

Body processes of the digestive system



**ASSIGN
BUSTER**

- Magdalena Mustafa

Digestive System

Digestive system is made up of the digestive tract and other accessory organs. The purpose of digestive system is to convert food into small molecules that can be later on absorbed and utilized by the cells in the body. Food is broken down, until the molecules are minor enough to be absorbed and the waste products disposed. Alimentary canal or gastrointestinal (GI) tract are the different names for digestive tract, they consists of a long regular tube that start in the mouth, and goes down to the anus. The system includes the mouth, pharynx, esophagus, stomach, small intestine, and large intestine. The accessory structures that are present in the mouth are tongue and teeth. Salivary glands, liver, gallbladder, and pancreas are major accessory organ that play and important part in the process of digestion. These organs secrete fluids to the digestive tract. There are three types of processes that take place in the digestion system:

1. Digestion
2. Absorption
3. Elimination

The two processes - digestion and absorption - take place in the digestive tract. After the process of absorption of the nutrients, they are ready for all cells in the body and then are utilized in metabolism. When the food that cannot be digested or absorbed by the body, it is eliminated. The unwanted waste products are in form of feces, which are called defecation or elimination.

Mouth - The digestive tract starts with mouth. When food enters mouth the chewing process breaks down food into smaller molecules for easier digestion, when saliva mixes with food the process of breaking down begins in the body, where everything starts to be absorbed and used in the body.

Esophagus- Esophagus is located in the throat near trachea, the esophagus is receiving food from the mouth when it's swallowed.

Stomach - The food enters the stomach through the passage of the cardiac sphincter. Food is further broken in the stomach, through a process of heuristic churning and is completely blended with digestive fluids, which is hydrochloric acid, and other digestive enzymes. The role of parietal cells of the stomach is to secrete a compound, which is an elemental factor in the vitamin B-12 absorption. When the level of acidity changes in the small intestines, more of the enzymes are being activated to break apart the structure of the specific nutrients so they can be absorbed into the circulatory or lymphatic systems. Small intestine - The role of small intestine is to absorb most of the nutrients found within digested food. By the time ingested food reaches the small intestine, it went through a process of mechanically broking down molecules into a liquid. As the liquid moves across the inner surface of the small intestine, nutrients from the food come into contact with the many small blood vessels which surround the small intestine. The inner surface of the small intestine has got a lot of small folds to increase the surface area. The blood exits the small intestine, carrying away all the necessary proteins and nutrients, water electrolytes, vitamins, minerals, fats and medications to the entire body.

- Pancreas - The pancreas produce enzyme called insulin and pancreatic juice. Insulin is very important in human body as it controls sugar levels and also pancreatic juices contain enzymes that break up fats, proteins, and starch.
- Liver - Liver produces bile, which is stored in the gallbladder until the small intestine needs it to break up large fat particles.
- Gallbladder - The gallbladder stores the bile until it's needed for digestion in the small intestines.
- Colon (large intestine) - The function of large intestine is to absorb water from the remaining indigestible food, and then to pass useless and undigested waste material from the body.
- Rectum & Anus - The waste material left over when food is digested by other organs in the digestive pathway still has some water, and also bacteria and fibre. The Anus removes all the waste and unwanted substances from the body.

The bolus passes into the stomach through the cardiac sphincter found at the bottom of the oesophagus. The stomach is a very flexible sac that is the site of mechanical and chemical digestion, especially of proteins. It also absorbs certain molecules and is capable of storing food for an extended period of time. The wall of the stomach is lined with many exocrine glands for example the gastric glands that secrete gastric juice into stomach lumen. There are four types of cells found in these glands. Mucous cells, as the name implies, these cells secrete a sticky mucus substance, composed of glycoprotein, water, ions and other things. The mucus lubricates the lining of the stomach and also protects the lining of the stomach from degradation

due to the highly acidic environment. The second type is called chief cells. These cells release the zymogen of the stomach called pepsinogen. Pepsinogen is transformed into an active enzyme called pepsin by a low pH. Pepsin change proteins into smaller polypeptides. Chief cells are found deeper within the exocrine gland of the stomach. The next type is called parietal cells. These cells produce and secrete hydrophilic acid (HCl), which serves several important functions. It raises the acidity of the stomach and stimulates the chief cells to release pepsinogen, then convert pepsinogen into its active form called pepsin, it also denatures proteins, which allow pepsin to cleave bond and kill bacterial cells.

Parietal cells also produce and secrete a glycoprotein called gastric intrinsic factor, which helps the small intestine absorb vitamin B12. The next type of cells found in stomach is G cells. These types of cells are found deep in the exocrine glands and release a hormone called gastrin. This peptide hormone stimulates parietal cells to release hydrochloric acid. G cells are stimulated by acetylcholine. Other important cell in the stomach is the enterochromaffin-like cell. These cells release a molecule called histamine, which stimulates parietal cells.

Conclusion

The stomach does absorb some substances, such as alcohol, aspirin and caffeine, it acts mostly in mechanical and chemical digestion. The cells work together to produce gastric juice, which breaks down proteins into smaller polypeptides. The mixing of gastric juice and food produces a fluid-like substance which is called chyme.

In the digestive system there are two types of nerves, their role is to help with control of all actions in the system. The first one is extrinsic nerve, which is not controlled by the brain or spinal cord. This type of nerve is responsible for release a chemical substance called acetylcholine and the other one adrenaline. The acetylcholine in the digestion tract makes the muscle of the digestive organs to squeeze with increased force to push food and fluids through the digestive tract, it also causes pancreas and stomach to make more digestive juices. The other nerve adrenaline also plays an important role in digestion. It makes the muscles of the intestines and stomach to relax, and lower the blood flow to these organs.

The nerves that are present inside, are called intrinsic. They are a dense network that lay in the walls of the stomach, oesophagus, small intestine and colon. Intrinsic nerves are caused to work when the walls of the hollow organs are stretched by passing food. Also many different substances are released that can delay or speed up the process and movement of food particles and the production of juices by the specialized digestive organs.