

Digestion in the Mouth

By Jennifer Kenny

Where do you think digestion begins? Most people automatically think of the stomach when they think of digestion. Actually, though, digestion starts in the mouth as the first workstation in the digestive process.

Food, of course, is ground up by our teeth. We chew without thinking. The jaw muscles pull the jaw up and down, thereby crushing the food and making it softer and smaller.

When you are chewing, glands make saliva. Two quarts of saliva are produced each day. Saliva is constantly produced, but more of it is made when we eat. Smelling, seeing, or thinking about food gets the process of making more saliva started. Talk about a mouth-watering meal!



Saliva softens and moistens food in your mouth. Enzymes in saliva help break down food so that it is easier to swallow. Saliva helps us taste food. It also keeps your mouth healthy by washing away bacteria, viruses, and yeast that could cause infection. It clumps these unhealthy microbes together so they can be swallowed and then killed by the stomach acid.

Saliva is more than 99% water. Sometimes it is thin and watery. Sometimes it is thick and full of mucus. Its composition, or what it is made of, depends on the food you are eating. Saliva also contains the compound EGF (epidermal growth factor). This compound speeds repairs so cuts in your mouth heal quickly. Saliva protects your mouth from erosion, or the gradual wearing away, by acidic foods you eat. It also washes away sugars that bacteria feed on.

Your tongue is important to digestion also. It moves your food around the mouth making sure it is mixed with saliva. Taste is detected because of your tongue. Taste is a chemical sense. The bumps on your tongue are called papillae. They contain taste buds. An adult has 10,000 taste buds.

Foods tasted on the tongue can be grouped into four categories: sweet, sour, salty, and bitter. All the taste buds that detect one taste are in one area of your tongue. The tip of your tongue detects sweet and salty tastes. The sides of your tongue detect sour tastes. The back of your tongue detects bitter tastes. Taste buds respond to the chemicals in your food. They send signals along the nerves to your brain so your body knows what you are eating.

Your nose has an important job too. It smells the food. Therefore, the flavor of the food is clearer and stronger. That's why, if you have a cold, things might taste strange.

Your mouth has another important role in digestion as well. It warms or cools food so it is safe to swallow and so the food pipe is not damaged.

When all these jobs have come together, food is soft. The tongue pushes food into a round lump, called a bolus, out of the mouth and into the esophagus. The esophagus is a tube, which opens into the stomach. The beginning part of the digestive process is voluntary up to this point. The minute the food is at the back of the mouth, though, it is automatic and can't be controlled. As the food enters the esophagus, the next step in digestion begins.

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Digestion in the Mouth

Questions

_____ 1. Digestion starts in the _____.

- A. stomach
- B. esophagus
- C. mouth
- D. nose

_____ 2. When you are chewing, glands make _____.

- A. bolus
- B. saliva
- C. teeth
- D. EGF

_____ 3. Which is NOT a job of saliva?

- A. chews food
- B. helps us taste food
- C. washes away bacteria
- D. softens and moistens food

_____ 4. The bumps on your tongue are called _____.

- A. gumdrops
- B. blisters
- C. papillae
- D. bolus

_____ 5. An adult has _____ taste buds.

- A. 10,000
- B. 1,000
- C. 10
- D. 4

_____ 6. Your mouth is able to warm or cool food so it is safe to swallow.

- A. false
- B. true

_____ 7. The tongue pushes food into a round lump called a _____.

- A. bolus
- B. papillae
- C. taste bud
- D. tube

8. Why do you think your mouth could be compared to a workstation in a factory?

Digestion in the Small Intestine

By Jennifer Kenny

The small intestine is a very important stop in the digestive process. In fact, most of digestion occurs here. The small intestine is a long, narrow, twisting tube of muscles and tissue. It can be anywhere from thirteen feet to twenty feet long, but it is only one inch in diameter. It is coiled tightly so that it can fit in the abdomen.

