

# HOW TO MAXIMISE YOUR OTT'S HINDGUT HEALTH

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# INTRODUCTION

What IS hindgut health?

And, given you can't exactly 'see' your off the track's hindgut, how do you know if it is healthy?

Excellent questions! I'm glad you asked! Because we are about to take a close look at your OTT's hindgut health, and discover just what a healthy hindgut looks like.

We will meet the microbes that live there, look at how to feed to keep the hindgut and its microbes healthy and discover a few simple ways to measure the health of your OTT's hindgut.

Let's go!



Nerida

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## 1

# HINDGUT HEALTH

## WHAT IS HINDGUT HEALTH?

First things first, let's define what hindgut health actually is...

### Healthy hindgut

A healthy hindgut contains **a diverse population of beneficial microbes**, who digest food, produce vitamins and other beneficial compounds like hormones, communicate with the horse via the gut brain axis and maintain immune function.

The microbe population in a healthy hindgut is diverse, **stable** and difficult to knock out of balance.

Plus, **the gut wall itself is healthy**. It creates an **effective barrier** between the horse's body and the gut contents allowing the efficient absorption of nutrients into the body, but blocking the passage of bacteria, toxins, pathogens and various other muck!

### Unhealthy hindgut

On the other hand, an unhealthy hindgut contains any combination of **less beneficial microbes, less diverse microbes, more 'bad' microbes or a microbe population that is unstable and easily knocked out of balance**, into what we call dysbiosis.

Plus, **the gut wall is usually unhealthy and will leak...** allowing bacteria, toxins, pathogens and various other muck into your horse's body!

## THE HINDGUT MICROBES

Because so much of hindgut health revolves around the microbes that live in your OTT's hindgut, let's meet them!

If I were to try and introduce you to all of your OTT's microbes and you spent 0.1 seconds shaking hands with each one, it would take us more than 30,000 years, and we simply don't have that much time.

So let's make group introductions, starting with group 1, the good bacteria!

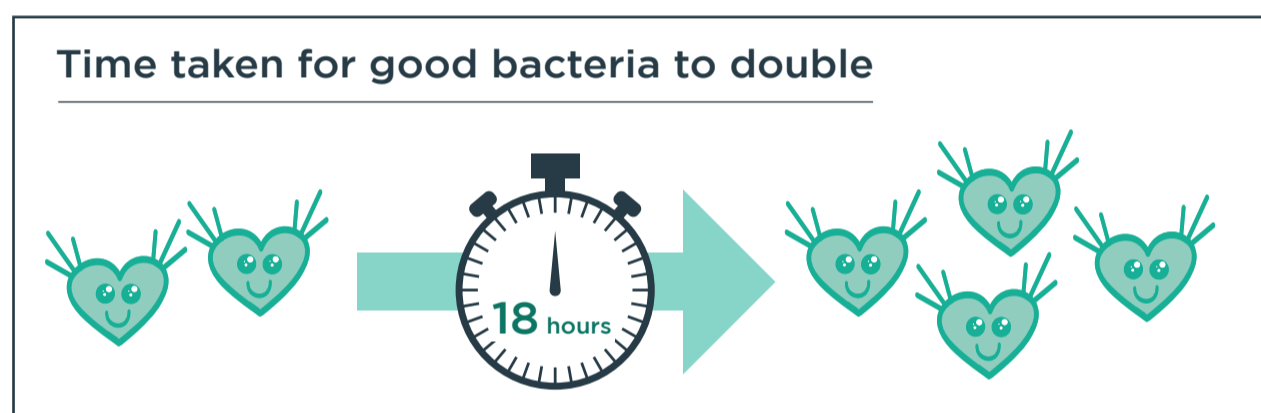
## THE HINDGUT MICROBES (CONT..)

### The good bacteria

The good bacteria are predominantly 'fibre fermenters'... meaning their favourite food is fibre. Their proper name is the 'fibrolytic bacteria' and these critters are happy to do the slow, laborious work of digesting the fibre in your OTT's diet.

The good bacteria are slow, peaceful little creatures and take their time reproducing, doubling their populations only every 18 hours or so... which is slow in the world of bacteria! In other words, if you had 2 good bacteria, after 18 hours, you would only have... 4!

There are MANY different species of good bacteria in a horse's hindgut. And one of the characteristics of a healthy hindgut bacterial population is that there are **MANY different species** and not one, or a few species that dominate over the others.



