Difference Between Digestion in Humans and Ruminants

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Key Difference - Digestion in Humans vs Ruminants

Digestive system in animals is an important system in the context of digestion of ingested food into simpler forms that could be easily absorbed by the body cells. This provides all the essential compounds needed by the body for the existence and development of the living organism. Different digestive systems have evolved according to different species, their feeding patterns, and their habitats. Ruminant species survive only on plant matter. They are herbivorous animals. Therefore, **the digestive system of ruminants is evolved with the presence of a rumen which is a complex stomach with four different compartments. Humans are omnivorous who depend on plant and animal matter both thus, their digestive system composes of one stomach.** This is the **key difference** between digestion of humans and ruminants.

What is Human Digestion?

The humans are omnivorous species that depends on both animal and plant matter. Their digestive tract differs from other species. Humans do not contain enzyme cellulase. Therefore, they are unable to digest cellulosic matter. The human digestive tract is also referred to as the gastrointestinal tract. It is composed of different accessory glands which include the liver, gallbladder, pancreas, salivary glands and the tongue. The human digestive tract is composed of mouth and buccal cavity, esophagus, stomach, small intestine, large intestine, rectum, and anus.

Mechanical digestion of food takes place inside the buccal cavity. Saliva is secreted by the salivary glands and is mixed with the food. With the assistance of the tongue, the mechanically digested food is converted into a liquefied bolus for easy swallowing. Chemical digestion of food also begins at the buccal cavity since saliva contains salivary amylase. In the stomach, different enzymes from the pancreas and accessory glands are released and the ingested food gets completely chemically digested.