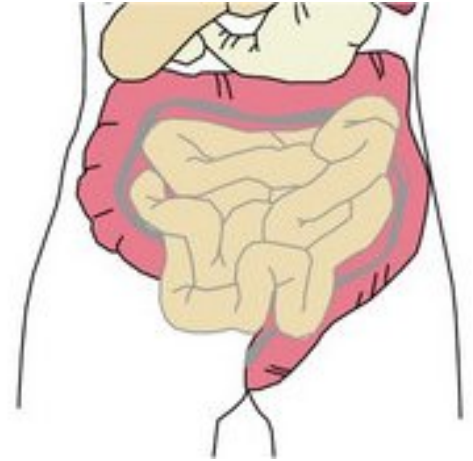
Before entering the small intestine, the liquid result of digestion leaves the stomach. Do you know what this liquid food is called? It is called chyme. The muscles create waves and push the liquid along. These waves of muscle contraction are called peristalsis.

The first part of the small intestine is about eight to ten inches long. It has a special name. It is called the duodenum. It is shaped like a horseshoe. Chemicals here neutralize the acid so chyme can continue in the digestive system. Digestive juices from the liver and pancreas enter here and mix with the liquid food. These juices finish breaking down fats, proteins, starches, and sugars.

Now, these parts are small enough to pass through the wall of the small intestine. Most of digestion is finished at this point, but nutrients need to get to the rest of the body. This is called absorption. Absorption is what makes the small intestine such an important part of the digestive system.

The small intestine has a rich blood supply so that these nutrients, which have been absorbed by the small intestine, can be carried away. The inner lining of the small intestine is also known for its millions of villi. Villi are tiny fingerlike structures. Each villus has its own blood capillary and lacteal (or lymph vessel). Amino acids and sugars pass into the blood capillary to be carried into the bloodstream. Fatty acids pass into the lacteal to get into the lymphatic system and bloodstream. Getting the nutrients to all the cells in our body gives us energy and keeps us alive.

Anything that doesn't get sent to the other cells in our body heads to the large intestine. Most of digestion has just been completed.



Digestion in the Small Intestine

Questions

- _____ 1. The small intestine measures anywhere from _____.
- A. six to thirteen feet
 - B. twenty to twenty-six feet
 - C. thirteen to twenty feet
- _____ 2. The first part of the small intestine is called _____.
- A. pancreas
 - B. duodenum
 - C. chyme

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- _____ 3. The process of the small intestine taking nutrients so that they can get to the rest of the body is_____.
- A. lacteal
 - B. villi
 - C. absorption
- _____ 4. _____ are fingerlike structures on the inner lining of the small intestine.
- A. Lymph vessels
 - B. Capillaries
 - C. Villi
- _____ 5. Anything that doesn't get sent to other cells in our body from the small intestine heads to the_____.
- A. pancreas
 - B. stomach
 - C. large intestine
- _____ 6. Which is not a job of the small intestine?
- A. getting nutrients ready to go to all cells in our body
 - B. finish breaking down fats, proteins, starches, and sugars
 - C. converting food into chyme
7. What would happen if your small intestine was not working properly?

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Date _____

The Scoop on Poop

By Joyce Furstenau

From the moment that first bite of juicy hamburger touches your tongue, your body begins breaking it down into smaller and smaller pieces so it can provide your body with energy. Once your body has used up every last bit of protein, carbohydrates, and fat, what's left over is dumped. Your body gets rid of these wastes in the form of FECES (**fee-sees**), commonly called poop. And, yes, everyone poops.

Your body's digestive system is an amazing machine that is fueled by food. It actually starts when you get the first whiff of that burger sizzling on the grill. YUM! That's when saliva begins to form in your mouth. The saliva helps you to break down the food when you chew, making it easier to swallow. Once you swallow, that bite of burger is propelled by muscles in your ESOPHAGUS (**eh-saf-a-gus**) into your stomach. The process takes about ten seconds.

It stays in your stomach for several hours where it is attacked by stomach acids. The acids break it down into a soupy liquid. It is now ready to do its work. A muscle called a SPHINCTER (**sfink-ter**) opens up, and the mushed up food goes into the small intestine.