### The fungi

The second group of microbes I'd like you to meet are the fungi!

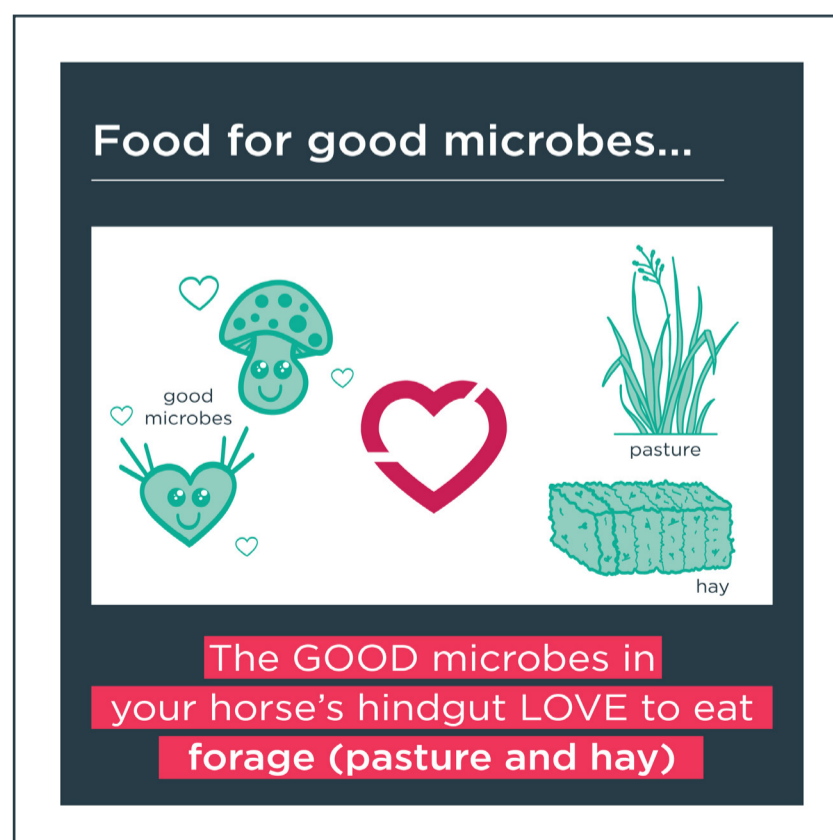
Their proper name is the 'anaerobic fungi' and they are also fibre fermenters, which adds them to the 'good microbes' list! The fungi are **actually better at digesting fibre than their fibre loving bacterial colleagues**, making them an incredibly important part of your OTT's beneficial hindgut microbe population!

### The bad bacteria

The third group of microbes we will meet are the 'bad bacteria'.

These are the starch fermenters, whose favourite food is... starch.

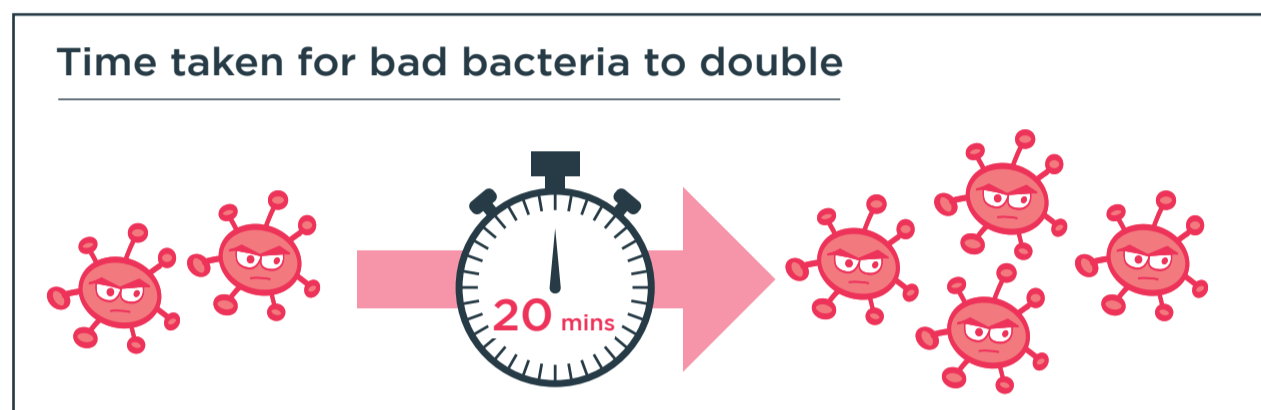
Their proper name is the 'amylolytic bacteria' and these critters are little party animals... they love 'fast food' and they live in the fast lane, with very rapid reproduction.



