Equine Gut Health

By The Nude Horse

"Bad digestion is the root of all evil"

Hippocrates (circa 460-375BC)

Emerging research gives growing support to the importance of a healthy gut. It's implicated in everything from effective digestion to good mental health and a strong immune system. Stressful equine lifestyles, processed feeds often high in grains or sugars and antibiotics all mess with the balance of bacteria in the body. Supplying feeds sources high in good microbes help to right the gut balance.

Gastro-Intestinal (GI) dysfunction is known to cause many diseases common in horses. High risk situations for GI disturbance come with the administration of certain antibiotics, various drugs and wormers.

Loose droppings represent a sign of disturbance to the environment within the large intestine and the balance between the many microbial species present. This is likely to cause a decrease in the efficiency with which feeds are digested and may lead to a loss of condition and interfere with the metabolism and absorption of vitamins and minerals.

Gastric Ulcers

Gastric ulcers have been found to be a common problem in performance horses, affecting up to 93% of race horses in one study.

Best management strategies may be useful in decreasing the incidence and severity of gastric ulcer occurrence and in treating ulcers once they are detected.

It has been found that transporting horses, keeping them confined in an unfamiliar environment and feeding diets high in grain has resulted in an increased incidence of gastric ulcers.

Feeding grains is known to increase fermentable carbohydrates leading to a decrease in pH, reducing grain intake may help keep pH higher and hence decrease the incidence of gastric ulcers. Feeding quality lucerne ad lib has been found to result in less severe gastric ulcer cases in performance horses.

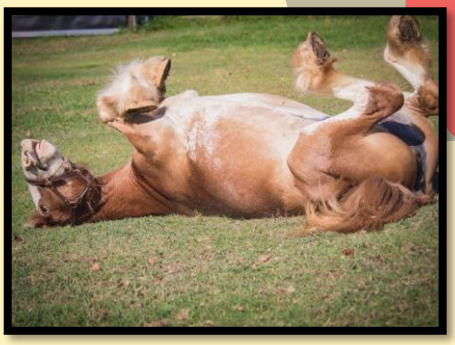
Colic

Colic has been a common cause of illness and death in horses, some linking colic to the development of laminitis. Risk factors for colic that have been identified in a variety of studies include change in stabling conditions, recent change in diet and level of activity, decreased exposure to pasture and lack of access to water whilst on transit. Prevention is the best strategy for horse owners.

'It has been noted antibiotics may lead to colic because they alter the microbial population in the gut, which in turn affects starch digestion.

Symptoms to look for if colic is suspect:

- Pawing
- Rolling
- Bloating
- Sweating
- Distress
- Uneasiness
- Loss of interest in food and water
- Peculiar postures (sitting, stretching)
- Absence of gut sounds



Many cases of colic can be treated successfully with medication, while others involving severe impactions or twists may require immediate surgery'.[1] (Adapted from the Online Equine Nutrition Course, My Horse University.)

Equine colitis

Ed Kane Phd in DVM360 magazine says "*Serious colitis causes severe diarrhea, which accounts for huge water loss, and can cause rapid loss of fluid from the circulatory system.*"

“Once colon health is disrupted, its ability to carry out the normal functions of digestion and absorption are critically affected.

Colitis disrupts the integrity of the mucosa. Once a horse is affected, the ability of its colon to absorb water and nutrients—the colon's normal function—

Equine clostridial colitis
Picture courtesy http://vet.uga.edu

is compromised. In addition, major shifts take place with respect to the bacterial population needed for normal gastrointestinal (GI) function.

“Any time you put a horse on antimicrobials (antibiotics or wormer), it can have flora shifts within the GI tract," says **Magdesian**. "When the flora shifts, then particular bacteria may overgrow. In some cases, the most common known shift is to E. *coli, C. difficile*, *Enterobacter*, *C. perfringens* and *Salmonella*. The most common theory in racehorses is they're put on antibiotics for respiratory or other infections and they develop a secondary colitis from the [flora] shift.”

Horses tend to have more sensitive reactions to antimicrobials with resultant flora shift compared with most animals such as dogs and cats—or even people—because they're hindgut fermenters. Experimental models show that other hindgut fermenters such as rabbits and guinea pigs when given a tiny dose of certain antibiotics predictably get colitis.

Basic treatment for equine colitis includes administering fluid therapy and electrolytes, restoring flora imbalance (Synbiotics) and providing supplemental protein because the animal's serum protein concentration decreases rapidly.”[2]

“Many bad bacteria can migrate up from the large intestine and there they are not compatible with small intestinal epithelium, resulting in a diarrhea that is referred to as "small intestinal bacterial overgrowth””[3]

Endotoxemia in Horses

The presence of endotoxins in the blood is referred to as endotoxemia. These toxins are generally due to the presence of certain types of bacteria in the horse's gut that have breached the gut wall and entered the blood stream. If not treated promptly, endotoxemia can lead to shock, laminitis, and death. This condition is seen both in adult horses and in newborn foals.

Pet MD recommends “During cases of endotoxemia, horses must be treated immediately for it to have any success. There are several courses of treatment and supportive care, including intensive antibiotics, IV fluid therapy to help maintain hydration and support the cardiovascular system, and administration of a non-steroidal anti-inflammatory drug, which helps with the horse's pain, controls inflammation, and counteracts the endotoxin. Plasma transfusions are sometimes used.”