The small intestine begins its task of taking the "soup" and then absorbing all the nutrients. It sends all these useful nutrients into your bloodstream. This provides the fuel for your body. What's left behind goes into the large intestine, which is also called the COLON (**coe-lin**). From there, the leftovers move into the last sixteen inches of the colon, called the RECTUM (**rek-tum**). That waste comes out your ANUS (**a-nuss**) when you go to the bathroom in the form of feces, stool, bowl movement, number two, doo-doo, or poop.

What is poop made of? Mostly water that wasn't absorbed, dead intestinal cells, and fiber from food that wasn't digested, along with bacteria. It's the bacteria that gives poop its stink. In fact, about one fourth of most poo-poo is bacteria. EWW! No wonder it stinks!

Why is poop brown? Well, it isn't always brown, but it is most of the time. The color comes from the combination of a liquid made by your liver called BILE and an orange-yellow substance called BILIRUBIN (**bill-uh-roob-in**). When iron combines with the bilirubin it turns poop brown.

Sometimes your digestive tract doesn't work right. This can cause you to do the "Green-Apple-Quick-Step" and you get DIARRHEA (**die-uh-ree-uh**). In other words, you've got the trots and your poop is very watery. YUCK! The opposite problem can occur if you don't drink enough water or don't get enough fiber in your diet. This condition is called CONSTIPATION (**con-sti-pa-shun**). That's when your poop is stuck. Drinking water or exercise can help constipation. Most of the time, these problems can be treated by changing your diet or taking over the counter medications. Both of these conditions can become serious, however, and you may need to consult a doctor.

In any case, pooping is a very important bodily function, without which we could not live. Since there is so much bacteria in poop, don't forget to wash your hands after using the toilet so you won't spread germs. That's pretty much the scoop on poop. PHEW!

Name _____

Friday, May 2



Date _____

The Scoop on Poop

Questions

_____ 1. Your digestive system starts working when?

- A. when you can smell your food
- B. when you start chewing your food
- C. after you swallow your food
- D. after you take your first bite

2. Once you swallow, your food is sent to your stomach by what organ?

3. What muscle controls the opening from your stomach to your small intestine?

_____ 4. What is the job of your small intestine?

- A. send messages to your stomach that it is empty
- B. send messages to your brain that you are full
- C. send messages when it is time to use the bathroom
- D. send nutrients into your bloodstream

_____ 5. The last sixteen inches of your colon is called what?

- A. large intestine
- B. sphincter
- C. anus
- D. rectum

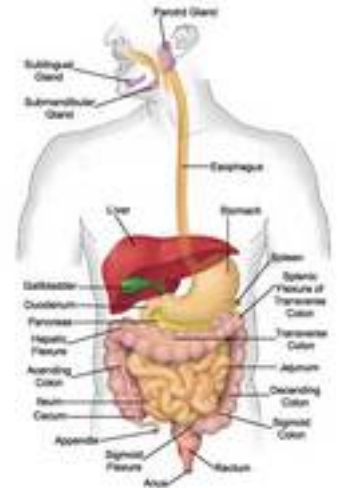
6. When iron combines with bilirubin what happens to your poop?

The Intestines

By Brandi Waters

During digestion, your mouth and stomach do most of the work to get your food ready for your body to use. Their job is to break food down into tiny pieces. In the stomach, food is mixed with digestive juices to form a thick liquid called chyme. The food must be mixed well. Your stomach can sense when the chyme is ready to leave the stomach. Then it is ready to move on to the small intestine.

The job of the small intestine is to remove nutrients from the chyme. Nutrients are all of the good things that your body needs. Protein, carbohydrates, fats, vitamins, and minerals are all nutrients. The nutrients move from your small intestine to your blood. It carries the nutrients to all the parts of your body. The inside of your small intestine is covered with millions of villi. Villi are like fingers that stick out from the surface of the small intestine. These villi are how your small intestine pulls nutrients out of the chyme. They form grooves and crevices for chyme to flow into. This makes the surface area of the small intestine much larger than it looks. That means that the small intestine can pull out many more nutrients than it could with a smooth surface.



