DOWNLOAD PDF DISORDERS OF THE DIGESTIVE SYSTEMS SOLID ORGANS: THE LIVER AND PANCREAS

Chapter 1 : Digestive System | Common Digestive Disorders

Digestive Organs. To digest food, your digestive tract needs some help from nearby organs, including the liver, gallbladder, and pancreas, that produce or store enzymes and other substances that help break down food.

The Amazing Process of How the Body Regulates Digestion Digestion is the process by which food and drink are broken down into their smallest parts so that the body can use them to build and nourish cells and to provide energy. When we eat fruit, bread, meat, and vegetables, they are not in a form that the body can use as nourishment. Our food and drink must be converted into smaller molecules of nutrients before they can be absorbed into the blood and carried to cells throughout the body. What Organs Make up the Digestive System? The digestive system starts with the mouth and proceeds all of the way to the anus. It consists of a series of hollow organs joined in a long, twisting tube. Lining the tube is mucosa. In the mouth, stomach, and small intestine,the mucosa contains tiny glands that produce juices to help digest food. In addition to the hollow organs are two solid digestive organs, the liver and the pancreas, which produce juices that reach the intestine through small tubes. Nerves and blood also play a major role in the digestive system. Digestion begins in the mouth, when we chew and swallow, and is completed in the small intestine. This process involves the mixing of food, its movement through the digestive tract, and chemical breakdown of the large molecules of food into smaller molecules. Different types of food will somewhat vary the chemical process. Movement of Food Through the System The large, hollow organs of the digestive system contain muscle that enables their walls to move. The movement of organ walls can propel food and liquid and also can mix the contents within each organ. The first major muscle movement occurs when food or liquid is swallowed. Although we are able to start swallowing by choice, once the swallow begins, it becomes involuntary and proceeds under the control of the nerves. The esophagus is the organ into which the swallowed food is pushed. It connects the throat above with the stomach below. At the junction of the esophagus and stomach, there is a ringlike valve closing the passage between the two organs. However, as the food approaches the closed ring, the surrounding muscles relax and allow the food to pass. The food then enters the stomach, which has three mechanical tasks to do. First, the stomach must store the swallowed food and liquid. This requires the muscle of the upper part of the stomach to relax and accept large volumes of swallowed material. The second job is to mix up the food, liquid, and digestive juice produced by the stomach. The lower part of the stomach mixes these materials by its muscle action. The third task of the stomach is to empty its contents slowly into the small intestine. Several factors affect emptying of the stomach, including the nature of the food mainly its fat and protein content and the degree of muscle action of the emptying stomach and the next organ to receive the stomach contents the small intestine. As the food is digested in the small intestine and dissolved into the juices from the pancreas, liver, and intestine, the contents of the intestine are mixed and pushed forward to allow further digestion. Finally, all of the digested nutrients are absorbed through the intestinal walls. The waste products of this process include undigested parts of the food, known as fiber, and older cells that have been shed from the mucosa. These materials are propelled into the colon, where they remain, usually for a day or two, until the feces are expelled by a bowel movement. Typical movement of the esophagus, stomach, and intestine is called peristalsis. The action of peristalsis looks like an ocean wave moving through the muscle. The muscle of the organ produces a narrowing and then propels the narrowed portion slowly down the length of the organ. These waves of narrowing push the food and fluid in front of them through each hollow organ. Production of Digestive Juices The glands that act first are in the mouthâ€”the salivary glands. Saliva produced by these glands contains an enzyme that begins to digest the starch from food into smaller molecules. The next set of digestive glands is in the stomach lining. They produce stomach acid and an enzyme that digests protein. One of the unsolved puzzles of the digestive system is why the acid juice of the stomach does not dissolve the tissue of the stomach itself. In most people, the stomach mucosa is able to resist the juice, although food and other tissues of the body cannot. After the stomach empties the food and its juice into the small intestine, the