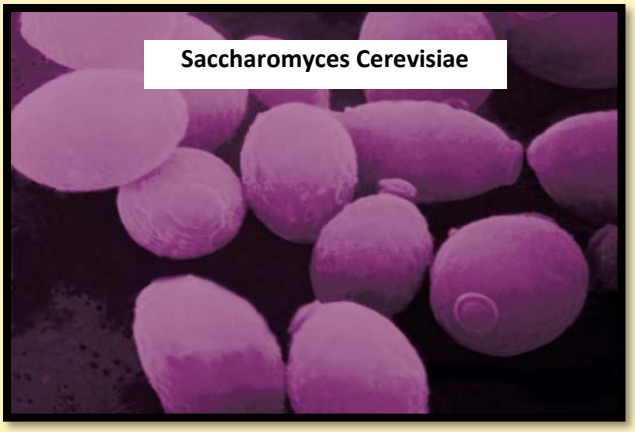
Improving gut health through feed supplements

Synbiotics – Pre and Pro Biotics

Synbiotics is the synergy of Pre and Pro Biotic. The pro biotic microbial organisms (good bugs) depend on the availability of pre biotic to stimulate their growth and colonisation.

Horses rely heavily on fermentation of fibre by good bacterial microbes in their large intestine and this can supply around $^{2}/_{3}$ of their energy in the form of volatile fatty acids (VFA's) and lactic acid. In an adult horse, the whole gastro-intestinal tract represents around 12% of the total bodyweight. A recent study on humans reveals about 100 trillion bacterial cells live in and on our bodies, which means 'we are only 10 % human cells and the rest of us is made up of bacteria.'[4] Research is yet to show the direct comparison in our equine friends, but it certainly gives food for thought.

In 2014 a landmark review paper on the microbiome published in the **Journal of Clinical Investigation** from New York University said: "*The composition of the microbiome and its activities are involved in*



most, if not all, of the biological processes that constitute human (equine) health and disease, as we proceed through our own life cycle".

Dr David Marlin a Scientific and Equine Consultant reveals "The benefits of feeding live yeasts* to horses include stabilisation of the conditions in the large intestine resulting in the stimulation of natural fermentative activity, improving fibre digestion of forages such as hay and haylage and improving the efficiency of digestion." He recommends "***It is worth considering feeding a gut balancer type of product*** *to horses under stress, horses prone to colic or laminitis, horses that develop GI upset on medications such as antibiotics, to horses around the time of worming, when changes to diet are made, for poor doers, older horses that lose condition and horses that develop loose droppings*."[5]

* The most common live yeast preparation is Saccharomyces Cerevisiae.

Mycotoxins and Binders

Mycotoxins are typically molds capable of causing disease and death.

The use of mycotoxin binders, or adsorbents, may have the greatest use for avoidance of exposure to low levels of multiple mycotoxins. The use of adsorbents to prevent effects of mycotoxins has been actively researched for over 20 years. A number of binder products have been shown effective and their use offers one of the greatest potentials for preventing animal toxicity.

Reviews of mycotoxin binders has been published (Avantaggiato et al., 2005;Ramos et al., 1996a; Ramos and Hernandez, 1997; Huwig et al. 2001).

The addition of mycotoxin binders to contaminated diets has been considered the most promising dietary approach to reduce effects of mycotoxins (Galvano et al., 2001). The theory is that the binder decontaminates mycotoxins in the feed by binding them strongly enough to prevent toxic interactions with the consuming animal and to prevent mycotoxin absorption across the digestive tract. This approach is seen as prevention rather than therapy.

Potential absorbent materials include mannonoligosaccharides (MOS), clay, zeolite and diatomaceous earth.

Marshmallow Root

Of recent years interest in Marshmallow Root has been talked about for GI disturbances in horses and

for good reason. Traditional internal uses for marshmallow root include urinary tract infections and gastrointestinal irritations and inflammations. Marshmallow Root has known demulcent[+] and emollient[@] properties. Both in the root and the leaves there are acidic polysaccharides forming mucilage, but the concentration is highest in the root (Bone, 2003). In vitro studies have indicated that the adhesion of polysaccharides to mucous membranes might have a part in the therapeutic effect of mucilage on irritated membranes (Schmidgall et al., 2000).

The Naturopathic Herbalist states: " These polysaccharides have a 'slippery', mild taste and swell in water, producing a gel-like mass that can be used to soothe and protect irritated tissues in the body, such as sore or inflamed mucous membranes.

Most mucilage is not broken down by the digestive system, but absorb toxins from the bowel and give bulk to stool. The major effects of mucilage-rich herbs in the body include:

- Lower bowel transit time by absorbing water in the colon and creating stool a bulking & softening effect
- Absorb toxins in the colon
- Protect against gastric acidity
- Regulate intestinal flora and protect against ingested toxins or bacteria
- Relaxes and soothes via the endodermal lining of the gut
- Demulcent[+] & Vulnerary[^] action internally, soothes and protects inflamed or irritated nerve endings in mucous membranes or epithelia."[6]

Beta Glucan

The School of Food and Biological Engineering found the results of "feeding Beta Glucan glucan might exert favorable effects on improving intestinal functions and health. The trial also revealed that the population of Lactobacillus and Bifidobacterium increased ($p < 0.05$), whereas the number of Enterobacteriaceae (pathogen) decreased ($p < 0.05$) in a dose-dependent manner during the period of cereal β-glucan administration."[7]

Footnotes

[#] A **demulcent** (derived from the Latin: demulcere "caress") is an agent that supposedly forms a soothing film over a mucous membrane, relieving minor pain and inflammation of the membrane.

[@]**Emollient** definition "any preparation or substance that has a softening or soothing effect".

^ **Vulnerary** a medicine used in the healing of wounds.

Reference Materials

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