By the time that the chyme makes it all the way through your small intestine, almost all the nutrients have been removed. They are carried by your blood to the parts of your body that need them the most. What is left moves on to you large intestine, or colon. It is mostly water and pieces of undigested food. Water is an important part of blood. It is also a part of every cell in your body. The job of the large intestine is to remove water from what remains of the food that you eat. What is left after the large intestine has done its job is waste material that cannot be used by your body. Digestion is complete. Your body has taken everything that it can use from the food that you have eaten.

The Intestines

Questions

- _____ 1. In the _____ food is broken down and mixed with digestive juices to form a liquid called chyme.
- the stomach
 - the small intestine
 - the liver
 - the large intestine
- _____ 2. Nutrients are removed from chyme in the _____.
- vitamins
 - large intestine
 - blood
 - small intestine
- _____ 3. The job of the large intestine is to remove _____ from what is left of the food that we eat.
- nutrients
 - vitamins
 - digestive juices
 - water

Flatulence: The Gas We Pass

By Joyce Furstenau

Joseph Pujol (Le_Petomane) at a "concert."

"Cut the cheese," "pass gas," and "fart" are all clever ways we humans have come up with to talk about FLATULENCE. Flatulence is described in Wikipedia as "the expulsion through the rectum of a mixture of gases that are byproducts of the digestion process of mammals and other animals." Passing gas is a normal bodily function. In fact, it is an important signal of normal bowel activity. Everyone from the Queen of England to the U.S. President has gas, also known as *flatus* (pronounced FLAY tuss). The average person has a "flatus event" up to fourteen times each day.

Most of the gas we make is absorbed through the walls of our intestines, but sometimes, oops, one or two of these gas bubbles sneak out. Flatulence is what happens when the food we eat creates gas in our intestines. Sometimes it comes from swallowed air that never got burped out. Other times, some of the food we eat isn't broken down in the stomach. The undigested food proceeds through our intestines where bacteria pitch in to help. One byproduct of that breakdown is gas.

Certain foods can make your "airborne experiences" smell bad, too. Ugh! Beans, bran, broccoli, Brussel sprouts, cabbage, carbonated beverages, cauliflower, dairy products, and even white bread can add to the stinkiness of the air around you. Beans contain a type of sugar called *raffinose* that the body simply can't use. So, when you eat a lot of beans, you know the routine.

The primary components of flatus are five odorless gases: nitrogen, hydrogen, carbon dioxide, methane, and oxygen. The unpleasant odor often associated with flatus is because of a small amount of sulfur-containing compounds, produced only by particular bacteria and not found in everyone.

The fragrance factor is also determined by the speed at which you eat. For some, inhaling a bowl of chili can create an atomic event. Others can eat flatulence-filled foods with no reaction at all. Each person's body reacts differently.

History has provided several accounts of flatulence. Hippocrates himself professed, "Passing gas is necessary to well-being." In the mid-1800s the French entertainer Joseph Pujol ("Le Petomane," which translates into "The Fart Maniac",) was able to pass gas at will and at varying pitch. He actually played tunes for sold-out shows at the Moulin Rouge. (So much for playing "air guitar.")

Excess gas isn't always a laughing matter. It can be a sign of a medical problem. If you are concerned about excess gas, you will want to talk about it with your health care provider. Flatulence can definitely cause social embarrassment. Even though it's a normal function, if you feel a toot coming on, be kind to others. Leave the room or use the bathroom. Thanks!



Name _____

Tuesday, May 6



Date _____

Flatulence: The Gas We Pass

Questions

1. What is the medical term used to describe the gas we pass?

2. How many times a day is considered "normal" for passing gas?

_____ 3. Which of these foods is known to create excess gas in some people?

- A. carrots
- B. pineapple
- C. beans
- D. beets

_____ 4. Which of these gases is present in flatus?

- A. neon
- B. methane
- C. carbon monoxide
- D. helium

_____ 5. What gas is to blame for the odor in flatus?

- A. neon
- B. oxygen
- C. sulfur
- D. helium

6. What did Hippocrates say about passing gas?
