Department of Medical Laboratory Techniques

Physiology / Theoretical

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Human digestive system

The digestive system is one of the most clearly defined in the body. It consists of a long passageway, the digestive tract, and associated glands. These include the liver and pancreas, which are connected to the main tract by ducts, or tubes, and empty their products, such as enzymes, into the tract.

Six Functions of the Digestive System

1. Ingestion
2. Mechanical processing
3. Digestion
4. Secretion :
5. Absorption
6. Excretion

Ingestion –

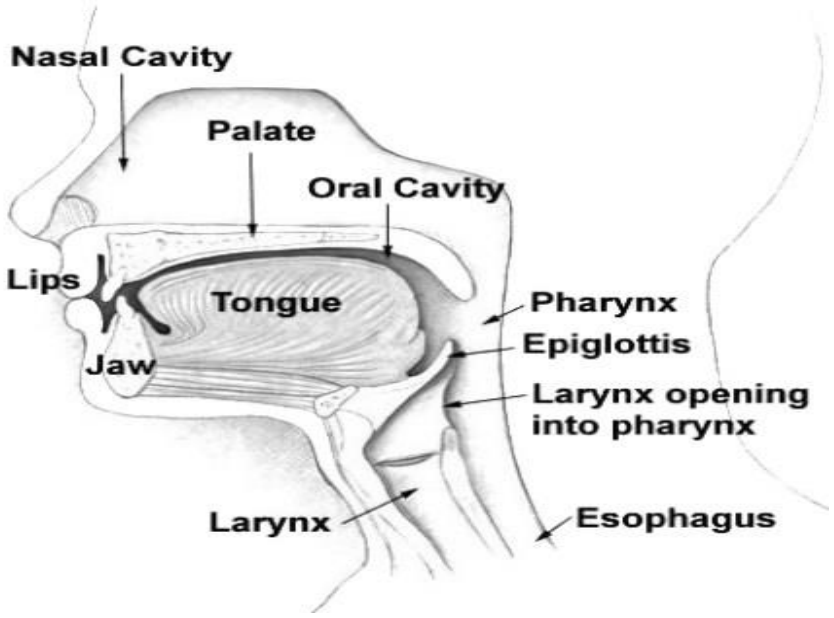
Gastrointestinal Tract

The digestive canal is a muscular tube lined with a layer of gastrointestinal a special cell called the epithelium, which is approximately 9 meters long. The digestive canal consists of a group of Starting from Hollow organs coiled along the length of the mouth, then the esophagus, stomach, small intestine, and intestine the anus, and the following is an explanation of these organs in some detail the thick one, and it's over. That is its primary purpose , It is the breakdown of food into nutrients that can be absorbed into the body to provide it with energy ,The mouth is to be processed and

moistened mechanically, followed by digestion of food mainly in the stomach and small intestines.

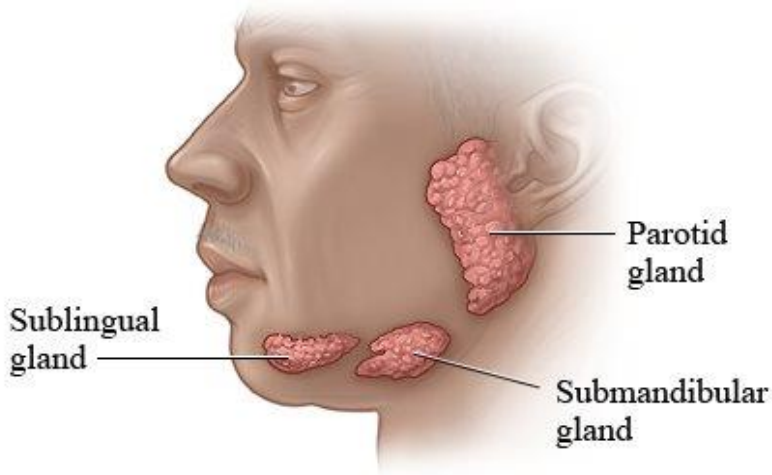
Oral Cavity :-

Cavity: The mouth or oral cavity represents the first part of the digestive system and is responsible for starting the digestive process , In addition the composition of the mouth plays a role in the air that may reach the body digesting food, as it is an input in the process of speaking, the mouth consists of two main parts: The first part represents the vestibule of the mouth essential and important ,the Vestibule is the area between the teeth and cheeks, and the second part is the cavity of the propis oral. It is filled with muscle (palates Soft,: Proper Cavity).



