15.15A: Anatomy of the Digestive System

The human gastrointestinal tract refers to the stomach and intestine, and sometimes to all the structures from the mouth to the anus.

Learning Objectives

- Outline the anatomical organization of the digestive system

Key Points

- The major organs of the digestive system are the stomach and intestine.
- The upper gastrointestinal tract consists of the esophagus, stomach, and duodenum.
- The lower gastrointestinal tract includes the small intestine and the large intestine.
- Digestive juices are produced by the pancreas and the gallbladder.
- The small intestine includes the duodenum, jejunum, and ileum.
- The large intestine includes the cecum, colon, rectum, and anus.

Key Terms

- **upper gastrointestinal tract**: This tract consists of the esophagus, stomach, and duodenum.
- **lower gastrointestinal tract**: This tract includes most of the small intestine and all of the large intestine.

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to the anus.

Figure: **Upper and lower gastrointestinal tract**: The major organs of the human gastrointestinal system.

### Upper Gastrointestinal Tract

The upper gastrointestinal tract consists of the esophagus, stomach, and duodenum. The exact demarcation between upper and lower can vary. Upon gross dissection, the duodenum may appear to be a unified organ, but it is often divided into two parts based upon function, arterial supply, or embryology.

The upper gastrointestinal tract includes the:

- **Esophagus**, the fibromuscular tube that food passes through—aided by peristaltic contractions—the pharynx to the stomach.
- **Stomach**, which secretes protein-digesting enzymes called proteases and strong acids to aid in food digestion, before sending the partially digested food to the small intestines.
- **Duodenum**, the first section of the small intestine that may be the principal site for iron absorption.
Lower Gastrointestinal Tract

The lower gastrointestinal tract includes most of the small intestine and all of the large intestine. According to some sources, it also includes the anus.

![Diagram of the gastrointestinal tract]

Figure: **Small intestine**: This image shows the position of the small intestine in the gastrointestinal tract.

The small intestine has three parts:

- **Duodenum**: Here the digestive juices from the pancreas (digestive enzymes) and the gallbladder (bile) mix together. The digestive enzymes break down proteins and bile and emulsify fats into micelles. The duodenum contains Brunner's glands that produce bicarbonate, and pancreatic juice that contains bicarbonate to neutralize hydrochloric acid in the stomach.

- **Jejunum**: This is the midsection of the intestine, connecting the duodenum to the ileum. It contains the plicae circulares and villi to increase the surface area of that part of the GI tract.

- **Ileum**: This has villi, where all soluble molecules are absorbed into the blood (through the capillaries and lacteals).

The large intestine has four parts:

1. **Cecum**, the vermiform appendix that is attached to the cecum.
2. **Colon**, which includes the ascending colon, transverse colon, descending colon, and sigmoid flexure. The main function of the colon is to absorb water, but it also contains bacteria that produce beneficial vitamins like vitamin K.
3. **Rectum**.
4. **Anus**.

The ligament of Treitz is sometimes used to divide the upper and lower GI tracts.