juices of two other digestive organs mix with the food to continue the process of digestion. One of these organs is the pancreas. It produces a juice that contains a wide array of enzymes to break down the carbohydrates, fat, and protein in our food. Other enzymes that are active in the process come from glands in the wall of the intestine or even a part of that wall. The liver produces yet another digestive juiceâ€"bile. The bile is store between meals in the gallbladder. At mealtime, it is squeezed out of the gallbladder into the bile ducts to reach the intestine and mix with the fat in our food. The bile acids dissolve the fat into the watery contents of the intestine, much like detergents that dissolve grease from a frying pan. After the fat is dissolved, it is digested by enzymes from the pancreas and the lining of the intestine. Absorption and Transport of Nutrients Digested molecules of food, as well as water and minerals from the diet, are absorbed from the cavity of the upper small intestine. The absorbed materials cross the mucosa into the blood, mainly, and are carried off in the bloodstream to other parts of the body for storage or further chemical change. As noted above, this part of the process varies with different types of nutrients. An average American adult eats about half a pound of carbohydrate each day. Some of our most common foods contain mostly carbohydrates. Examples are bread, potatoes, pastries, candy, rice, spaghetti, fruits, and vegetables. Many of these foods contain both starch, which can be digested, and fiber, which the body cannot digest. The digestible carbohydrates are broken into simpler molecules by enzymes in the saliva, in juice produced by the pancreas, and in the lining of the small intestine. Starch is digested in two steps: First, an enzyme in the saliva and pancreatic juice breaks the starch into molecules called maltose; then an enzyme in the lining of the small intestine maltase splits the maltose into glucose molecules that can be absorbed into the blood. Glucose is carried through the bloodstream to the liver, where it is stored or used to provide energy for the work of the body. Table sugar is another carbohydrate that must be digested to be useful. An enzyme in the lining of the small intestine digests table sugar into glucose and fructose, each of which can be absorbed from the intestinal cavity into the blood. Milk contains yet another type of sugar, lactose, which is changed into absorbable molecules by an enzyme called lactase, also found in the intestinal lining. Foods such as meat, eggs, and beans consist of giant molecules of protein that must be digested by enzymes before they can be used to build and repair body tissues. An enzyme in the juice of the stomach starts the digestion of swallowed protein. Further digestion of the protein is completed in the small intestine. Here, several enzymes from the pancreatic juice and the lining of the intestine carry out the breakdown of huge protein molecules into small molecules called amino acids. These small molecules can be absorbed from the hollow of the small intestine into the blood and then be carried to all parts of the body to build the walls and other parts of cells. Fat molecules are a rich source of energy for the body. The first step in digestion of a fat such as butter is to dissolve it into the watery content of the intestinal cavity. The bile acids produced by the liver act as natural detergents to dissolve fat in water and allow the enzymes to break the large fat molecules into smaller molecules, some of which are fatty acids and cholesterol. The bile acids combine with the fatty acids and cholesterol and help these molecules to move into the cells of the mucosa. In these cells the small molecules are formed back into large molecules, most of which pass into vessels called lymphatics near the intestine. These small vessels carry the reformed fat to the veins of the chest, and the blood carries the fat to storage depots in different parts of the body. Another vital part of our food that is absorbed from the small intestine is the class of chemicals we call vitamins. There are two different types of vitamins, classified by the fluid in which they can be dissolved: Most of the material absorbed from the cavity of the small intestine is water in which salt is dissolved. The salt and water come from the food and liquid we swallow and the juices secreted by the many digestive glands. In a healthy adult, more than a gallon of water containing over an ounce of salt is absorbed from the intestine every 24 hours. The major hormones that control the functions of the digestive system are produced and released by cells in the mucosa of the stomach and small intestine. These hormones are released into the blood of the digestive tract, travel back to the heart and through the arteries, and return to the digestive system, where they stimulate digestive juices and cause organ movement. The hormones that control digestion are gastrin, secretin, and cholecystokinin CCK: Gastrin causes the stomach to produce an acid for dissolving and digesting some foods.

It is also necessary for the normal growth of the lining of the stomach, small intestine, and colon. Secretin causes the pancreas to send out a digestive juice that is rich in bicarbonate. It stimulates the stomach to produce pepsin, an enzyme that digests protein, and it also stimulates the liver to produce bile. CCK causes the pancreas to grow and to produce the enzymes of pancreatic juice, and it causes the gallbladder to empty. Nerve Regulators Two types of nerves help to control the action of the digestive system. Extrinsic outside nerves come to the digestive organs from the unconscious part of the brain or from the spinal cord. They release a chemical called acetylcholine and another called adrenaline. Acetylcholine also causes the stomach and pancreas to produce more digestive juice. Adrenaline relaxes the muscle of the stomach and intestine and decreases the flow of blood to these organs. Even more important, though, are the intrinsic inside nerves, which make up a very dense network embedded in the walls of the esophagus, stomach, small intestine, and colon. The intrinsic nerves are triggered to act when the walls of the hollow organs are stretched by food. They release many different substances that speed up or delay the movement of food and the production of juices by the digestive organs.

Chapter 2 : Digestive System Diseases: Medical Terminology ::

National Digestive Diseases Information Clearinghouse digestive tractâ€"and the liver, pancreas, and gallbladder are the solid organs of the digestive system.

But before food can do that, it must be digested into small pieces the body can absorb and use. About the Digestive System Almost all animals have a tube-type digestive system in which food enters the mouth, passes through a long tube, and exits as feces poop through the anus. The smooth muscle in the walls of the tube-shaped digestive organs rhythmically and efficiently moves the food through the system, where it is broken down into tiny absorbable atoms and molecules. During the process of absorption, nutrients that come from the food including carbohydrates, proteins, fats, vitamins, and minerals pass through channels in the intestinal wall and into the bloodstream. The blood works to distribute these nutrients to the rest of the body. Every morsel of food we eat has to be broken down into nutrients that can be absorbed by the body, which is why it takes hours to fully digest food. In humans, protein must be broken down into amino acids, starches into simple sugars, and fats into fatty acids and glycerol. The water in our food and drink is also absorbed into the bloodstream to provide the body with the fluid it needs. How Digestion Works The digestive system is made up of the alimentary canal also called the digestive tract and the other abdominal organs that play a part in digestion, such as the liver and pancreas. The alimentary canal is the long tube of organs â€" including the esophagus, stomach, and intestines â€" that runs from the mouth to the anus. Digestion begins in the mouth, well before food reaches the stomach. When we see, smell, taste, or even imagine a tasty meal, our salivary glands, which are located under the tongue and near the lower jaw, begin producing saliva. In response to this sensory stimulation, the brain sends impulses through the nerves that control the salivary glands, telling them to prepare for a meal. As the teeth tear and chop the food, saliva moistens it for easy swallowing. A digestive enzyme called amylase, which is found in saliva, starts to break down some of the carbohydrates starches and sugars in the food even before it leaves the mouth. Swallowing, which is accomplished by muscle movements in the tongue and mouth, moves the food into the throat, or pharynx. The pharynx, a passageway for food and air, is about 5 inches A flexible flap of tissue called the epiglottis reflexively closes over the windpipe when we swallow to prevent choking. From the throat, food travels down a muscular tube in the chest called the esophagus. Waves of muscle contractions called peristalsis force food down through the esophagus to the stomach. At the end of the esophagus, a muscular ring or valve called a sphincter allows food to enter the stomach and then squeezes shut to keep food or fluid from flowing back up into the esophagus. The stomach muscles churn and mix the food with acids and enzymes, breaking it into much smaller, digestible pieces. An acidic environment is needed for the digestion that takes place in the stomach. Glands in the stomach lining produce about 3 quarts 2. Most substances in the food we eat need further digestion and must travel into the intestine before being absorbed. Role of the Intestines By the time food is ready to leave the stomach, it has been processed into a thick liquid called chyme. A walnut-sized muscular valve at the outlet of the stomach called the pylorus keeps chyme in the stomach until it reaches the right consistency to pass into the small intestine. Chyme is then squirted down into the small intestine, where digestion of food continues so the body can absorb the nutrients into the bloodstream. The small intestine is made up of three parts: The villi are the vehicles through which nutrients can be absorbed into the body. The liver located under the ribcage in the right upper part of the abdomen , the gallbladder hidden just below the liver , and the pancreas beneath the stomach are not part of the alimentary canal, but these organs are essential to digestion. The liver produces bile, which helps the body absorb fat. Bile is stored in the gallbladder until it is needed. The pancreas produces enzymes that help digest proteins, fats, and carbs. It also makes a substance that neutralizes stomach acid. These enzymes and bile travel through special channels called ducts directly into the small intestine, where they help to break down food. The liver also plays a major role in the handling and processing of nutrients, which are carried to the liver in the blood from the small intestine. From the small intestine, undigested food and some