Salivary glands:

Parotid glands: located at the top of the glands, which are the parotid glands the mouth contains three pairs submandibular glands: the cheek near the ear, and the submandibular glands the small sublingual gland that is widespread in it, and in fact it exists in addition to many glands.

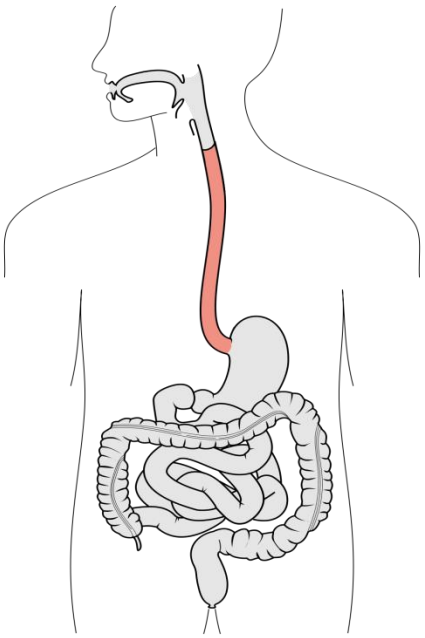


Esophagus

A muscular tube that transports food and liquids from the mouth to the stomach ,It is about 25 cm and 2 cm in diameter, as it extends from the pharynx to the stomach after passing through an opening in the diaphragm.

Functions include:

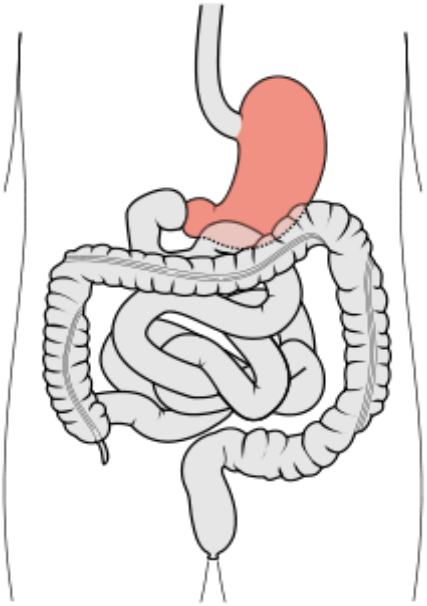
1. Secrete mucus
2. Moves food from the throat to the stomach using muscle movement called peristalsis
3- If acid from the stomach gets in here that's heartburn.



Stomach

can be defined as a muscular organ located in the upper part of the abdomen, taking the shape of the letter "J", and in fact the size of the stomach varies from one person to another, and from one meal to another, The stomach related to the esophagus and small intestine, and is surrounded by a large number of lymph nodes.

The stomach performs three tasks main :
- digestion of food, where enzymes are secreted to digest protein,
-and also secreted Hydrochloric acid, which kills most microorganisms ingested with food,
-and the stomach also serves to store the food.
Temporarily for a period of about two hours or more in preparation for transferring it to the small intestine, in addition ,It should be noted that the volume of the stomach when empty is 50 ml.