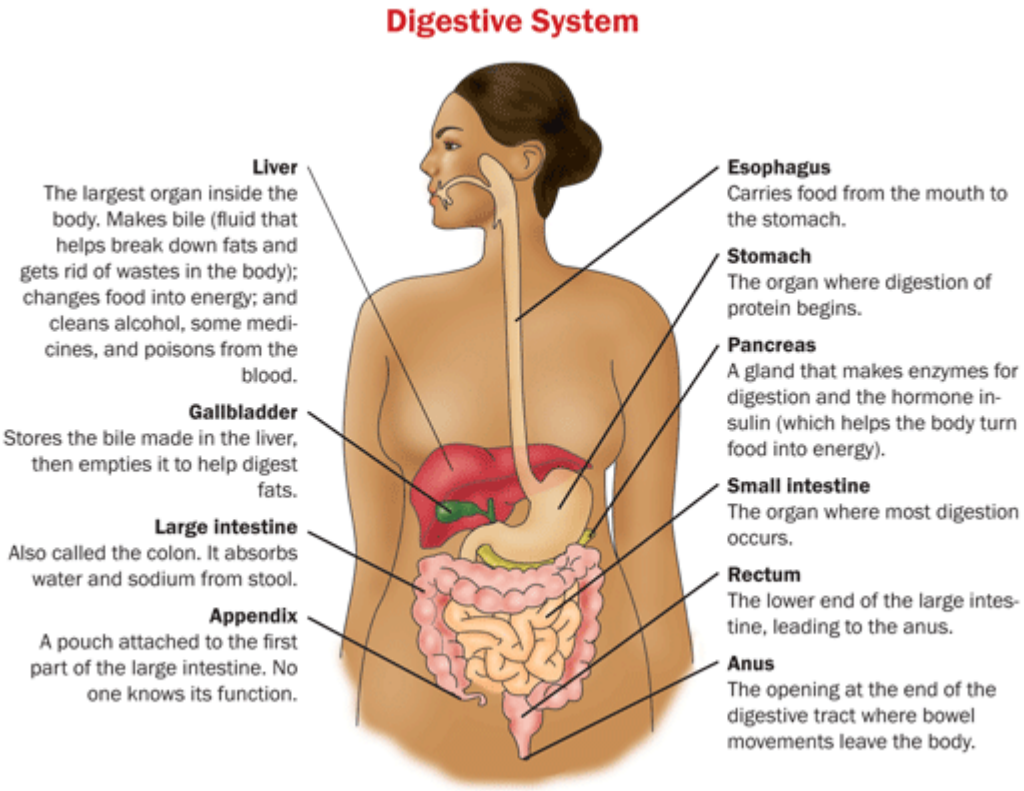

Figure 01: Human Digestion

The small intestine is lined is developed with a higher surface area for effective absorption of nutrients. Most of the nutrients are absorbed within the small intestine into the bloodstream. Water is mostly absorbed by the large intestine. The undigested food particles are eliminated from the body through the anus where the particles are temporarily stored in the rectum.

What is Ruminants' Digestion?

Animals such as cow, sheep, and goat are considered as ruminant species. Ruminant species comes under the category, herbivorous animals. They only depend on plant matter. Herbivores, including ruminants, possess a higher number of microorganisms that contain cellulose enzyme to digest the cellulosic compounds in plant matter. Ruminant species possess a complex digestive system when compared with humans. They are referred to as ruminant species due to the presence of a rumen. The rumen is a complex stomach that contains four different compartments which include Rumen, Reticulum, Omasum, and Abomasum. All four compartments are different to each other in structure and the function they carry out. Out of the four compartments, the rumen is the largest compartment and contains a higher population of microorganisms that possess enzyme cellulose and carry out different fermentative reactions.

The ruminant digestive system starts from the mouth and buccal cavity. It possesses 32 teeth that involve the mechanical digestion of ingested plant matter into a liquefied bolus that is mixed with saliva for easy swallowing. The partially chewed bolus initially enters the rumen and undergoes fermentation for a short period of time. When the animal is at rest, it has the ability to cough up the partially chewed food back into the buccal cavity and completely chew it to from another bolus of food. This is directed to the rest of the compartments. In the reticulum and abomasum, enzymatic digestion takes place and the nutrients which are

digested, are absorbed in the small intestine. In the omasum, water and minerals that are present in the bolus are absorbed into the bloodstream. The abomasum and the small intestine are similar to that of humans. The undigested food bolus then enters the rectum and leaves the body as fecal matter. Herbivore fecal matter appears in green color and contains a higher percentage of water.

What are the Similarities Between Digestion in Humans and Ruminants?

- Both are involved in the digestion of ingested food.
- Mechanical digestion in both types takes place in the buccal cavity.

What is the Difference Between Digestion in Humans and Ruminants?

Digestion in Humans vs Digestion in Ruminants	
Digestion in humans is the process which involves the breakdown of both plant and animal matter into absorbable forms.	Digestion in ruminants is the process which involves only the digestion of plant matter.
Stomach	
The human digestive system has a single stomach.	Ruminants have a complex stomach with four different compartments.
Cellulase	
Humans do not contain cellulose.	Ruminants contain cellulase that digests cellulose.
Bolus	
In humans, the bolus is once swallowed it completes the digestion of containing food particles.	In ruminants, when the food bolus is swallowed, it could be coughed up again for further mechanical digestion.

Summary - Digestion in Humans vs Ruminants

Different animals possess different types of digestive systems. Different digestive systems have evolved according to different species, their feeding patterns, and their habitats. Ruminant species survive only on plant matter. They are herbivorous animals. Therefore, their digestive system is evolved with the presence of a rumen which is a complex stomach with four different compartments. Humans are omnivorous which depend on plant and animal matter both. Their digestive system composed of one stomach. In both systems, undigested food material is eliminated as the fecal matter. This is the difference between digestion of humans and ruminants.

Reference:

1.Keeton, William T., et al. “Human digestive system.” Encyclopædia Britannica, Encyclopædia Britannica, inc., 22 Nov. 2016. Available here
2.“The Structure and Functions of Ruminants Digestive System.” Biology, Byjus Classes, 27 Nov. 2017. Available here

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