## THE HINDGUT MICROBES (CONT..)

Some are able to double their population in as little as 20 minutes!

To show you the potential impact of this, if you had 2 bad bacteria and they doubled every 20 minutes, after 18 hours, you would have: **18,014,400,000,000,000**... more than 18 quadrillion bacteria.



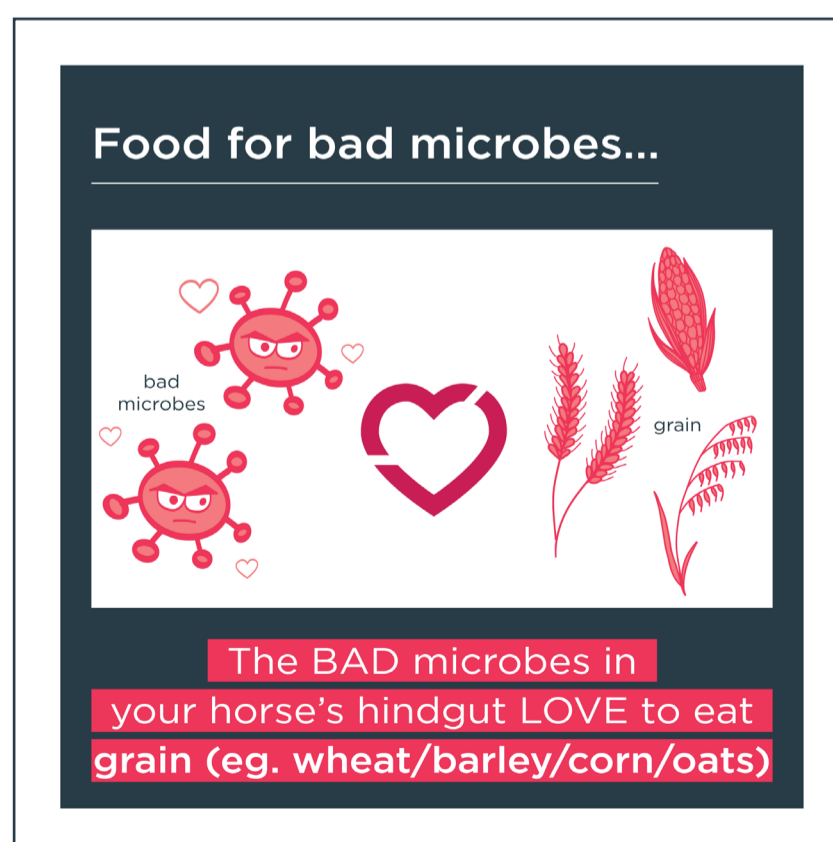
So, while the bad bacteria are a perfectly normal part of a healthy hindgut when in very small numbers, if you feed them, they can **get out of control, really fast!**

And when their **populations explode** like this, they literally **kill off your horse's good bacteria.**

So a huge part of managing hindgut health lies in keeping these party-animal bad bacteria under control.

And we do that by making sure we don't feed them... Which is a little bit like making sure a gremlin doesn't get wet!

Right! Now we have met our three major groups of microbes, let's move on to briefly looking at how they help, or harm your horse as they digest food!



# TURNING FIBRE INTO FUEL: GOOD BACTERIA & FUNGI

The digestion of fibre by the good bacteria and fungi takes place via a process called fermentation.

During fermentation, the microbes cut up and then eat the fibre in your horse's hindgut. They take some energy the fibre contains for themselves.

And then they turn their 'leftovers' into compounds called volatile fatty acids, or VFAs for short. Your OTT absorbs these VFAs and uses them for energy!

It's a 'you scratch my back and I'll scratch yours' relationship!