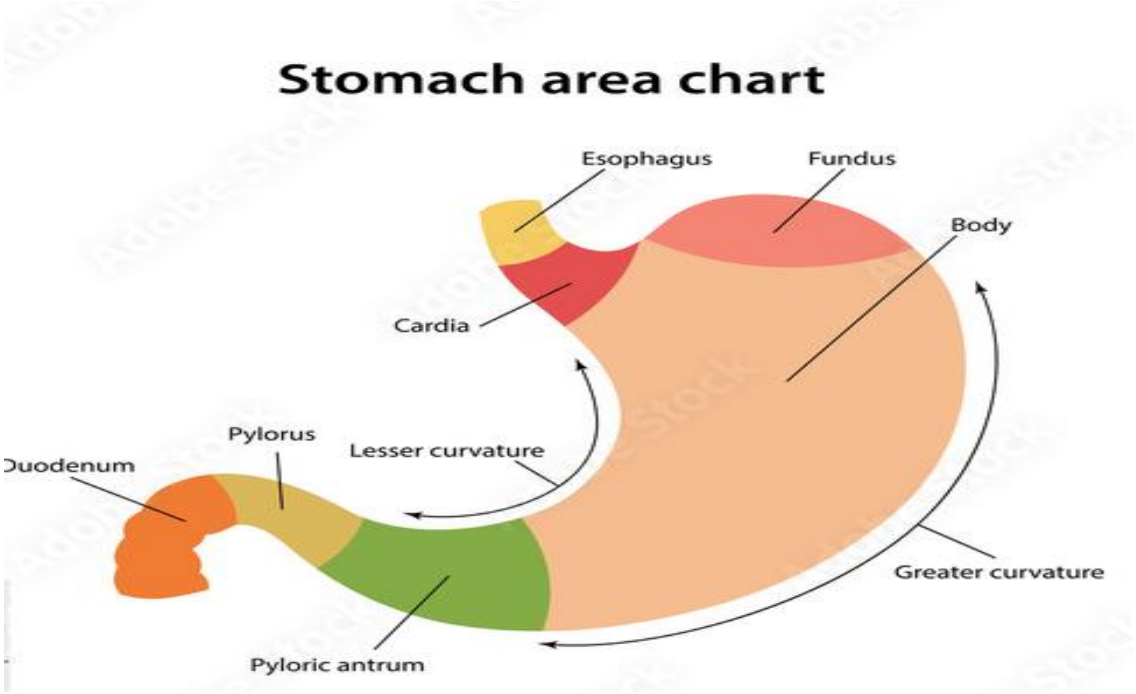
Parts of Stomach

1- Cardia :- It represents the part that connects the esophagus to the stomach and through which food passes into the stomach.

2- Fundus:- It takes the shape of a dome and is located below the diaphragm

Specifically, at the top left of the heart
3- Body :- It represents the main body of the stomach

4- Pylorus :- It connects the stomach to the duodenum, and it is noteworthy that the pylorus takes the shape of a funnel, the main part of the stomach Its end is called the pyloric antrum (antrum pyloric).