water travels to the large intestine through a muscular ring or valve that prevents food from returning to the small intestine. By the time food reaches the large intestine, the work of absorbing nutrients is nearly finished. The large intestine is made up of three parts: The cecum is a pouch at the beginning of the large intestine that joins the small intestine to the large intestine. This transition area expands in diameter, allowing food to travel from the small intestine to the large. The appendix, a small, hollow, finger-like pouch, hangs at the end of the cecum. Doctors believe the appendix is left over from a previous time in human evolution. It no longer appears to be useful to the digestive process. The colon extends from the cecum up the right side of the abdomen, across the upper abdomen, and then down the left side of the abdomen, finally connecting to the rectum. The colon has three parts: Bacteria in the colon help to digest the remaining food products. The rectum is where feces are stored until they leave the digestive system through the anus as a bowel movement. Digestive System Problems Nearly everyone has a digestive problem at one time or another. Some conditions, like indigestion or mild diarrhea , are common; they result in mild discomfort and get better on their own or are easy to treat. Others, such as inflammatory bowel disease IBD , can be ongoing and troublesome and should be discussed with a GI specialist or gastroenterologist doctors who specialize in the digestive system. Problems With the Esophagus Problems affecting the esophagus may be congenital present at birth or noncongenital developed after birth. In babies with esophageal atresia, the esophagus comes to a dead end instead of connecting to the stomach. Both conditions are usually detected soon after a baby is born â€" sometimes even before â€" and require surgery to repair. Esophagitis inflammation of the esophagus can be caused by infection, certain medications, or gastroesophageal reflux disease GERD. GERD often can be corrected through lifestyle changes, such as dietary adjustments. Sometimes, though, it requires treatment with medication. Problems With the Stomach and Intestines Almost everyone has had diarrhea or constipation. Constipation is the opposite: The contents of the large intestines do not move along fast enough and waste materials stay in the large intestine so long that too much water is removed and the feces become hard. Other common stomach and intestinal disorders include: Gastrointestinal infections can be caused by viruses, by bacteria such as Salmonella, Shigella, Campylobacter, or E. Abdominal pain or cramps, diarrhea, and sometimes vomiting are the common symptoms of gastrointestinal infections. These usually go away on their own without medicines or other treatment. Appendicitis , an inflammation of the appendix, most often affects kids and teens between 11 and 20 years old, and requires surgery to correct. The classic symptoms of appendicitis are abdominal pain, fever, loss of appetite, and vomiting. Gastritis and peptic ulcers arise when a bacterium, Helicobacter pylori , or the chronic use of drugs or certain medications weakens the protective mucous coating of the stomach and duodenum, allowing acid to get through to the sensitive lining beneath. This can irritate and inflame the lining of the stomach gastritis or cause peptic ulcers, which are sores or holes in the lining of the stomach or the duodenum that cause pain or bleeding. Medications usually successfully treat these conditions. Inflammatory bowel disease IBD is chronic inflammation of the intestines that affects older kids, teens, and adults. There are two major types: They are treated with medications and, if necessary, intravenous IV feedings to provide nutrition. In some cases, surgery may be necessary to remove inflamed or damaged areas of the intestine. Celiac disease is a disorder in which the digestive system is damaged by the response of the immune system to a protein called gluten, which is found in wheat, rye, and barley and a wide range of foods, from breakfast cereal to pizza crust. People with celiac disease have difficulty digesting the nutrients from their food and may have diarrhea, abdominal pain, bloating, exhaustion, and even depression when they eat foods with gluten. Symptoms can be managed by following a gluten-free diet. Celiac disease runs in families and can become active after some sort of stress, such as surgery or a viral infection. A doctor can diagnose celiac disease with a blood test and by taking a biopsy of the small intestine. There is no cure, but IBS symptoms may be treated by changing eating habits, reducing stress, and making lifestyle changes. A doctor may also prescribe medications to relieve diarrhea or constipation. No one test is used to diagnose IBS, but a doctor may identify it based on symptoms, medical history, and a physical exam. Problems With the Pancreas, Liver, and Gallbladder Conditions affecting the pancreas, liver, and gallbladder often affect the

ability of these organs to produce enzymes and other substances that aid in digestion. Cystic fibrosis is a chronic, inherited illness that not only affects the lungs but also causes the production of abnormally thick mucus to block the ducts or passageways in the pancreas. This mucus also prevents digestive juices from entering the intestines, making it difficult to properly digest proteins and fats. This causes important nutrients to pass out of the body unused. To help manage their digestive problems, people with cystic fibrosis can take digestive enzymes and nutritional supplements. Hepatitis , a condition with many different causes, is when the liver becomes inflamed and may lose its ability to function. Viral hepatitis, such as hepatitis A, B, or C, is highly contagious. Mild cases of hepatitis A can be treated at home; however, serious cases involving liver damage may require hospitalization. The gallbladder can develop gallstones and become inflamed â€" a condition called cholecystitis. Keeping Digestion on Track The kinds and amounts of food a person eats and how the digestive system processes that food play key roles in maintaining good health. Eating a healthy diet is the best way to prevent common digestive problems.

