

length of an animal's alimentary canal is often correlated with diet. A longer alimentary canal provides more time for digestion and more surface area for absorption of nutrients. In humans, the alimentary canal is much longer than the distance between the mouth and anus. A person 1.8m tall can have a 9-m alimentary canal.

Specialized Organs

Mouth

- functions both in ingestion and in the beginning of digestion. your teeth and tongue work together to accomplish mechanical digestion
- **Saliva** - a watery liquid that contains digestive enzymes, mucus, and other chemicals to help chemically digest your food. Enzymes in saliva include **amylase**, which breaks the chemical bonds in starches to form sugars. Another enzyme, **lysozyme**, helps fight infection by digesting the cell walls of bacteria that may enter the mouth along with the food.
- **Mucus** - a sticky substance that coats and lubricates the food so that it can slide down the tube without harming the tissues that line the tube.

Pharynx

- the upper portion of the throat; is a short tube that is shared by the digestive system and respiratory system
- the tongue pushes each chewed clump of food, called a **bolus**, down the throat
- **Epiglottis** - a cartilage flap that temporarily seals off the airway and prevents food from moving into the air passageway as it passes through the pharynx and into the esophagus.

Esophagus

- muscle-encased tube, which connects the pharynx to the stomach
- **Peristalsis** - a series of muscle contractions; during peristalsis, the muscles contract in a wave-like motion that forces the bolus of food toward the stomach
- **Sphincter** - a muscular valve, that closes the esophagus and prevents the contents of the stomach from flowing back into the esophagus

Stomach

- an elastic, muscular sac that continues the chemical and mechanical digestion of food. With its accordion-like folds and highly elastic wall, the stomach can stretch to hold up to 2L of food and drink enough to satisfy the body's needs for many hours
- **Chemical Digestion in the Stomach**
 - after the bolus enters the stomach, it is bathed in a liquid called **gastric juice**, which is a mixture of hydrochloric acid, enzymes, and mucus secreted by glands in the stomach lining.
- **Mechanical Digestion in the Stomach**
 - the stomach contents are mixed by the churning action of muscles in the stomach wall. this form of mechanical digestion turns the bolus into an acidic, nutrient-rich liquid called **chyme**.

- three types: arteries, capillaries and veins
- a blood vessel's wall consists of smooth muscle tissue that regulates the diameter of the blood vessel, and connective tissue that enables the blood vessel to expand and contract as blood flows through it.

Arteries

- large blood vessels that carry blood from the heart to the tissues
- the walls of arteries are made of epithelial tissue wrapped in layers of smooth muscle and connective tissue
- the blood in the arteries is under pressure due to the heart's pumping action; this pressure helps to ensure that blood flows only in one direction - toward the tissues
- the narrowest arteries: arterioles, flow into capillaries

Capillaries

- microscopic blood vessels with a high surface area resembling a network of tiny tubes
- the walls of capillaries consist of a very thin layer of epithelial tissue encased in a moist membrane. this structure enables the nutrients and oxygen to pass out and in
- blood returns from the capillaries to the heart through blood vessels called veins
- the walls of veins also consist of epithelial tissue surrounded by smooth muscle and connective tissue
- the blood in veins is under very little pressure
- most veins contain flaps of tissue called valves that allow blood to flow only toward the heart

Nutrient Exchange Between Blood and Cells

Diffusion

- molecules move across a membrane from an area of higher concentration to an area of lower concentration

Diffusion Gradient

- the gradual change in the concentration of solutes in a solution as a function of the distance through a solution

Blood Pressure

- the force that blood exerts against the artery walls
- this force drives blood through the arteries, into the capillaries and through the capillary walls

The Lymphatic System

- a network of vessels, nodes, and organs that collects the fluid that leaves capillaries, "screens" it for microorganisms, and returns it to the circulatory system
- **Lymph** - a clear watery fluid made up of protein molecules, salt, glucose, and other substances.
- if the lymphatic system did not drain lymph from the tissues, the lymph would accumulate, causing swelling called **edema**
- **Spleen** - an organ that helps remove old or damaged blood cells, stores platelets, and helps control the amount of blood and blood cells that circulate through the body