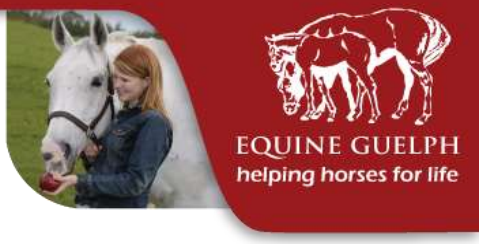
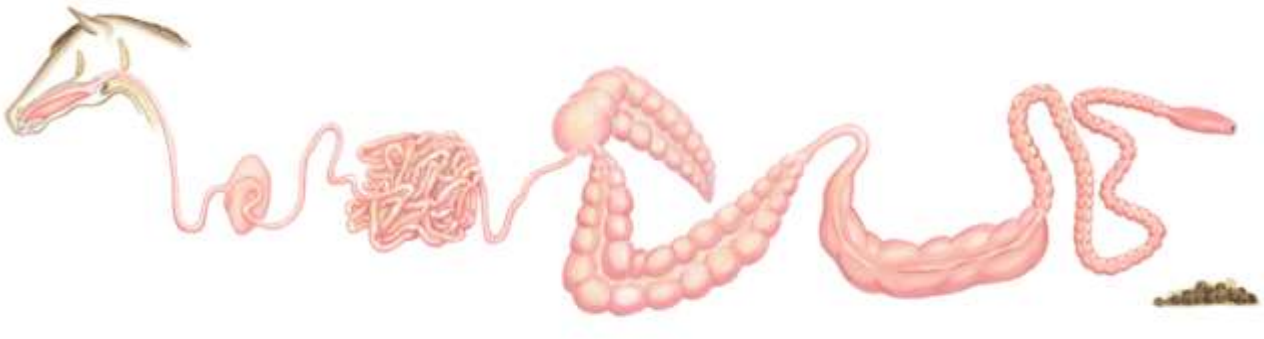
The Digestive Tract





Introduction to the Digestive Tract - The horse's digestive tract, also called the gut, is amazingly well-developed for the life nature intended. This includes hanging out with the herd, moving around all day to find good forage and grazing for around 16 hours out of each day, eating small meals frequently. When humans domesticated the horse, the natural way of life for the horse changed completely. The horse is no longer able to spend the day with "friends, forage and freedom" to engage in normal behaviours. We control most of the life of the horse with stalls and paddocks, and provide its only food sources, often providing infrequent, large meals instead of small amounts frequently throughout the day. These changes have increased the risk of problems for the horse, so a good understanding of the digestive tract and how it functions can help the horse owner prevent many of those problems and reduce the risk for the others.

Mouth – In the mouth we find the teeth, the tongue, and the salivary glands. Using the front teeth, the horse crops the grass, and then, with the tongue, moves it to the molars where the grass is ground up by the molars and the particle size of the food is broken down. The teeth erupt through the gum over the lifetime of the horse, wearing down due to the grinding of the forage. The teeth wear down differently when on a diet of grass, compared with hay and grain diet. Salivary glands release fluid that helps lubricate the food during chewing and this is important to help swallow the food and prevent choking.

Esophagus – At the back of the mouth, there is a simple muscular tube about 127 cm (50 inches) in length that moves the food from the mouth to the stomach. If the horse bolts its food, or if the food is not adequately lubricated, it can become lodged in the esophagus, causing choke.

Stomach – The horse is a large animal with a very small stomach, designed to have small amounts of food going through it throughout the day. The food is mixed with enzymes and strong acids to break down the food. This acid stops the fermentation process that started when the food was ground up, and starts to break down the particles and begins the process of protein digestion. An empty stomach invites problems as the acid is always at work. Without small amounts of food to work on, the acid can attack

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the lining of the stomach, causing painful lesions called ulcers. The horse is not able to vomit, so once the food has been swallowed, it is going into the stomach and through the rest of the digestive tract.

Small Intestine – The food moves out of the stomach into the small intestine which is a long tube about 15 to 21 meters (50 to 70 feet) in length and a diameter of 5-10 cm (2-4 inches). It can hold about 38 to 45 L (10 to 12 US gal) of fluid/material. Enzymes secreted in the small intestine break down the proteins, fats, and the sugar/starches. There is no gall bladder (as there is in the human) so bile from the liver is released into the small intestine to break up the fat. When the food is digested, it begins to be absorbed into the bloodstream, releasing amino acids, vitamins and some minerals. Food needs to move slowly and steadily through the small intestine for most efficient digestion here. Water is important to the movement of the fibrous matter through the entire digestive tract.

Large Intestine – The large intestine is composed of the cecum, the large colon and the small colon, followed by the rectum and ending with the anus. The cecum is a critical organ for the horse, unlike the corresponding organ in the human called the appendix. It is in the cecum where an active population of bacteria live, and it is the bacteria that are breaking down the fibre through the process of fermentation. After 7 or more hours of fermentation, the food leaves the cecum. The population of bugs that live in the cecum are specific to the diet of the horse, hence the need to slowly change the feed in order to let the bacterial population adjust to the new food. As food moves into the large colon, nutrients, vitamins, and minerals are absorbed. The remains of the food move into the small colon where water is absorbed and fecal balls are formed to be moved along the rectum and out the anus. The entire trip through the digestive tract may take about 36 to 72 hours, depending on the type of food ingested. If we truly understand the design and functioning of the digestive system, we can take effective steps for management of the horse and its diet to prevent many problems like colic and other complications.

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