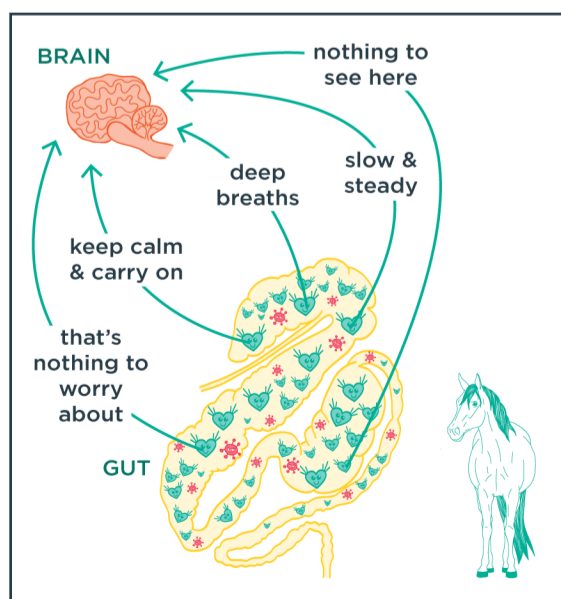
**Horses on high forage diets can get 80% or more of their daily energy needs met by these VFAs!**

PLUS, in the process of the good bacteria going about their usual daily routine of digesting fibre, **they also produce vitamins** for your OTT.

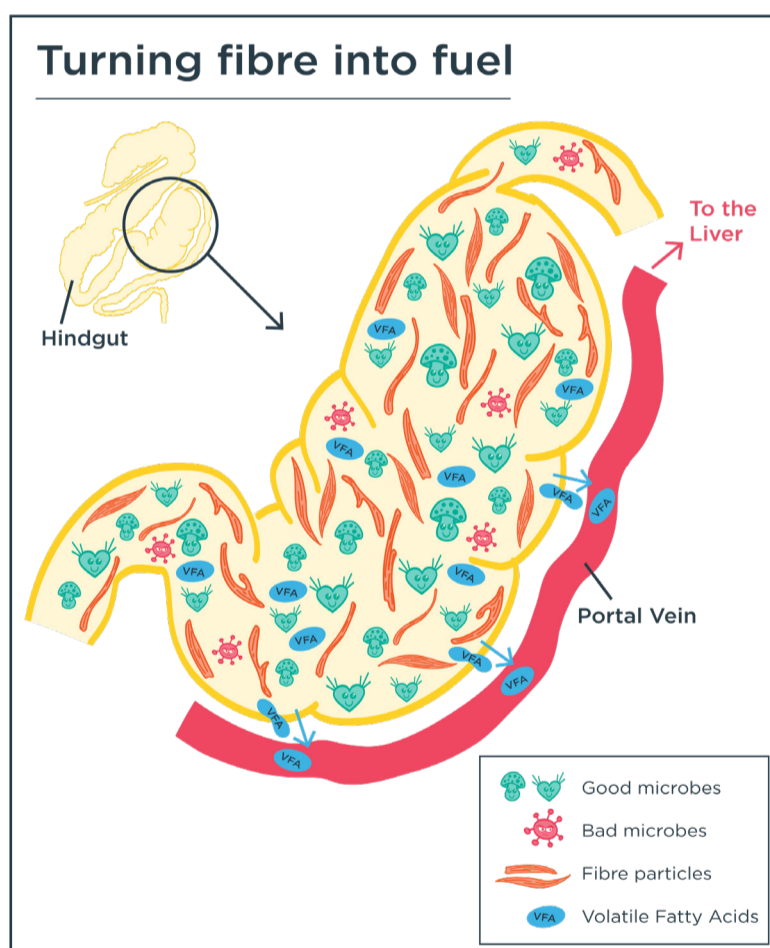
AND **they make hormones** and various **other metabolites that control your horse's immune system and behaviour.**

The communication via the gut-brain axis, between your horse's good microbes and nervous system plays a huge role in establishing 'normal', calm behaviour in your OTT.

This slow, fibre fermenting system is the 'natural' state for a horse's hindgut to be in.



Gut brain axis with a healthy gut



**A healthy hindgut with mostly good microbes and plenty of fibre produces VFAs at the same rate your horse can absorb them. This is ideal!**

It is this state that developed over 55 million years of evolution!

**And our #1 goal in feeding OTTs should be to return their gut to this fibre fermenting state and then keep it there.**

Now, let's look at what happens if we feed the gremlins of the hindgut, the bad bacteria!

# TURNING STARCH INTO ACIDS: THE BAD BACTERIA

The bad bacteria do everything fast, and digesting food is no exception.

