

# Digestive system



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Digestion is a process of breaking down food into small particles to allow for the absorption and use by the body for energy and for other important bodily functions. This process is done through a series of complex organs and glands that form the digestive system. The digestive system is made up of the digestive tract which is a series of hollow organs joined in a long, twisting tube from the mouth to the anus and includes other organs that aid the body in breaking down and absorbing food (Smith and Morton, 2001).

The mouth, esophagus, stomach, small intestine, large intestine, rectum, and anus form the digestion organs. The micoasa is a lining found in the mouth, stomach, and small intestine, which contains tiny glands that produce juices to help digest food. The digestive tract also has a smooth layer of muscles that helps break down food and also move it along the digestive tract.

Digestion involves many different stages starting with the cephalic phase, long before the food even enters the mouth. He sight, smell and even the thought of food activates saliva in the mouth and the digestive juices which contain enzymes that break down food.

Once the food enters the mouth digestion begins. The taste buds begin by determining the chemicals in the food through the taste buds thus also giving the sensations of sweet, sour or bitter. The teeth then chew and grind the food while mixing

it with saliva. Enzymes like the salivary amylase begin to break down the long starch food chains found in bread, pasta and potatoes. Moistening of the

food is done by mucin, to aid in the easy passing of the food through the gastrointestinal tract (Walker 2002).

After the food is swallowed it travels down the esophagus, which is a long muscular tube that runs from the mouth to the stomach. The esophagus uses rhythmic, wave like muscle movements called peristalsis to propel food from the throat into the stomach. Each mouthful takes approximately six seconds to reach the stomach once swallowed. The muscle movement enables us to eat and drink even when we are in the upside down position.

The stomach is a large sac like organ made up of muscle that churns the food and mixes it with very strong gastric acid which enables for further digestion. The stomach walls are made of three layers of muscle. The presence of hydrochloric acid in the stomach stops the action of salivary amylase and helps kill any bacteria present. The stomach produces pepsin, an enzyme which breaks down proteins mostly found in meat, fish eggs and dairy products (Morrison, 2001). Food can stay in the stomach for a few minutes or hours while the numerous acids and enzymes are working on it. When the food is finally churned into a creamy mixture called chyme, the pyloric sphincter which is an opening controlled by a muscle opens and allows the chyme to pass slowly into the small intestine.

The stomach has a volume of only 50ml when empty but can expand to hold food of up to 1.5 liters. The hormone ghrelin is produced by cells in the stomach lining which acts as a communication system to the brain that controls hunger and satiety (Johnson, 2005).

Small quantities of chyme are allowed into the small intestine at short intervals as the pyloric sphincter opens. Food first enters in the duodenum, the first section of the small intestine.

It then moves to the jejunum and the ileum, which is the final part of the small intestine. It allows for the secretion of many hormones which help in the digestive process. Digestion and absorption of fats, carbohydrates and proteins takes place in the small intestines. Bile is produced in the liver and stored in the gall bladder, pancreatic enzymes and other digestive enzymes aid in the breakdown of food. The gall bladder produces bile salts that help to make fat absorption easier. Fat digestion and absorption takes longer than other food to be completed, from three to five hours. The intestine wall contains cells which help neutralize the acid in the chyme whilst producing enzymes to digest food. The unabsorbed residue from the small intestine then enters the large intestine.

The large intestine is about 1.5 metres long and contains numerous bacteria that break down and use the undigested residues of food called fibres. Some of the water and electrolytes like sodium are absorbed as the watery contents move along the large intestine. The first part of the large intestine is called the cecum and the appendix is attached to it (Hoffman, 2008). Food then travels up the ascending colon and across the abdomen in the transverse colon then goes back down the other side of the body in the descending colon and finally through the sigmoid colon. From the large intestine the solid waste is stored in the rectum awaiting excretion through the anus. Control of digestion also involves different hormones. These include; Gastrin which stimulates the production of acids in the stomach

which is used in digesting some foods. It is also necessary for normal growth of cells in the stomach lining, the small intestines and the colon.

Secretin stimulates the pancreas to produce digestive juices rich in bicarbonate which helps in neutralizing the stomach contents as they enter the small intestine. Peptin production is also stimulated by secretin, and the peptin is an enzyme that digests proteins and stimulates the liver to produce bile (Jakab, 2007). CCK stimulates the pancreas to produce the enzyme in pancreatic juice and promotes the emptying of the gallbladder. It also sees to the normal cell growth of the pancreas. Appetite regulation is done by two hormones. Ghrelin is produced in the stomach and the intestines and is stimulated by the absence of food in the digestive system thus stimulates the feeling of emptiness or hunger. Peptide YY is produced in the digestive tract as a response to eating and thus inhibits appetite.

The digestive system is a complex system, together, nerves, hormones, blood, and other organs of the digestive system to conduct the complex tasks of digesting and absorbing nutrients from the foods and liquids you consume each day (Frost, 2000).