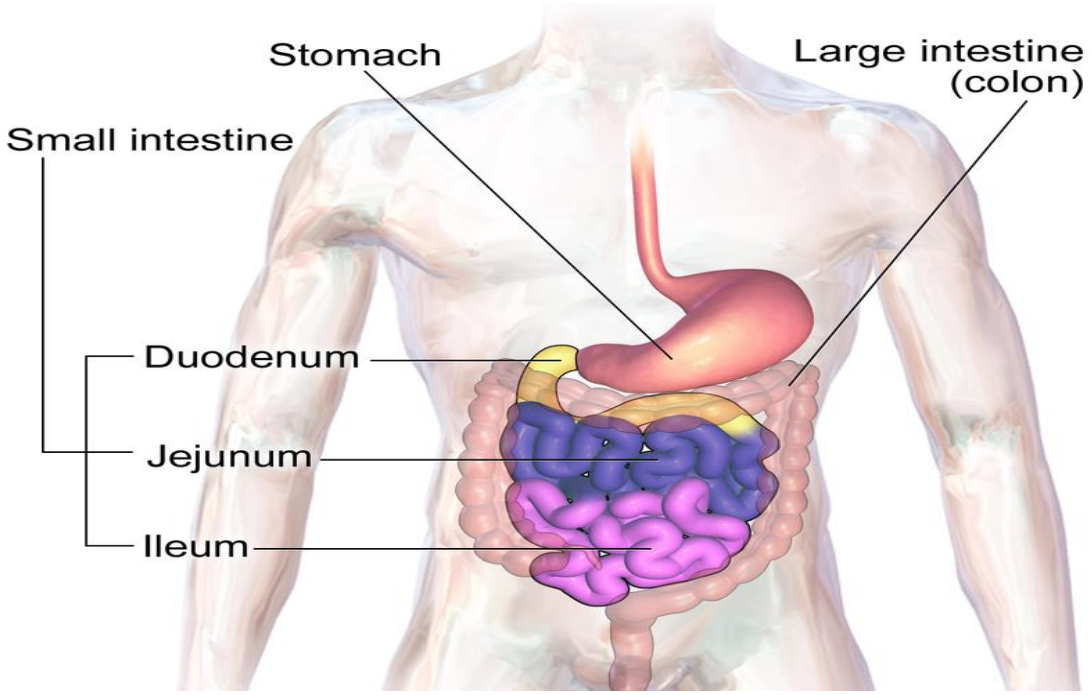


Small Intestine

Is the longest part of the digestive system. It extends from the stomach (pylorus) to the large intestine (cecum) and consists of three parts: duodenum, jejunum and ileum. The main functions of the small intestine are to complete digestion of food and to absorb nutrients.

The small intestine is coiled inside the lower abdominal cavity beneath the stomach. The large intestine surrounds it, framing the edges of the abdominal cavity.

The small intestine is divided into the **duodenum**, **jejunum**, and **ileum**. Together these can extend up to **six** meters in length.



Duodenum

The duodenum by definition is the first part of the small intestine. It extends from the pyloric sphincter of the stomach, into. It's a short, descending chute (about 10 inches long) that curves around the pancreas in a "C" shape before connecting to the rest of the coiled intestines.

Jejunum

The remaining small intestine lays in many coils inside the lower abdominal cavity. Its middle section, called the jejunum, makes up a little less than half of this remaining length. The jejunum is characterized by many blood vessels, which give it a deep red color.

Ileum

The ileum is the last and longest section of the small intestine. Here the walls of the small intestine begin to thin and narrow, and blood supply is reduced. Food spends the most time in the ileum, where the most water and nutrients are absorbed.

Function

What does the small intestine do?
The small intestine is where most of the long process of digestion takes place. It:

- Systematically breaks food down.
- Absorbs nutrients.
- Extracts water.
- Moves food along the gastrointestinal tract.

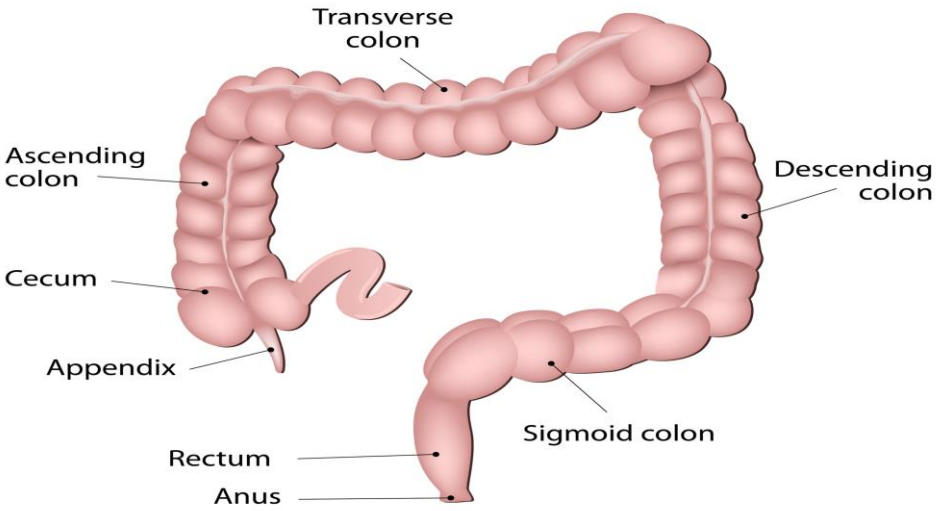
There's a lot involved in all this. The process can take up to five hours.