Chapter 3 : Digestion and the Digestive System | Colon and Rectal Disease Information, Treatments, Top I

Digestive system: The system of organs responsible for getting food into and out of the body and for making use of food to keep the body racedaydvl.com digestive system includes the salivary glands, mouth, esophagus, stomach, liver, gallbladder, pancreas, small intestine, colon, and rectum.

Fatty liver also called steatosis - buildup of fat in liver cells. Fibrosis - the growth of scar tissue due to infection, inflammation, injury, or even healing. Gallstones - solid masses or stones made of cholesterol or bilirubin that form in the gallbladder or bile ducts. Gastrectomy - operation in which part subtotal or partial or all total of the stomach is removed. Gastritis - inflammation of the stomach lining. Gastroenteritis - infection or irritation of the stomach and intestines, which may be caused by bacteria or parasites from spoiled food or unclean water, or eating food that irritates the stomach lining. Glucagon - a hormone produced by the pancreas. Glycogen - converted glucose for storage. Glycogen plays a role in controlling blood sugar levels. Hepatitis - inflammation of the liver that sometimes causes permanent damage; caused by viruses, drugs, alcohol, or parasites. Hepatitis has the following forms: Hepatitis A - a form of infectious hepatitis caused by the hepatitis A virus. The virus may be spread by fecal-oral contact, fecal-infected food or water, and may also be spread by a blood-borne infection which is rare. Hepatitis B - a form of infectious hepatitis caused by the hepatitis B virus. Transmission of the hepatitis B virus occurs through blood and body fluid exposure such as blood, semen, vaginal secretions, or saliva. Hepatitis C - a form of infectious hepatitis caused by the hepatitis C virus. Transmission of the hepatitis C virus occurs primarily from contact with infected blood, but can also occur from sexual contact or from an infected mother to her baby. Hepatitis D - a form of infectious hepatitis caused by the hepatitis D Delta virus. This form of hepatitis can only occur in the presence of hepatitis B. Transmission of hepatitis D occurs the same way as hepatitis B. Hepatitis E - a form of infectious hepatitis caused by the hepatitis E virus. This form of hepatitis is similar to hepatitis A. Transmission occurs through fecal-oral contamination. Hepatitis E is most common in poorly developed countries and is rarely seen in the U. Hepatitis G - the newest form of infectious hepatitis. Transmission is believed to occur through blood and is seen in IV drug users, individuals with clotting disorders, such as hemophilia, and individuals who require hemodialysis for renal failure. Hepatobiliary scintigraphy - an imaging technique of the liver, bile ducts, gallbladder, and upper part of the small intestine. Hepatology - field of medicine concerned with the functions and disorders of the liver. Hormones - chemical substances created by the body that control numerous body functions.

DOWNLOAD PDF DISORDERS OF THE DIGESTIVE SYSTEMS SOLID ORGANS: THE LIVER AND PANCREAS

Chapter 4 : Gastrointestinal: Disorders, Facts and General Information - Disabled World

Continued Accessory Digestive Organs. Pancreas Among other functions, the pancreas is the chief factory for digestive enzymes that are secreted into the duodenum, the first segment of the small.

Digestive System Learn about how the digestive system works and the anatomical structures involved. The digestive system is a series of hollow organs joined in a long, twisting tube from the mouth to the anus see figure. Inside this tube is a lining called the mucosa. In the mouth, stomach, and small intestine, the mucosa contains tiny glands that produce juices to help digest food. Two solid organs, the liver and the pancreas, produce digestive juices that reach the intestine through small tubes. In addition, parts of other organ systems for instance, nerves and blood play a major role in the digestive system. Top of Page Why is digestion important? When we eat, the food are not yet in a form that the body can use as nourishment. Our food and drink must be changed into smaller molecules of nutrients before they can be absorbed into the blood and carried to cells throughout the body. Digestion is the process by which food and drink are broken down into their smallest parts so that the body can use them to build and nourish cells and to provide energy. Top of Page How is food digested? Digestion involves the mixing of food, its movement through the digestive tract, and the chemical breakdown of the large molecules of food into smaller molecules. Digestion begins in the mouth, when we chew and swallow, and is completed in the small intestine. The chemical process varies somewhat for different kinds of food. Top of Page Movement of Food Through the System The large, hollow organs of the digestive system contain muscle that enables their walls to move. The movement of organ walls can propel food and liquid and also can mix the contents within each organ. Typical movement of the esophagus, stomach, and intestine is called peristalsis. The action of peristalsis looks like an ocean wave moving through the muscle. The muscle of the organ produces a narrowing and then propels the narrowed portion slowly down the length of the organ. These waves of narrowing push the food and fluid in front of them through each hollow organ. Top of Page The first major muscle movement occurs when food or liquid is swallowed. Although we are able to start swallowing by choice, once the swallow begins, it becomes involuntary and proceeds under the control of the nerves. The esophagus is the organ into which the swallowed food is pushed. It connects the throat above with the stomach below. At the junction of the esophagus and stomach, there is a ringlike valve closing the passage between the two organs. However, as the food approaches the closed ring, the surrounding muscles relax and allow the food to pass. Top of Page The food then enters the stomach, which has three mechanical tasks to do. First, the stomach must store the swallowed food and liquid. This requires the muscle of the upper part of the stomach to relax and accept large volumes of swallowed material. The second job is to mix up the food, liquid, and digestive juice produced by the stomach. The lower part of the stomach mixes these materials by its muscle action. The third task of the stomach is to empty its contents slowly into the small intestine. Top of Page Several factors affect emptying of the stomach, including the nature of the food mainly its fat and protein content and the degree of muscle action of the emptying stomach and the next organ to receive the contents the small intestine. As the food is digested in the small intestine and dissolved into the juices from the pancreas, liver, and intestine, the contents of the intestine are mixed and pushed forward to allow further digestion. Finally, all of the digested nutrients are absorbed through the intestinal walls. The waste products of this process include undigested parts of the food, known as fiber, and older cells that have been shed from the mucosa. These materials are propelled into the colon, where they remain, usually for a day or two, until the feces are expelled by a bowel movement.