Compared to fibre, starch is easy to digest, so the amylolytic bacteria cut it up, eat it and **produce VFAs really fast! Much faster than your horse can absorb them!**

Plus, because a lot of these 'bad' bacteria are 'lactic acid bacteria', they also rapidly produce lactic acid. And **lactic acid can't be absorbed from the hindgut.**

Which all means... when your horse's hindgut goes into a state of starch fermentation, the VFAs and lactic acid accumulate! (And it starts getting very acidic in there.)

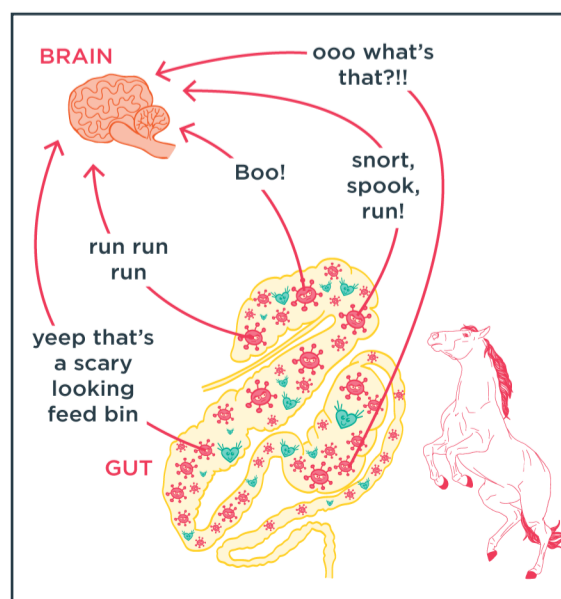
## So long good microbes...

The really bad news is, when VFAs and lactic acid accumulates enough, the good **fibre fermenters will start to die... because they do not like being in acidic conditions!**

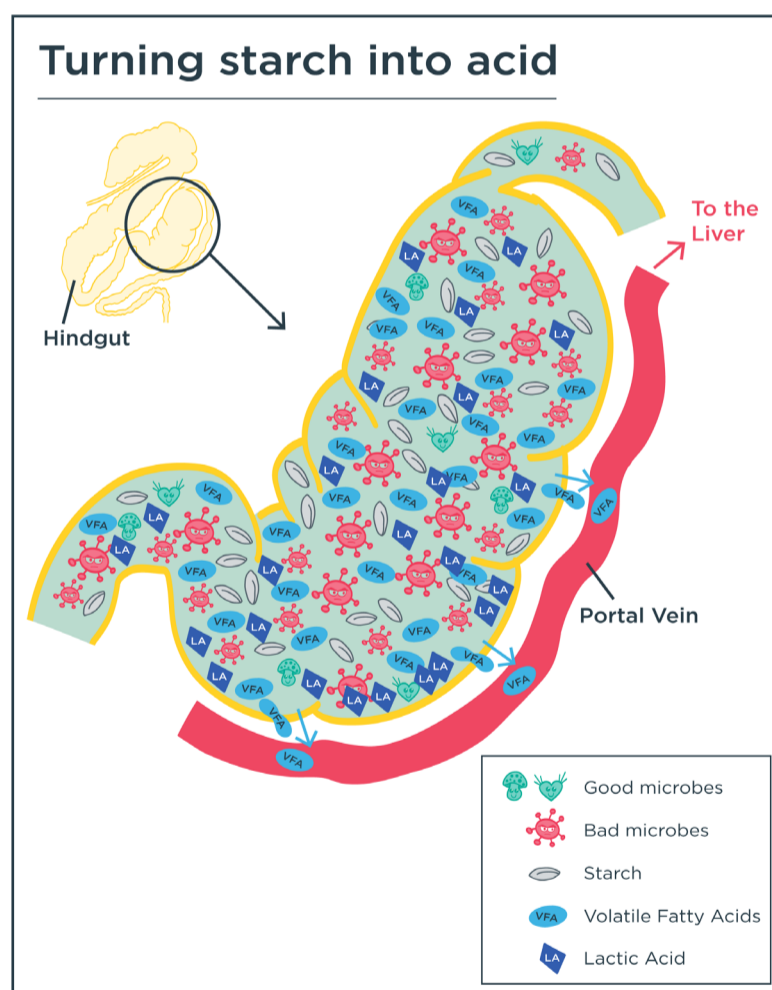
If this happens, your horse is in a royal pickle!

It has lost its friends the fibre fermenting microbes. And that has a massive negative impact on your OTT.

**They lose their ability to digest fibre...** and will become your classic 'hard keeper' because they can't extract enough energy from their forages to maintain weight.



