

**The cow's digestive tract consists of the following—**

Mouth

Esophagus

A four-compartment stomach, which includes

Rumen (paunch)

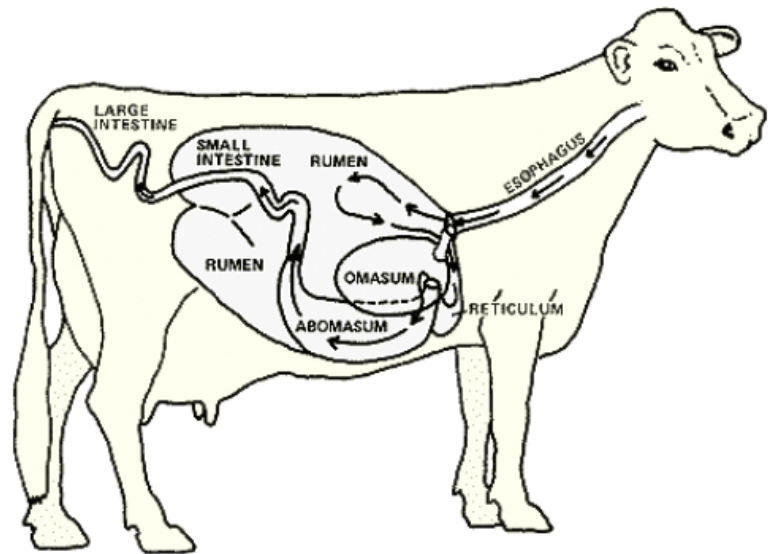
Reticulum (“honeycomb”)

Omasum (“manyplies”)

Abomasum (“true stomach”)

Small intestine

Large intestine



**Rumen**

- The rumen (on the left side of the animal) is the largest stomach compartment and consists of several sacs. It can hold 25 gallons or more of material depending on the size of the cow. Because of its size, the rumen acts as a storage or holding vat for feed.
- Aside from storage, the rumen is also a fermentation vat. The rumen’s environment favors the growth of microbes. These microbes digest or ferment feed within the rumen and make volatile fatty acids (VFAs). The rumen absorbs most of the VFAs from fermentation.
- A good blood supply to the rumen walls improves absorption of VFAs and other digestion products. Tiny projections (papillae) line the rumen, which increases the rumen’s surface area and the amount it can absorb.

**Reticulum**

- The reticulum is a pouch-like structure in the forward area of the body, close to the heart. The tissues in the reticulum form a network similar to a honeycomb. A small tissue fold lies between the reticulum and rumen, but the two aren’t separate compartments. Together they’re called the rumino-reticulum.
- Heavy or dense feed and metal objects eaten by the cow drop into this compartment. Nails and other sharp objects may work into the tissue and cause “hardware disease.” You can use magnets to prevent disease or correct the problem through surgery. Leaving it untreated may lead to infection and possibly death.

**Omasum**

- The omasum is a globe-shaped structure containing leaves of tissue (like pages in a book). It absorbs water and other substances from digestive contents. Feed material (ingesta) between the leaves will be drier than ingesta found in the other compartments.

**Abomasum**

- The abomasum is the only compartment lined with glands. These glands release hydrochloric acid and digestive enzymes, needed to breakdown feeds. The abomasum is similar to a nonruminant stomach.

**Rumination**

Cows may spend 35 to 40 percent of each day ruminating (cud chewing). The amount of time spent ruminating depends on the diet. Little ruminating occurs when cows eat grain or finely ground rations. But when eating long hay, cows may ruminate for several hours. Mature cattle spend little time chewing while eating feed. Thus, during rest periods, cows regurgitate (bring up) soft feed wads (cud) to re-chew and break into smaller pieces. They also re-salivate the feed and re-swallow it. This process makes the feed easier for the microbes to digest.

**Small Intestine**— consists of three sections: the duodenum, jejunum and ileum. It measures about 20 times the length of the animal. Secretions from the pancreas and gallbladder aid in digestion within the small intestine. The small intestine completes most of the digestive process and absorbs many nutrients through villi (small finger-like projections). From the villi the nutrients enter into the blood and lymphatic systems.

**Cecum**—the large area where the small and large intestine meet. The cecum breaks down some previously undigested fiber, but the exact importance of the cecum remains unknown.

**Large Intestine**—the last section of the tract that undigested feedstuffs pass through. Microbes digest some undigested feed here, but the main digestive function of the large intestine is to absorb water.

**Quick facts—**

- Ruminant stomachs have four compartments: the rumen, the reticulum, the omasum and the abomasum.
- Rumen microbes ferment feed and produce volatile fatty acids, which is the cow's main energy source. Rumen microbes also produce B vitamins, vitamin K and amino acids.
- In calves, the esophageal grooves allows milk to bypass the rumen and directly enter the abomasum. Rumen development occurs following a change in diet and microbial growth.