Chapter 5 : Digestive System: MedlinePlus

Two solid digestive organs, the liver and the pancreas, produce digestive juices that reach the intestine through small tubes called ducts. The gallbladder stores the liver's digestive juices until they are needed in the intestine.

Inside this tube is a lining called the mucosa. In the mouth, stomach, and small intestine, the mucosa contains tiny glands that produce juices to help digest food. There are also two solid digestive organs, the liver and the pancreas, which produce juices that reach the intestine through small tubes. In addition, parts of other organ systems for instance, nerves and blood play a major role in the digestive system. Why Is Digestion Important? When we eat such things as bread, meat, and vegetables, they are not in a form that the body can use as nourishment. Our food and drink must be changed into smaller molecules of nutrients before they can be absorbed into the blood and carried to cells throughout the body. Digestion is the process by which food and drink are broken down into their smallest parts so that the body can use them to build and nourish cells and to provide energy. How Is Food Digested? Digestion involves the mixing of food, its movement through the digestive tract, and chemical breakdown of the large molecules of food into smaller molecules. Digestion begins in the mouth, when we chew and swallow, and is completed in the small intestine. The chemical process varies somewhat for different kinds of food. Movement of Food Through the System The large, hollow organs of the digestive system contain muscle that enables their walls to move. The movement of organ walls can propel food and liquid and also can mix the contents within each organ. Typical movement of the esophagus, stomach, and intestine is called peristalsis. The action of peristalsis looks like an ocean wave moving through the muscle. The muscle of the organ produces a narrowing and then propels the narrowed portion slowly down the length of the organ. These waves of narrowing push the food and fluid in front of them through each hollow organ. The first major muscle movement occurs when food or liquid is swallowed. Although we are able to start swallowing by choice, once the swallow begins, it becomes involuntary and proceeds under the control of the nerves. The esophagus is the organ into which the swallowed food is pushed. It connects the throat above with the stomach below. At the junction of the esophagus and stomach, there is a ringlike valve closing the passage between the two organs. However, as the food approaches the closed ring, the surrounding muscles relax and allow the food to pass. The food then enters the stomach, which has three mechanical tasks to do. First, the stomach must store the swallowed food and liquid. This requires the muscle of the upper part of the stomach to relax and accept large volumes of swallowed material. The second job is to mix up the food, liquid, and digestive juice produced by the stomach. The lower part of the stomach mixes these materials by its muscle action. The third task of the stomach is to empty its contents slowly into the small intestine. Several factors affect emptying of the stomach, including the nature of the food mainly its fat and protein content and the degree of muscle action of the emptying stomach and the next organ to receive the stomach contents the small intestine. As the food is digested in the small intestine and dissolved into the juices from the pancreas, liver, and intestine, the contents of the intestine are mixed and pushed forward to allow further digestion. Finally, all of the digested nutrients are absorbed through the intestinal walls. The waste products of this process include undigested parts of the food, known as fiber, and older cells that have been shed from the mucosa. These materials are propelled into the colon, where they remain, usually for a day or two, until the feces are expelled by a bowel movement. Production of Digestive Juices The glands that act first are in the mouthâ€”the salivary glands. Saliva produced by these glands contains an enzyme that begins to digest the starch from food into smaller molecules. The next set of digestive glands is in the stomach lining. They produce stomach acid and an enzyme that digests protein. One of the unsolved puzzles of the digestive system is why the acid juice of the stomach does not dissolve the tissue of the stomach itself. In most people, the stomach mucosa is able to resist the juice, although food and other tissues of the body cannot. After the stomach empties the food and its juice into the small intestine, the juices of two other digestive organs mix with the food to continue the process of digestion. One of these organs is the pancreas. It produces a juice that

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The bile acids combine with the fatty acids and cholesterol and help these molecules to move into the cells of the mucosa. In these cells the small molecules are formed back into large molecules, most of which pass into vessels called lymphatics near the intestine. These small vessels carry the reformed fat to the veins of the chest, and the blood carries the fat to storage depots in different parts of the body. Another vital part of our food that is absorbed from the small intestine is the class of chemicals we call vitamins. There are two different types of vitamins, classified by the fluid in which they can be dissolved: Most of the material absorbed from the cavity of the small intestine is water in which salt is dissolved. The salt and water come from the food and liquid we swallow and the juices secreted by the many digestive glands. In a healthy adult, more than a gallon of water containing over an ounce of salt is absorbed from the intestine every 24 hours. How Is the Digestive Process Controlled? Hormone Regulators A fascinating feature of the digestive system is that it contains its own regulators. The major hormones that control the functions of the digestive system are produced and released by cells in the mucosa of the stomach and small intestine. These hormones are released into the blood of the digestive tract, travel back to the heart and through the arteries, and return to the digestive system, where they stimulate digestive juices and cause organ movement. The hormones that control digestion are gastrin, secretin, and cholecystokinin CCK: Gastrin causes the stomach to produce an acid for dissolving and digesting some foods. It is also necessary for the