Gut brain axis with an unhealthy gut



An unhealthy hindgut with an overgrowth of bad bacteria plus lots of starch, will produce VFAs at a rate faster than the horse can absorb AND also produce a lot of lactic acid. This creates an acidic hindgut and kills off the good bacteria.

Their gut-brain axis communication gets all messed up, so **their behaviour can become anxious, spooky, hyperactive and unsafe!**

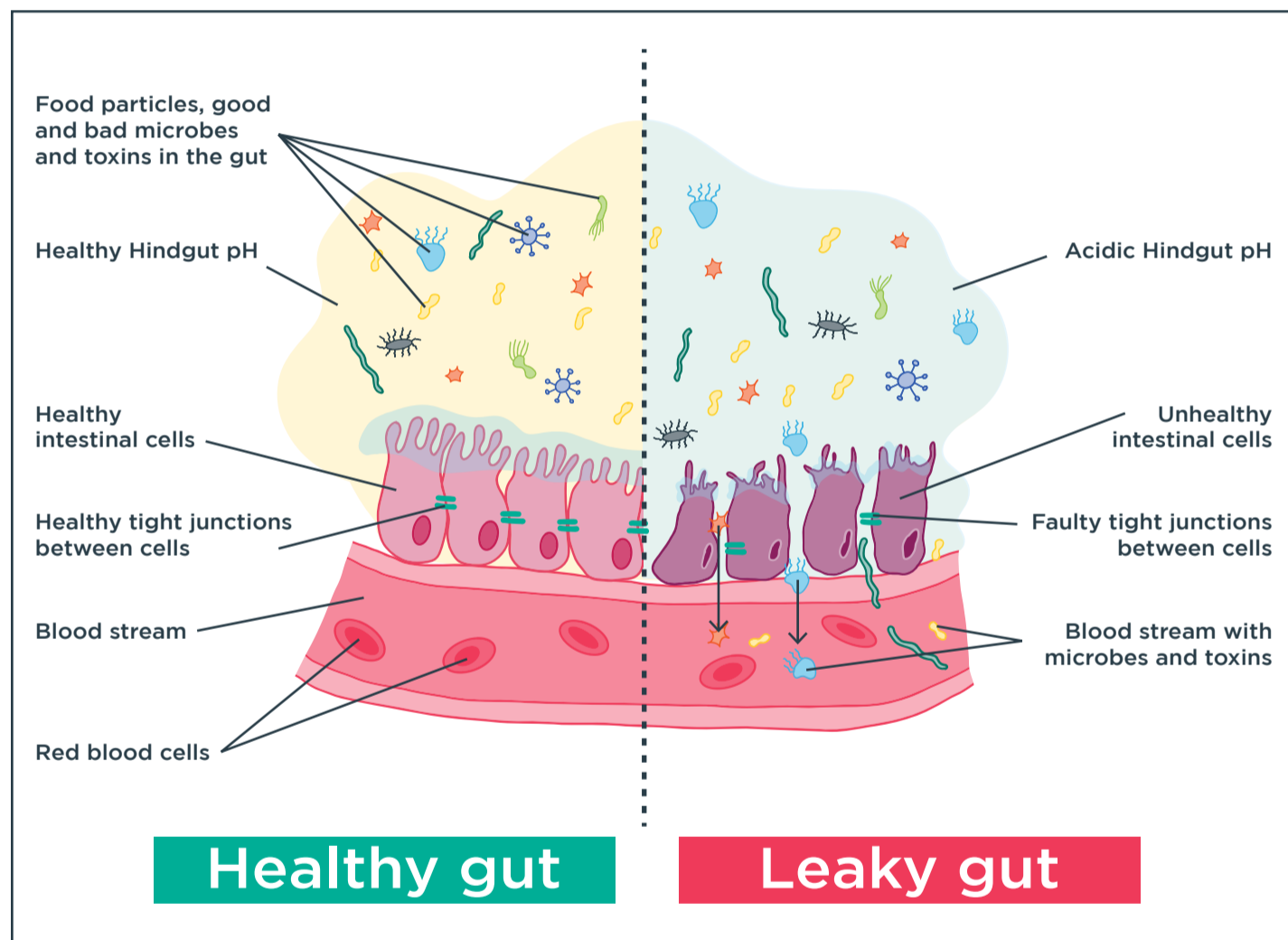
Their immune function, hoof health, appetite and a host of other health parameters are negatively affected. AND, their gut will start leaking!

