

A HEALTHY GUT MEANS A HAPPY HORSE

WITH DAVID WOOD BVSC MRCVS.



At the Melbourne Equitana last November, I was introduced to veterinarian David Wood, who for the past 20 years has provided technical nutrition advice to Horsepower. Qualifying in the UK in 1975, Wood has spent many years working in Australia and also in Brunei where he was instrumental in establishing the Royal Brunei Polo Club. During his work he has been able to observe a large cohort of horses in an intensely domesticated situation. He has done a lot of consulting work in South East Asia and the Middle East; countries where keeping horses is not as easy as it is in the temperate southern, eastern part of Australia. It is not surprising that Wood encountered nutritional issues with horses that had been imported into these areas and eventually he has specialised in the nutritional aspects of horses, especially those in the tropics.

Wood's lectures at Equitana were centered around, **Feeding The Equine Microbiome**. Feeding the what? Some readers may have observed the inclusion of the word microbiome trickling into the conversation at the chemist, the doctor, in health magazines and on television. Only about 10% of what we all are is human, the rest is our microbiome. Consisting of both good and bad bugs and indeed bugs that are essential to our good health, there is a huge amount of research world wide on the microbiome. We are all essentially walking ecosystems, with our microbiomes performing essential functions in various parts of our body to keep us healthy.

When we think about horses and hind gut, we immediately think colic! None of us are immune to the trauma we, let alone our horses suffer from colic. A healthy hind gut is in everyone's interests.

"I am most interested in the microbiome of the hind gut," explains Wood, "for its important role to play in the horse's digestion, immunity and overall health. The microbiome is a very complex and dynamic eco system. I compare it to a rainforest and this rainforest has been designed by evolution to handle large amounts of fibre. The horse is a fibre eater and over evolution it grazed for 20 hours a day and processed a lot of low grade forage

feed; not much starch, not much energy. So for the health of its microbiome, its gut was designed to extract the energy from these high fibre feeds. Then along came man and domesticated the horse and started feeding it grain; high in starch, low in fibre. The microbiome was not domesticated at the same time which was a recipe for trouble.

"FEEDING A LOT OF STARCH TO HORSES IS LIKE DRIVING A BULLDOZER THROUGH A RAINFOREST"

Feeding a lot of starch to horses is like driving a bulldozer through a rainforest. It can damage the microbiome and stimulate the growth and overpopulation of bad bugs. And these bad bugs are basically the ones that produce lactic acid and gas. Too much acid and gas damage the gut wall which can lead to colic. Once that scenario starts the acid compromises the integrity of the gut wall and toxins from inside the gut start leaking out in to the circulation. At the same time you have gas production which causes parts of the bowel to float and it can get twisted and displaced and the blood supply can be compromised. It all comes down to the imbalance between the good fibre and the starch.

"Feeding plenty of good hay or pasture is the answer. We have known that, as well as feeding little and often for hundreds of years, but we now know why. It is a balance and it is an ecosystem that is very dynamic. Within four to five hours of feeding a high starch meal to a horse, starch can start to spill over into the hind gut and that is what causes trouble. If there is too much starch, that will impact the hind gut microbiome and if there are not enough good bugs to counterbalance the bad bugs, then you may have this leaky gut syndrome and the possibility of colic.

So really to protect the microbiome means a couple of things:

1 Feed the good bugs and the good bugs like fibre. That means hay available 24/7 to the stabled horse or having the horse out on pasture.

2 Horses were designed to graze, so if they are fed what they were designed to eat, they will have a healthy gut microbiome.

"There are also behavioural aspects to the microbiome. The microbiome as stated constitutes about 90% of what we are genetically, the human genes only about 10%. So is the health of the microbiome going to have an impact on the organism as a whole? You bet it is. These bugs in the horse's gut are producing the same chemicals it uses as neurotransmitters and hormones. (Neurotransmitters are the brain chemicals such as amino acids, peptides and monoamines etc. that communicate information throughout our body. For instance they tell our heart to beat, our lungs to breathe and our stomach to digest etc). There is a constant flow of these transmitters going from the gut to the brain. If you want to counteract the negative behavioural effects of starch either feed less of it or try to balance it with more fibre. Diversity in the microbiome is what provides for robust digestive and immune systems and is driven by forage feeds.

"However, it is not that simple. As a general rule if you just feed pasture or hay, it is going to be deficient in minerals and trace elements because of farming practices and the fact that the soils in Australia are old, often mineral deficient soils. Horses that are just fed on forage feeds alone will likely be deficient in, calcium, zinc, iodine, manganese and selenium etc. Without selenium, Vitamin E will not work and it is a key antioxidant. Also you cannot pick nutritional deficiencies by looking at the horse unless they are extreme.