normal growth of the lining of the stomach, small intestine, and colon. Secretin causes the pancreas to send out a digestive juice that is rich in bicarbonate. It stimulates the stomach to produce pepsin, an enzyme that digests protein, and it also stimulates the liver to produce bile. CCK causes the pancreas to grow and to produce the enzymes of pancreatic juice, and it causes the gallbladder to empty. Nerve Regulators Two types of nerves help to control the action of the digestive system. Extrinsic outside nerves come to the digestive organs from the unconscious part of the brain or from the spinal cord. They release a chemical called acetylcholine and another called adrenaline. Acetylcholine also causes the stomach and pancreas to produce more digestive juice. Adrenaline relaxes the muscle of the stomach and intestine and decreases the flow of blood to these organs. Even more important, though, are the intrinsic inside nerves, which make up a very dense network embedded in the walls of the esophagus, stomach, small intestine, and colon. The intrinsic nerves are triggered to act when the walls of the hollow organs are stretched by food. They release many different substances that speed up or delay the movement of food and the production of juices by the digestive organs. Established in , the clearinghouse provides information about digestive diseases to people with digestive disorders and to their families, health care professionals, and the public.

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Chapter 6 : Glossary - Liver, Biliary, and Pancreatic Disorders | Johns Hopkins Medicine Health Library

The human digestive system consists of esophagus, stomach, liver, pancreas, large intestine, small intestine, bowel, and colon. Disorders or malfunctioning in any of these organs can lead to diseases and disorders.

Latest Publications Main Document Digestion is the breaking down of food in the body, into a form that can be absorbed and used or excreted. It is also the process by which the body breaks down food into smaller components that can be absorbed by the blood stream. Gastrointestinal diseases refer to diseases involving the gastrointestinal tract, namely the esophagus, stomach, small intestine, large intestine and rectum, and the accessory organs of digestions, the liver, gallbladder, and pancreas. Symptoms may include bloating, diarrhea, gas, stomach pain, and stomach cramps. In order to use the food we eat, our body has to break the food down into smaller molecules that it can process; it also has to excrete waste. The digestive process begins in the mouth. Food is partly broken down by the process of chewing and by the chemical action of salivary enzymes these enzymes are produced by the salivary glands and break down starches into smaller molecules. The digestive system is made up of the digestive tract, a series of hollow organs joined in a long, twisting tube from the mouth to the anus, and other organs that help the body break down and absorb food. Organs that make up the digestive tract are the mouth, esophagus, stomach, small intestine, large intestine, also called the colon, rectum, and anus. Inside these hollow organs is a lining called the mucosa. In the mouth, stomach, and small intestine, the mucosa contains tiny glands that produce juices to help digest food. The digestive tract also contains a layer of smooth muscle that helps break down food and move it along the tract. Two solid digestive organs, the liver and the pancreas, produce digestive juices that reach the intestine through small tubes called ducts. Parts of the nervous and circulatory systems also play major roles in the digestive system. Mechanical and chemical digestion begin in the mouth where food is chewed, and mixed with saliva to break down starches. The stomach continues to break food down mechanically and chemically through the churning of the stomach and mixing with enzymes. Absorption occurs in the stomach and gastrointestinal tract, and the process finishes with excretion. Food enters the stomach through the cardiac orifice where it is further broken apart and thoroughly mixed with gastric acid, pepsin and other digestive enzymes to break down proteins. The enzymes in the stomach also have an optimum, meaning that they work at a specific pH and temperature better than any others. The acid itself does not break down food molecules, rather it provides an optimum pH for the reaction of the enzyme pepsin and kills many microorganisms that are ingested with the food. It can also denature proteins. This is the process of reducing polypeptide bonds and disrupting salt bridges which in turn causes a loss of secondary, tertiary or quaternary protein structure. The parietal cells of the stomach also secrete a glycoprotein called intrinsic factor which enables the absorption of vitamin B Other small molecules such as alcohol are absorbed in the stomach, passing through the membrane of the stomach and entering the circulatory system directly. Food in the stomach is in semi-liquid form, which upon completion is known as chyme. Gastrointestinal Functional Disorders Functional disorders are the most common problems affecting the colon and rectum, and include constipation and irritable bowel syndrome IBS. The primary causes for functional disorders include: Being stressed Eating a diet low in fiber Not getting enough exercise Traveling or other changes in routine Eating large amounts of dairy products Resisting the urge to have a bowel movement Taking antacid medicines containing calcium or aluminum Resisting the urge to have bowel movements due to pain from hemorrhoids Overusing laxatives stool softeners that, over time, weaken the bowel muscles Taking certain medicines especially antidepressants, iron pills, and strong pain medicines such as narcotics Statistics:

Chapter 7 : Digestive System | Cleveland Clinic

The liver, pancreas, and gallbladder are the solid organs of the digestive system. Every organ has a role in breaking down food and managing the waste material. Parts of the nervous and circulatory systems also play roles in the digestive process.

