mouth to the stomach is called _____.

- A. tubing
- B. peristalsis
- C. mucus

_____ 5. What is the name of the ring of muscle that allows food to enter the stomach?

- A. submucosa
- B. epiglottis
- C. esophageal sphincter

6. Compare peristalsis to the process of squeezing toothpaste out of its tube.

_____ 7. Which statement can you infer from the informational passage?

- A. If the esophageal sphincter remains open after letting food enter the stomach, there is no painful result.
- B. If the esophageal sphincter remains open after letting food enter the stomach, the individual may experience a painful result.

_____ 8. Which is the main idea of this passage?

- A. Heartburn is a burning sensation.
- B. The esophagus in an adult is about ten inches long.
- C. The esophagus is the tube sending food from the mouth to the stomach during the digestive process.

The Stomach

By Jennifer Kenny

Can you place your hand on your stomach? If you placed it on your belly button, you actually want to move your hand higher. The stomach is actually at the top of your abdomen.

Think of your stomach as a bag made of muscles. It is shaped like a j. An adult's stomach is about ten inches long. Like a bag, the stomach can only fit so much. An adult's stomach can hold around 2.5 pints of food.

As you know, digestion begins in the mouth. A round lump called a food bolus is sent from the mouth down the esophagus into the stomach. The stomach has three areas. The fundus is the upper part. The body is the middle part. The pylorus is the lower part. The stomach also has layers similar to the esophagus (serosa, muscles, submucosa, and mucosa).

The mucosa contains glands that produce gastric juices. These juices are made of powerful acids and enzymes. The gastric juices contain hydrochloric acid that is strong enough to burn a hole in your carpet!

Now, by the time food has reached the stomach, it has already changed into fat, protein, starch, and sugar. The stomach muscles contract and relax about three times a minute. This churns the food, thereby mixing it with the powerful digestive juices. This process turns food into a liquid called chyme.

During this process, the starches and sugars stay in the stomach for one to two hours. Proteins remain for three to five hours. Fats stay even longer.

During the whole process, the lining of the stomach is protected by mucus so the gastric juices, which are so powerful, don't hurt the stomach itself. Even so, the lining cells wear out and new ones constantly have to be produced. Incredibly, the whole stomach lining is replaced every three days!

Now, despite these amazing tidbits, you might be wondering what happens to the chyme. The chyme moves through the pyloric sphincter into the small intestine. The pyloric sphincter is a ring of muscle that is usually shut tight so that the contents of the stomach can't leave before they are ready. When the contents are ready, though, contractions push some contents out and into the small intestine.

When the stomach is finally empty, it tells the brain. Then you'll start to feel hungry. Did you ever hear your stomach growl? Well, that's the churning of these incredible stomach muscles - getting ready to work even before you've eaten!



The Stomach

Questions

- _____ 1. Which best describes the location of the stomach in the human body?
- A. bottom of the abdomen
 - B. top of the abdomen
 - C. near your belly button

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- _____ 2. The shape of the stomach most resembles the letter _____.
- A. p
 - B. x
 - C. j
- _____ 3. An adult's stomach can hold around _____ pints of food.
- A. 250
 - B. 25
 - C. 2 1/2
- _____ 4. Pick the correct order of stops along the digestive tract.
- A. small intestine, mouth, esophagus, stomach
 - B. small intestine, stomach, esophagus, mouth
 - C. mouth, esophagus, stomach, small intestine
 - D. mouth, small intestine, esophagus, stomach
- _____ 5. Food leaves the stomach in a liquid form called _____.
- A. hydrochloric acid
 - B. mucus
 - C. chyme
- _____ 6. Which usually stays the longest in the stomach?
- A. fats
 - B. proteins
 - C. starches and sugars
- _____ 7. The whole stomach lining is replaced every _____ days.
- A. 6
 - B. 3
 - C. 9
- _____ 8. The selection ends by telling you about something your stomach does. What does it tell you about?
- A. stomach growls and churns
 - B. stomach lining replaces itself
 - C. food entering the stomach

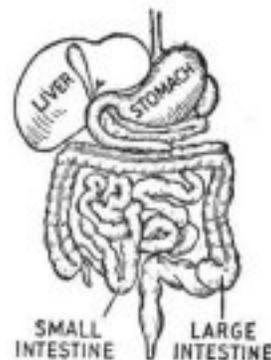
The Large Intestine

By Jennifer Kenny

Digestion starts in the mouth. It then continues through the esophagus, stomach, and small intestine. Anything that hasn't already been sent to the cells in our body heads to the large intestine through the valve called the ileocaecal sphincter.

The large intestine is a tube of muscles and tissue that is around five feet long in adults. It is shorter than the small intestine, but wider than the small intestine. The large intestine has two main parts — the colon and the rectum.

Parts of food, which can't be used, go to the large intestine. Fiber from fruits, vegetables, and grains can't be digested. Bacteria break down any digested food that gets here. They then make several vitamins including vitamin K, which the body needs for clotting. The large intestine removes water, vitamins, and minerals from this undigested food and fiber. Did you know that the large intestine could absorb about 1.6 gallons of water a day? The water and mineral salts pass through intestinal walls where blood capillaries carry them away to be used by your body.



When the water is removed, the waste becomes more solid. It becomes the brown waste material called feces. The muscles in the large intestine make waves to move the waste along until the waste reaches the rectum, or end of the intestine. The rectum is about 6 to 8 inches long. The feces stay there until you go to the toilet and they leave the body through the anus.

Sometimes things go wrong in the large intestine. Diarrhea can occur when your large intestine is irritated or inflamed. Then the feces are loose and watery because food residues have moved through the large intestine too quickly to absorb the excess water. The opposite condition, of course, is constipation. This happens when the food residues moved too slowly and too much water has been absorbed. The feces become hard and dry and it may be difficult to go to the bathroom. So, do your best to keep your digestive tract healthy!

The Large Intestine

Questions

- _____ 1. Parts of food, which can't be used, go to the _____
 - A. small intestine
 - B. mouth
 - C. large intestine
- _____ 2. The large intestine is a tube of muscles and tissue that is around _____ feet long in adults.
 - A. 10
 - B. 1
 - C. 5
- _____ 3. Fiber from fruit can be digested.
 - A. FALSE
 - B. TRUE

