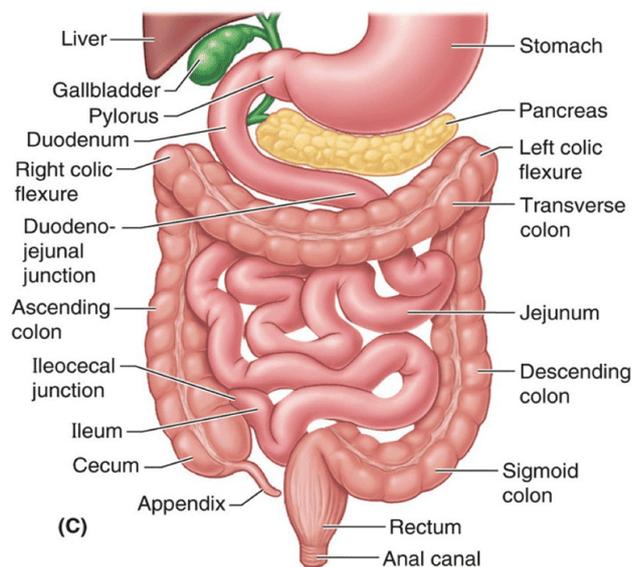


UNIT -3 LOWER GASTRO INTESTINAL ORGANS- ANATOMY

SMALL INTESTINE

The small intestine is the body's **major** digestive organ.

Small and Large Intestine



- **Location.** The small intestine is a muscular tube extending from the pyloric sphincter to the large intestine.
- **Size.** It is the longest section of the alimentary tube, with an average length of **2.5 to 7 m** (8 to 20 feet) in a living person.



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- **Subdivisions.** The small intestine has three subdivisions: the **duodenum**, the **jejunum**, and the **ileum**, which contribute 5 percent, nearly 40 percent, and almost 60 percent of the small intestine, respectively.
- **Ileocecal valve.** The ileum meets the large intestine at the ileocecal valve, which joins the large and small intestine.
- **Hepatopancreatic ampulla.** The main pancreatic and bile ducts join at the duodenum to form the flasklikehepatopancreatic ampulla, literally, the ” **liver-pancreatic-enlargement**”.
- **Duodenal papilla.** From there, the bile and pancreatic juice travel through the duodenal papilla and enter the duodenum together.
- **Microvilli.** Microvilli are tiny projections of the plasma membrane of the mucosa cells that give the cell surface a fuzzy appearance, sometimes referred to as the **brush border**; the plasma membranes bear enzymes (brush border enzymes) that complete the digestion of proteins and carbohydrates in the small intestine.
- **Villi.** Villi are fingerlike projections of the mucosa that give it a velvety appearance and feel, much like the soft nap of a towel.
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- **Lacteal.** Within each villus is a rich capillary bed and a modified lymphatic capillary called a lacteal.
- **Circular folds.** Circular folds, also called **plicae circulares**, are deep folds of both mucosa and submucosa layers, and they do not disappear when food fills the small intestine.
- **Peyer's patches.** In contrast, local collections of lymphatic tissue found in the submucosa increase in number toward the end of the small intestine

LARGE INTESTINE

The large intestine is much larger in diameter than the small intestine but shorter in length.

- **Size.** About **1.5 m** (5 feet) long, it extends from the ileocecal valve to the anus.
- **Functions.** Its major functions are to dry out indigestible food residue by absorbing water and to eliminate these residues from the body as feces.
- **Subdivisions.** It frames the small intestines on three sides and has the following subdivisions: **cecum, appendix, colon, rectum, and anal canal.**



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- **Cecum.** The saclike cecum is the first part of the large intestine.
- **Appendix.** Hanging from the cecum is the wormlike appendix, a potential trouble spot because it is an ideal location for bacteria to accumulate and multiply.
- **Ascending colon.** The ascending colon travels up the right side of the abdominal cavity and makes a turn, the **right colic (or hepatic) flexure**, to travel across the abdominal cavity.
- **Transverse colon.** The ascending colon makes a turn and continuous to be the transverse colon as it travels across the abdominal cavity.
- **Descending colon.** It then turns again at the **left colic (or splenic) flexure**, and continues down the left side as the descending colon.
- **Sigmoid colon.** The intestine then enters the pelvis, where it becomes the S-shaped sigmoid colon.
- **Anal canal.** The anal canal ends at the anus which opens to the exterior.
- **External anal sphincter.** The anal canal has an external voluntary sphincter, the external anal sphincter, composed of skeletal muscle.
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- **Internal involuntary sphincter.** The internal involuntary sphincter is formed by smooth muscles.

ACCESSORY DIGESTIVE ORGANS

Other than the intestines and the stomach, the following are also part of the digestive system:

TEETH

The role the teeth play in food processing needs little introduction; we masticate, or chew, by opening and closing our jaws and moving them from side to side while continuously using our tongue to move the food between our teeth.