Structure of the Digestive System What organs make up the digestive system? Your digestive system is uniquely constructed to perform its specialized function of turning food into the energy you need to survive and packaging the residue for waste disposal. To help you understand how the many parts of the digestive system work together, here is an overview of the structure and function of this complex system. Mouth The mouth is the beginning of the digestive tract; and, in fact, digestion starts here when taking the first bite of food. Chewing breaks the food into pieces that are more easily digested, while saliva mixes with food to begin the process of breaking it down into a form your body can absorb and use. Esophagus Located in your throat near your trachea windpipe , the esophagus receives food from your mouth when you swallow. By means of a series of muscular contractions called peristalsis, the esophagus delivers food to your stomach. Stomach The stomach is a hollow organ, or "container," that holds food while it is being mixed with enzymes that continue the process of breaking down food into a usable form. Cells in the lining of the stomach secrete a strong acid and powerful enzymes that are responsible for the breakdown process. When the contents of the stomach are sufficiently processed, they are released into the small intestine. Small intestine Made up of three segments - the duodenum, jejunum, and ileum - the small intestine is a foot long muscular tube that breaks down food using enzymes released by the pancreas and bile from the liver. Peristalsis also is at work in this organ, moving food through and mixing it with digestive secretions from the pancreas and liver. The duodenum is largely responsible for the continuous breaking-down process, with the jejunum and ileum mainly responsible for absorption of nutrients into the bloodstream. Contents of the small intestine start out semi-solid, and end in a liquid form after passing through the organ. Water, bile, enzymes, and mucous contribute to the change in consistency. Once the nutrients have been absorbed and the leftover-food residue liquid has passed through the small intestine, it then moves on to the large intestine, or colon. Pancreas The pancreas secretes digestive enzymes into the duodenum, the first segment of the small intestine. These enzymes break down protein, fats, and carbohydrates. The pancreas also makes insulin, secreting it directly into the bloodstream. Insulin is the chief hormone for metabolizing sugar. Liver The liver has multiple functions, but its main function within the digestive system is to process the nutrients absorbed from the small intestine. Bile from the liver secreted into the small intestine also plays an important role in digesting fat. The liver also detoxifies potentially harmful chemicals. It breaks down and secretes many drugs. Gallbladder The gallbladder stores and concentrates bile, and then releases it into the duodenum to help absorb and digest fats. Colon large intestine The colon is a 6-foot long muscular tube that connects the small intestine to the rectum. The large intestine is made up of the cecum, the ascending right colon, the transverse across colon, the descending left colon, and the sigmoid colon, which connects to the rectum. The appendix is a small tube attached to the cecum. The large intestine is a highly specialized organ that is responsible for processing waste so that emptying the bowels is easy and convenient. Stool, or waste left over from the digestive process, is passed through the colon by means of peristalsis, first in a liquid state and ultimately in a solid form. As stool passes through the colon, water is removed. Stool is stored in the sigmoid S-shaped colon until a "mass movement" empties it into the rectum once or twice a day. It normally takes about 36 hours for stool to get through the colon. The stool itself is mostly food debris and bacteria. These bacteria perform several useful functions, such as synthesizing various vitamins, processing waste products and food particles, and protecting against harmful bacteria. When the descending colon becomes full of stool, or feces, it empties its contents into the rectum to begin the process of elimination. Rectum The rectum Latin for "straight" is an 8-inch chamber that connects the colon to the anus. When anything gas or stool comes into the rectum, sensors send a message to the brain. The brain then decides

if the rectal contents can be released or not. If they can, the sphincters relax and the rectum contracts, disposing its contents. If the contents cannot be disposed, the sphincter contracts and the rectum accommodates so that the sensation temporarily goes away. Anus The anus is the last part of the digestive tract. It is a 2-inch long canal consisting of the pelvic floor muscles and the two anal sphincters internal and external. The lining of the upper anus is specialized to detect rectal contents. It lets you know whether the contents are liquid, gas, or solid. The anus is surrounded by sphincter muscles that are important in allowing control of stool. The pelvic floor muscle creates an angle between the rectum and the anus that stops stool from coming out when it is not supposed to. The internal sphincter is always tight, except when stool enters the rectum. It keeps us continent when we are asleep or otherwise unaware of the presence of stool. When we get an urge to go to the bathroom, we rely on our external sphincter to hold the stool until reaching a toilet, where it then relaxes to release the contents. Cleveland Clinic is a non-profit academic medical center. Advertising on our site helps support our mission. We do not endorse non-Cleveland Clinic products or services. Merck Manual Home Health Handbook. Overview of the Digestive System. This information is provided by the Cleveland Clinic and is not intended to replace the medical advice of your doctor or healthcare provider. Please consult your healthcare provider for advice about a specific medical condition. This document was last reviewed on:

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Chapter 8 : Digestive System Disorder & Symptoms

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The nutrients in food are used by the body for energy, growth, and cell repair. Food and drink must be changed into smaller molecules of nutrients before the blood absorbs them and carries them to cells throughout the body. There are several organs that are part of the digestive system. The gastrointestinal GI tractâ€”also called the digestive tract, is made up of the hollow organs mouth, esophagus, stomach, instantizes, rectum and anus. The liver, pancreas, and gallbladder are the solid organs of the digestive system. Every organ has a role in breaking down food and managing the waste material. Parts of the nervous and circulatory systems also play roles in the digestive process. Together, a combination of nerves, hormones, bacteria, blood, and the organs of the digestive system completes the complex task of digesting the foods and liquids a person consumes each day. Digestive System Disorders Symptoms Abdominal pain: Organs of the abdomen include the stomach, small intestine, colon, liver, gallbladder, spleen, and pancreas. Abdominal pain can range in intensity from a mild stomach ache, maybe caused by excessive food intake, to severe acute pain. The pain is often nonspecific and can be caused by a variety of conditions, like a failure during the digestive process. Acid reflux and heartburn: Acid reflux occurs when stomach acid can leak back up into the esophagus, due to excessive food intake or laying down immediately after eating. When not treated or managed appropriately, this condition can develop into one of the more serious, life threatening digestive diseases, including GI bleeding, esophageal cancer or hernia. Renal colic is caused by the transit of stones from the kidneys to the bladder, which is very painful. And biliary colic occurs when kidney stones move from the gallbladder to the bile duct. It is usually caused by the slow movement of material through the colon bowel , due to different factors, such as medication, poor bowel habits, low fiber diets, possibly abuse of laxatives, hormonal disorders, diseases primarily of other parts of the body that also affect the colon, and high levels of estrogen and progesterone during pregnancy. Much of the gas generated is due to microbial breakdown of foods so that gases, for example, hydrogen, carbon dioxide, and methane are generated; the odor is from other trace waste gases or compounds such as skatole and sulfur-containing substances. It may be acute short duration , which is related to bacterial infections or viruses, or chronical long duration , which is usually caused by digestive disorders.

