Function of the Digestive System

The function of the digestive system is digestion and absorption. Digestion is the breakdown of food into small molecules, which are then absorbed into the body. The digestive system is divided into two major parts:

- The digestive tract (alimentary canal) is a continuous tube with two openings: the mouth and the anus. It includes the mouth, pharynx, esophagus, stomach, small intestine, and large intestine. Food passing through the internal cavity, or lumen, of the digestive tract does not technically enter the body until it is absorbed through the walls of the digestive tract and passes into blood or lymphatic vessels.

- Accessory organs include the teeth and tongue, salivary glands, liver, gallbladder, and pancreas.

The treatment of food in the digestive system involves the following seven processes:

1. **Ingestion** is the process of eating.

2. **Propulsion** is the movement of food along the digestive tract. The major means of propulsion is peristalsis, a series of alternating contractions and relaxations of smooth muscle that lines the walls of the digestive organs and that forces food to move forward.

3. **Secretion** of digestive enzymes and other substances liquefies, adjusts the pH of, and chemically breaks down the food.

4. **Mechanical digestion** is the process of physically breaking down food into smaller pieces. This process begins with the chewing of food and continues with the muscular churning of the stomach. Additional churning occurs in the small intestine through muscular constriction of the intestinal wall. This process, called segmentation, is similar to peristalsis, except that the rhythmic timing of the muscle constrictions forces the food backward and forward rather than forward only.

5. **Chemical digestion** is the process of chemically breaking down food into simpler molecules. The process is carried out by enzymes in the stomach and small intestines.

6. **Absorption** is the movement of molecules (by passive diffusion or active transport) from the digestive tract to adjacent blood and lymphatic vessels. Absorption is the entrance of the digested food (now called nutrients) into the body.

7. **Defecation** is the process of eliminating undigested material through the anus.
Structure of the Digestive Tract Wall

The digestive tract, from the esophagus to the anus, is characterized by a wall with four layers, or tunics. The layers are discussed below, from the inside lining of the tract to the outside lining:

- The **mucosa** is a mucous membrane that lines the inside of the digestive tract from mouth to anus. Depending on the section of the digestive tract, it protects the digestive tract wall, secretes substances, and absorbs the end products of digestion. It is composed of three layers:
  - The **submucosa** lies outside the mucosa. It consists of areolar connective tissue containing blood vessels, lymphatic vessels, and nerve fibers.
  - The **muscularis (outer layer)** is a layer of muscle. In the mouth and pharynx, it consists of skeletal muscle that aids in swallowing. In the rest of the digestive tract, it consists of smooth muscle (three layers in the stomach, two layers in the small and large intestines) and associated nerve fibers. The smooth muscle is responsible for movement of food by peristalsis and mechanical digestion by segmentation. In some regions, the circular layer of smooth muscle enlarges to form sphincters, circular muscles that control the opening and closing of the lumen (such as between the stomach and small intestine).
  - The **serosa** is a serous membrane that covers the muscularis externa of the digestive tract in the peritoneal cavity. The following is a description of the various types of serosae associated with the digestive system:

The Functions of the Urinary System

**There are several functions of the Urinary System:**

- Removal of waste product from the body (mainly urea and uric acid)
- Regulation of electrolyte balance (e.g. sodium, potassium and calcium)
- Regulation of acid-base homeostasis.
- Controlling blood volume and maintaining blood pressure.
Anatomy of the Urinary System

How do the kidneys and urinary system work?

The body takes nutrients from food and converts them to energy. After the body has taken the food components that it needs, waste products are left behind in the bowel and in the blood.

The kidney and urinary systems help the body to eliminate liquid waste called urea, and to keep chemicals, such as potassium and sodium, and water in balance. Urea is produced when foods containing protein, such as meat, poultry, and certain vegetables, are broken down in the body. Urea is carried in the bloodstream to the kidneys, where it is removed along with water and other wastes in the form of urine.

Other important functions of the kidneys include blood pressure regulation and the production of erythropoietin, which controls red blood cell production in the bone marrow. Kidneys also regulate the acid-base balance and conserve fluids.

Kidney and urinary system parts and their functions:

- **Two kidneys.** This pair of purplish-brown organs is located below the ribs toward the middle of the back. Their function is to remove liquid waste from the blood in the form of urine; keep a stable balance of salts and other substances in the blood; and produce erythropoietin, a hormone that aids the formation of red blood cells. The kidneys remove urea from the blood through tiny filtering units called nephrons. Each nephron consists of a ball formed of small blood capillaries, called a glomerulus, and a small tube called a renal tubule. Urea, together with water and other waste substances, forms the urine as it passes through the nephrons and down the renal tubules of the kidney.

- **Two ureters.** These narrow tubes carry urine from the kidneys to the bladder. Muscles in the ureter walls continually tighten and relax forcing urine downward, away from the kidneys. If urine backs up, or is allowed to stand still, a kidney infection can develop. About every 10 to 15 seconds, small amounts of urine are emptied into the bladder from the ureters.

- **Bladder.** This triangle-shaped, hollow organ is located in the lower abdomen. It is held in place by ligaments that are attached to other organs and the pelvic bones. The bladder’s walls relax and expand to
store urine, and contract and flatten to empty urine through the urethra. The typical healthy adult bladder can store up to two cups of urine for two to five hours.

- **Two sphincter muscles.** These circular muscles help keep urine from leaking by closing tightly like a rubber band around the opening of the bladder.

- **Nerves in the bladder.** The nerves alert a person when it is time to urinate, or empty the bladder.

- **Urethra.** This tube allows urine to pass outside the body. The brain signals the bladder muscles to tighten, which squeezes urine out of the bladder. At the same time, the brain signals the sphincter muscles to relax to let urine exit the bladder through the urethra. When all the signals occur in the correct order, normal urination occurs.

**Facts about urine:**

- Adults pass about a quart and a half of urine each day, depending on the fluids and foods consumed.

- The volume of urine formed at night is about half that formed in the daytime.

- Normal urine is sterile. It contains fluids, salts and waste products, but it is free of bacteria, viruses and fungi.

- The tissues of the bladder are isolated from urine and toxic substances by a coating that discourages bacteria from attaching and growing on the bladder wall.