

The Structure and Function of 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 22-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

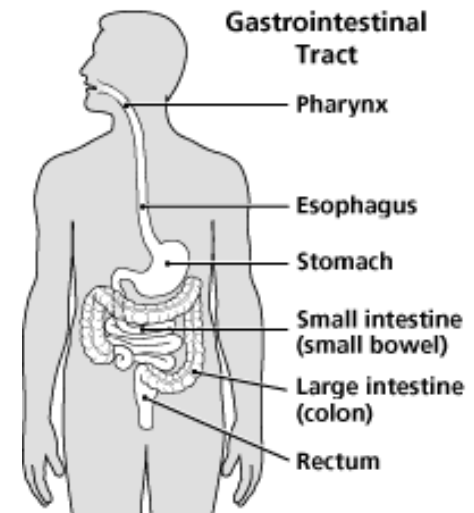
The pancreas secretes digestive enzymes into the duodenum, the first segment of the small intestine. These enzymes break down protein, fats and carbohydrates. The pancreas also makes insulin, secreting it directly into the bloodstream. Insulin is the chief hormone for metabolizing sugar.

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. In addition, the liver is the body's chemical "factory." It takes the raw materials absorbed by the intestine and makes all the various chemicals the body needs to function. The liver also de-toxifies 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. It is the rectum's job to receive stool from the colon, to let the person know that there is stool to be evacuated and to hold the stool until evacuation happens. 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.

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