

Tikrit University

College of Nursing

Basic Nursing Sciences



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Physiology

Digestive system

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Digestive System

The human digestive system (gastrointestinal tract) , also called the alimentary canal, is around 30 feet (9 meters) long in adults.

It consists Trusted Source of the following:

- the mouth, or oral cavity
- the esophagus
- the stomach
- the small intestine
- the large intestine, or colon
- the rectum

In addition, the following organs support digestion, for example, by chewing or adding enzymes and other secretions that enable the body to absorb nutrients:

- the teeth
- the tongue
- the salivary glands
- the liver
- the pancreas
- the gallbladder

Together, these organs provide mechanical processing, the secretion of enzymes and bile to help break down compounds, and the excretion of waste.

Some terms to describe these functions include:

- ingestion, which includes chewing and swallowing

- the secretion of substances that enable food and nutrients to move through the body effectively
- propulsion, where muscles move the contents of the canal forward
- digestion, the breakdown of food, for example, through chewing and secretions
- the absorption of nutrients, which mainly occurs in the small intestine
- defecation and urination, the removal of waste products through the rectum and the bladder, respectively

The mouth

Digestion begins even before the food enters the mouth.

When a person smells or thinks of food or eating, the salivary glands begin producing saliva.

Once the food is inside of the mouth:

- saliva moistens it.
- the teeth and tongue break it down mechanically.
- an enzyme in the saliva, salivary amylase, breaks it down into starch.

Chewing and amylase digestion will convert the food into a small, round blob, or bolus. This enables a person to swallow it easily.

The esophagus

After swallowing, the bolus enters the esophagus, where gravity and muscle contractions help move it down to the stomach through a process called peristalsis.

Peristalsis is the slow contraction of smooth muscles along and around the digestive system.

As the bolus moves through the esophagus, these contractions push it toward the stomach.

What is esophageal achalasia, and how does it affect digestion?

The stomach

The bolus enters the stomach through a ring-like muscle Trusted Source called the lower esophageal sphincter. This sphincter relaxes, allowing the bolus to enter the stomach.

In the stomach, the following processes occur:

- The stomach stores the food temporarily.
- Cells in the stomach secrete gastric juices. These include hydrochloric acid, which maintains the pH of the stomach between 1.5–2.0 Trusted Source.
- The stomach has three muscular layers that churn and mix its contents.

These processes turn the food into a thick paste, known as chyme.

Hydrochloric acid is essential for:

- destroying microorganisms, such as bacteria
- breaking down proteins and plant fibers
- activating pepsin, an enzyme that helps digest proteins

The acid, however, can harm the stomach lining, so some cells produce mucus to protect the lining from damage.

The stomach does not absorb many nutrients from the chyme into the bloodstream, so the chyme enters the small intestine through the pyloric sphincter.

How can you increase stomach acid naturally?

The small intestine

The small intestine is around 20 ft (6 m) long and absorbs around 90% Trusted Source of the nutrients from food into the bloodstream.

There are three sections:

- The duodenum: This receives chyme from the stomach and digestive enzymes from the liver and pancreas.
- The jejunum: Most of the chemical digestion and absorption occur here.
- The ileum: This contains the ileocecal valve, a sphincter through which food passes to the large intestine.

Once the food is fully broken down, the villi absorb the nutrients, which enter the bloodstream.

Villi are tiny, finger-like projections that line the walls of the small intestine. Within the villi are tiny capillaries called lacteals. By increasing their surface area, the villi maximize their absorption of nutrients.

How do the intestines work?

The large intestine

Any unabsorbed food and nutrients now pass to the large intestine, or colon. The material is now feces.

The large intestine is around 6 ft (2 m) long and consists of the:

- cecum, a pouch through which food enters from the small intestine
- ascending colon
- transverse colon
- descending colon
- sigmoid colon

From the large intestine, the body absorbs water and electrolytes.

Food travels slowly through the colon to allow the body to absorb water, and trillions of gut bacteria break down any undigested food.

Next, peristalsis moves the feces toward the rectum.

The rectum

As the digested food moves into the rectum, nerves in the wall of the rectum known as stretch receptors detect when the chamber is full and stimulate the desire to defecate.

Defecation involves two types of muscle movement.

The first happens automatically, and a person cannot control it. This is a relaxation of the smooth muscles in the internal anal sphincter.

The second, a person can control and is a conscious relaxation of the skeletal muscles in the external anal sphincter. If a person wishes to delay defecation, they can avoid relaxing their muscles to move the feces back into the colon.

The longer feces stay in the colon, the more water the body will absorb. This can lead to dry, hard feces, constipation, and possibly impaction. For this reason, a person should defecate as soon as is convenient.

A person should seek medical advice if they are unable to defecate for about 3 days or if they have abdominal or rectal pain or bleeding.