Hair testing is a waste of time unless you are looking for drugs like cocaine, or heroin, or heavy metals. The way to test what your horse is deficient in something is by diet analysis. You can run a pasture analysis and look at the other feeds you are feeding, and then work it out. If you have a horse with a copper deficiency for example, it may have a dull mousey coat and if you give it some copper it will become a magnificent mahogany bay. So you can

see some things like that change, but for other deficiencies like selenium, which can affect the heart muscle in foals, there is no outward sign. If you use a shotgun mix of minerals and vitamins, the horse will select what it needs. **But bear in mind that if a horse is on a decent diet on pasture, it will produce virtually all the vitamins they need via the microbiome in their hind gut.** The microbiome is churning out all the B Vitamins and it is also producing Vitamin C. The only things it is not producing are Vitamin K and Vitamin E. The way to ensure our horses are getting what they need is to feed them a broad spectrum mineral supplement including calcium, the important trace elements and some salt along with good quality hay or pasture.

"YOU CANNOT PICK NUTRITIONAL DEFICIENCIES BY LOOKING AT THE HORSE UNLESS THEY ARE EXTREME"

"What you feed does depend on what you are asking the horse to do. You can't expect a horse to sit in a stable and just eat hay and go out and win races. It won't because there is not enough energy going in. If your horse is just a paddock ornament, or in light work, that is probably all it needs. It is a principle of **energy in and energy out**. If the tank is getting low, you need to top it up with something and essentially you are going to use starch or oil, and both of those in excess are going to have a negative effect on the microbiome of the hind gut. Starch is worse than oil, but even oil, which is becoming more and more popular, impacts the microbiome and its diversity, and here I am not talking about a little drop of Omega 3 oil, I'm talking about using oil as a substitute energy source.

"There are human **Metabolite Profiles** for autism, ADD, ADHD, anxiety, depression, chronic pain etc., so there are a lot of emotional issues going on in humans that are directly related to what is going on in the gut. That is established and it is my contention that the same is going on in horses. We now have a known metabolite profile for horses that crib bite. For so long it was thought that the increased starch in the diet which is turned into glucose which feeds the brain cells was the source of an excitable horse. More starch, more glucose, more brain stimulation equals a hotter horse, but I don't think that is correct. What is happening is that starch is changing the chemical signals coming out of the gut microbiome and you are getting more of

these neurotransmitters and hormones like adrenaline that are affecting what is going on in the brain and affecting the emotional state, the feeling of wellbeing or anxiety in the horse and things like that. There is a massive amount of work on this going on in medical science. In horses, crib biting may not be caused by boredom or a lack of food, it may be to do with endorphins in the brain. Weavers are certainly to do with endorphins which are morphine like substances. It is thought that old people rocking in rocking chairs, autistic children rocking back and forth and horses weaving are all doing it for a pain killing type of endorphin effect.

"I was recently speaking to an Occupational Therapist who deals with chronic pain management and she said her patients all had massive gut problems. For people that are depressed and in severe chronic pain, they are putting them on probiotics, which is what we vets are doing now too. They are also performing **Fecal Microbiome Transplants**; introducing healthy gut microflora into people specifically for treating *Clostridium difficile* infection and experimentally for things like ulcerative colitis and in the management of Type 2 diabetes and obesity etc. It is good to see the medical doctors catching up with the vets, because we were doing this with horses 40 years ago. We would take gut contents from healthy horses and stomach tube them into horses with chronic diarrhea. The potential of modifying the gut microbiome is huge for treating both physical and mental illness and we will be hearing a great deal more about it in the future.

"In the past few years a lot of "Low Starch" feeds have come onto the market but as yet there is no accepted standard on what constitutes a "low" starch level in horse feeds. To me, a low starch product is 12% or less starch and no grains qualify. Essentially we are trying to get the energy out of non grain sources like lupins, soy hulls, Lucerne and sugarbeet. I have been working on low starch feeds with broodmares and yearlings at a number of studs and they are amazed how well the horses look on these diets. But what interests me is that after working out how much they should have, say three kilos a day for a yearling, is how well they look on just two kilos a day. The studs are saying how great they are looking, but why are they on a kilo less than I thought they should have? We have upped the fibre and dropped the starch, so now the hind gut is working better and more efficiently, so we are getting more bang for our buck and only using two thirds of what we were expecting them to use.

The stud is:

- 1** Saving money
- 2** Getting horses which are going to be, stronger, sounder and hopefully have less OCD than they would have done otherwise.

With further research it may prove that the gut microbiome can alter a horse's temperament and totally turn on its head some of the preconceptions and "old wives tales" we have about horses.

Horse Deals would like to thank David Wood BVSc MRCVS for his time and passion in the production of this article. By Anna Sharpley