- **Function.** The teeth tear and grind the food, breaking it down into smaller fragments.
- **Deciduous teeth.** The first set of teeth is the deciduous teeth, also called **baby teeth** or **milk teeth**, and they begin to erupt around 6 months, and a baby has a full set (20 teeth) by the age of 2 years.
- **Permanent teeth.** As the second set of teeth, the deeper permanent teeth, enlarge and develop, the roots of the
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milk teeth are reabsorbed, and between the ages of 6 to 12 years they loosen and fall out.

- **Incisors.** The chisel-shaped incisors are adapted for cutting.
- **Canines.** The fanglike canines are for tearing and piercing.
- **Premolars and molars.** Premolars (bicuspid) and molars have broad crowns with round cusps (tips) and are best suited for grinding.
- **Crown.** The enamel-covered crown is the exposed part of the tooth above the **gingiva** or gum.
- **Enamel.** Enamel is the hardest substance in the body and is fairly brittle because it is heavily mineralized with calcium salts.
- **Root.** The outer surface of the root is covered by a substance called cementum, which attaches the tooth to the **periodontal membrane (ligament)**.
- **Dentin.** Dentin, a bonelike material, underlies the enamel and forms the bulk of the tooth.
- **Pulp cavity.** It surrounds a central pulp cavity, which contains a number of structures (connective tissue, blood vessels, and nerve fibers) collectively called the **pulp**.
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- **Root canal.** Where the pulp cavity extends into the root, it becomes the root canal, which provides a route for blood vessels, nerves, and other pulp structures to enter the pulp cavity of the tooth.

SALIVARY GLANDS

Three pairs of salivary glands empty their secretions into the mouth.

- **Parotid glands.** The large parotid glands lie anterior to the ears and empty their secretions into the mouth.
- **Submandibular and sublingual glands.** The submandibular and sublingual glands empty their secretions into the floor of the mouth through tiny ducts.
- **Saliva.** The product of the salivary glands, saliva, is a mixture of mucus and serous fluids.
- **Salivary amylase.** The clear serous portion contains an enzyme, salivary amylase, in a bicarbonate-rich juice that begins the process of starch digestion in the mouth.

Pancreas



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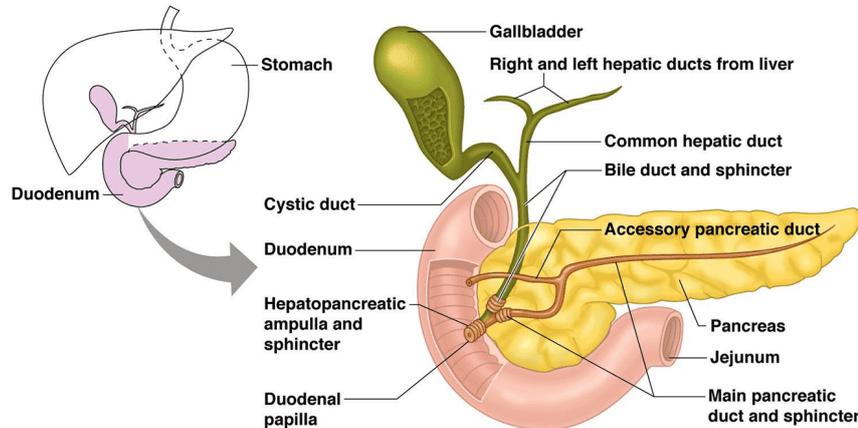
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Only the pancreas produces enzymes that break down all categories of digestible foods

- **Location.** The pancreas is a soft, pink triangular gland that extends across the abdomen from the spleen to the duodenum; but most of the pancreas lies posterior to the parietal peritoneum, hence its location is referred to as **retroperitoneal**.
- **Pancreatic enzymes.** The pancreatic enzymes are secreted into the duodenum in an alkaline fluid that neutralizes the acidic chyme coming in from the stomach.
- **Endocrine function.** The pancreas also has an endocrine function; it produces hormones **insulin and glucagon**

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Pancreas, Gallbladder, and Liver



Liver

The liver is the largest gland in the body.

- **Location.** Located under the diaphragm, more to the right side of the body, it overlies and almost completely covers the stomach.
- **Falciform ligament.** The liver has four lobes and is suspended from the diaphragm and abdominal wall by a delicate mesentery cord, the falciform ligament.



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- **Function.** The liver's digestive function is to produce bile.
- **Bile.** Bile is a yellow-to-green, watery solution containing bile salts, bile pigments, cholesterol, phospholipids, and a variety of electrolytes.
- **Bile salts.** Bile does not contain enzymes but its bile salts emulsify fats by physically breaking large fat globules into smaller ones, thus providing more surface area for the fat-digesting enzymes to work on.

Gallbladder

While in the [gallbladder](#), bile is concentrated by the removal of water.

- **Location.** The gallbladder is a small, thin-walled green sac that snuggles in a shallow fossa in the inferior surface of the liver.



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- **Cystic duct.** When food digestion is not occurring, bile backs up the cystic duct and enters the gallbladder to be stored.