What is the small intestine made of?
The tube is lined with many layers of tissues and muscles. The tissues contain nerves, blood vessels, immune cells and lymphatic glands.

Large Intestine

The large intestine includes the colon, rectum and anus. It's all one, long tube that continues from the small intestine as food nears the end of its journey through your digestive system. The large intestine turns food waste into stool and passes it from the body when you poop.

The large intestine is about six feet long much shorter than the small intestine, which is 22 feet. It's called the large intestine because it's wider about three inches, while the small intestine is only one inch in diameter.



Where is the large intestine located?

The large intestine is in your lower abdominal cavity from your waist down. It surrounds the small intestine in a sort of a square question mark shape, with the tail of the question mark ending at the anal canal.

Function
What does the large intestine do?

When the large intestine receives food from the small intestine, the food has been liquefied by the digestive process and most of the nutrients have been absorbed. The colon's job is to dehydrate what's left of the food and form it into stool. It does this by slowly absorbing water and electrolytes as its muscle system moves the waste along. Meanwhile, bacteria living in your colon feed on the waste and break it down further, completing the chemical part of the digestive process.

Parts of the large intestine

- **Ascending colon:** The ascending colon is the first part of the large intestine. It begins just beyond the cecum (a pouch-like structure at the end the ileum – the part of the small intestine furthest from the stomach) on the bottom right side of the abdomen and ascends (goes upwards) to the area of the abdomen just below the diaphragm.
- **Transverse colon:** The transverse colon runs horizontally across the abdomen from the right to the left. The splenic flexure connects it to the descending colon.
- **Descending colon:** The descending colon descends (goes downward) along the left side of the abdomen from just beneath the diaphragm at the top of the abdomen to the left pelvic region.
- **Sigmoid colon:** The S-shaped connection between the last part of the colon and the rectum, located on the bottom left side of the abdomen is called the sigmoid colon.

Rectum

By the time the sigmoid colon delivers the food waste to the rectum, it resembles the poop you know. The poop now consists of indigestible matter and dead cells shed from your intestinal mucosa, along with small

amounts of mucus and water. If about 16 ounces of liquid food entered the large intestine, about 5 ounces of it remain as poop. When poop enters the rectum, it triggers the urge to defecate. This is the natural continuation of the mass muscle movements of the colon.

Anus

The anus is the canal your poop will travel through to leave your body. It's closed on each side by a muscle sphincter. On the inside, the internal sphincter opens automatically to let poop through. The outer sphincter is the one you control to let poop out when you're ready. When poop in the rectum triggers the urge to defecate, nerve signals cause the internal sphincter to relax. This is your cue to find a toilet where you can let the poop out through your external sphincter.

Hormonal control of digestion

Digestion is a complex process that requires different organs to make moves at the right time. For instance, the right enzymes need to be squirted into the right place at the right time and in the right amounts. To help organize this system, a range of hormones are involved, these include:

1-Gastrin :- released in the stomach, this hormone stimulates the production of hydrochloric acid and pepsinogen (an inactive form of pepsin). Gastrin is produced in response to the arrival of food in the stomach. Acidic pH levels reduce the levels of gastrin.

2-Secretin :- stimulates bicarbonate secretion to neutralize acid in the duodenum.

3-Cholecystokinin (CCK) :- also found in the duodenum, this hormone stimulates the pancreas to release enzymes and the gallbladder to release bile.

4-Gastric inhibitory peptide :- decreases the churning of the stomach and reduces the speed that food empties from the stomach. It also triggers the secretion of insulin.

5- Motilin :- stimulates the production of pepsin and speeds up peristalsis.