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Chapter 9 : Your Digestive System and How it works

In addition to the hollow organs are two solid digestive organs, the liver and the pancreas, which produce juices that reach the intestine through small tubes. Nerves and blood also play a major role in the digestive system.

Bacteria in the large intestine can also break down food. How does food move through my GI tract? Food moves through your GI tract by a process called peristalsis. The large, hollow organs of your GI tract contain a layer of muscle that enables their walls to move. The movement pushes food and liquid through your GI tract and mixes the contents within each organ. The muscle behind the food contracts and squeezes the food forward, while the muscle in front of the food relaxes to allow the food to move. The digestive process starts when you put food in your mouth. Food starts to move through your GI tract when you eat. When you swallow, your tongue pushes the food into your throat. A small flap of tissue, called the epiglottis, folds over your windpipe to prevent choking and the food passes into your esophagus. Once you begin swallowing, the process becomes automatic. Your brain signals the muscles of the esophagus and peristalsis begins. When food reaches the end of your esophagus, a ringlike muscleâ€"called the lower esophageal sphincter â€"relaxes and lets food pass into your stomach. After food enters your stomach, the stomach muscles mix the food and liquid with digestive juices. The stomach slowly empties its contents, called chyme , into your small intestine. The muscles of the small intestine mix food with digestive juices from the pancreas, liver, and intestine, and push the mixture forward for further digestion. The walls of the small intestine absorb water and the digested nutrients into your bloodstream. As peristalsis continues, the waste products of the digestive process move into the large intestine. Waste products from the digestive process include undigested parts of food, fluid, and older cells from the lining of your GI tract. The large intestine absorbs water and changes the waste from liquid into stool. Peristalsis helps move the stool into your rectum. The lower end of your large intestine, the rectum, stores stool until it pushes stool out of your anus during a bowel movement. How does my digestive system break food into small parts my body can use? As food moves through your GI tract, your digestive organs break the food into smaller parts using: The digestive process starts in your mouth when you chew. Your salivary glands make saliva , a digestive juice, which moistens food so it moves more easily through your esophagus into your stomach. Saliva also has an enzyme that begins to break down starches in your food. After you swallow, peristalsis pushes the food down your esophagus into your stomach. Glands in your stomach lining make stomach acid and enzymes that break down food. Muscles of your stomach mix the food with these digestive juices. Your pancreas makes a digestive juice that has enzymes that break down carbohydrates, fats, and proteins. The pancreas delivers the digestive juice to the small intestine through small tubes called ducts. Your liver makes a digestive juice called bile that helps digest fats and some vitamins. Bile ducts carry bile from your liver to your gallbladder for storage, or to the small intestine for use. Your gallbladder stores bile between meals. When you eat, your gallbladder squeezes bile through the bile ducts into your small intestine. Your small intestine makes digestive juice, which mixes with bile and pancreatic juice to complete the breakdown of proteins, carbohydrates, and fats. Bacteria in your small intestine make some of the enzymes you need to digest carbohydrates. Your small intestine moves water from your bloodstream into your GI tract to help break down food. Your small intestine also absorbs water with other nutrients. In your large intestine, more water moves from your GI tract into your bloodstream. Bacteria in your large intestine help break down remaining nutrients and make vitamin K. Waste products of digestion, including parts of food that are still too large, become stool. What happens to the digested food? The small intestine absorbs most of the nutrients in your food, and your circulatory system passes them on to other parts of your body to store or use. Special cells help absorbed nutrients cross the intestinal lining into your bloodstream. Your blood carries simple sugars, amino acids, glycerol, and some vitamins and salts to the liver. Your liver stores, processes, and delivers nutrients to the rest of your body when needed. The lymph system , a network of vessels that carry white blood cells and a fluid called lymph throughout your body to fight

infection, absorbs fatty acids and vitamins. Your body uses sugars, amino acids, fatty acids, and glycerol to build substances you need for energy, growth, and cell repair. How does my body control the digestive process? Your hormones and nerves work together to help control the digestive process. Signals flow within your GI tract and back and forth from your GI tract to your brain. Hormones Cells lining your stomach and small intestine make and release hormones that control how your digestive system works. These hormones tell your body when to make digestive juices and send signals to your brain that you are hungry or full. Your pancreas also makes hormones that are important to digestion. Nerves You have nerves that connect your central nervous systemâ€”your brain and spinal cordâ€”to your digestive system and control some digestive functions. For example, when you see or smell food, your brain sends a signal that causes your salivary glands to "make your mouth water" to prepare you to eat. When food stretches the walls of your GI tract, the nerves of your ENS release many different substances that speed up or delay the movement of food and the production of digestive juices. The nerves send signals to control the actions of your gut muscles to contract and relax to push food through your intestines. What are clinical trials, and are they right for you? Clinical trials are part of clinical research and at the heart of all medical advances. Clinical trials look at new ways to prevent, detect, or treat disease. Researchers also use clinical trials to look at other aspects of care, such as improving the quality of life for people with chronic illnesses. Find out if clinical trials are right for you. What clinical trials are open? Clinical trials that are currently open and are recruiting can be viewed at www. The NIDDK translates and disseminates research findings through its clearinghouses and education programs to increase knowledge and understanding about health and disease among patients, health professionals, and the public.