## Microbe Balance and Diversity is Everything

I've hopefully managed to make it clear by now that hindgut health really comes down to microbial health.

And in microbial health, **the balance between the good and bad microbes AND maintaining a diverse population of good microbes** is everything.

Research shows us that the more diverse the good microbes in your horse's hindgut, **the lower the risk of diseases like colic** and **the better their performance!**



Healthy vs unhealthy gut lining.



## 2

# FEEDING THE GOOD MICROBES

When we feed the good microbes, their populations will flourish!

To feed the good microbes, we need to feed in a way that honours the 55 million year-long evolution of the relationship between the horse and its resident, fibre-loving microbes.

As horses evolved, they roamed free, and existed on a high forage, largely grain free diet that was made up of a HUGE variety of plant species.

## Rule #1 - Feed lots of forage!

Lots of forage provides lots of fibre and the fibre will feed a strong population of good microbes.

Lots of forage for an average size 500 kg OTT is free access to pasture or 10 to 15 kg of hay per day or some combination of pasture and ample hay.

## Rule #2 - Feed a variety of forage!

Forage variety creates fibre diversity. And because the good microbes have different favourite fibres, fibre diversity also creates the holy grail of a diverse population of fibre fermenting microbes.

You can create forage variety by grazing your OTT on pastures with lots of different plant species and/or feeding as many different hays as you can find.

For a lot more detail on hay for your OTT, watch QOTT Nutrition Series Video 6 – Buying Hay for Your OTT.

For the best fibre diversity, try to incorporate legumes like clover and lucerne into the diet, alongside as many different grasses and other edible plants as you can.



## FEEDING THE GOOD MICROBES (CONT..)

### Rule #3 - Feed alternate fibres!

Fibres like sugarbeet pulp, lupin hulls and copra meal, as well as flaxseeds or flaxseed meal, hemp hulls and chia seeds all add to the diversity of fibre in your horse's diet and can help to support a more diverse, good microbial population.

### Rule #4 - Keep grain to a minimum and feed in small meals!

Grains are high in starch, so keeping grain in the diet to a minimum means you are keeping the 'party-food' starch away from the 'party-animal' bad bacteria and keeping their numbers low!

Think of it like keeping the gremlins dry!

**Only feed grain or grain-based feeds to your OTT when absolutely necessary**, when you simply can't maintain their weight or energy levels on forage and fibres alone.

And when you do feed grains or grain-based feeds, keep the amount you feed to a minimum.

Never exceed 1 kg of grain or grain-based feed per 100 kg of BW, which is 5 kg/day for a 500 kg OTT, with no more than 2.5 kg fed in each meal.

**Ideally, for the best hindgut health, you should aim to feed much less grain or grain-based feed than this!**

### Rule #5 - Always feed cooked grains

Cereal grain starch, with the exception of oats, is exceptionally difficult for your OTT to digest in the small intestine.

Which means if you feed raw grains like wheat, corn, rice or barley, 70% or more of the starch they contain ends up in the hindgut where it feeds the bad bacteria and allows their population to explode.

Cooked grains, and particularly extruded grains or grain-based feeds are much more digestible in the small intestine and will deliver minimal starch to the hindgut.



In following these feeding rules, you **feed the good microbes copious** amounts and a large variety of fibre to **keep their populations strong and diverse**.

And at the same time, you effectively starve the bad bacteria, to keep their populations suppressed and at the levels normally found in a healthy horse's hindgut!



## 3

# MEASURING HINDGUT HEALTH

Now you know what a healthy hindgut microbial population looks like and how to feed to maintain it, you are hopefully wondering how you will KNOW if your horse's hindgut is healthy?!

The good news is, you can measure it! Here are 3 ways to measure hindgut health...

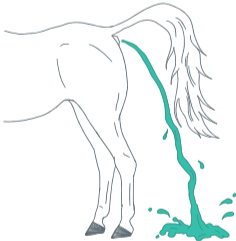


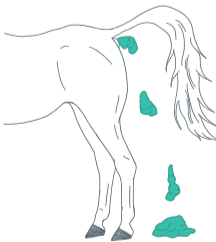

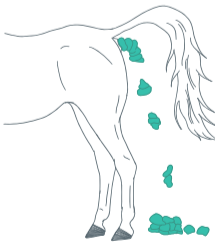





## MANURE SCORING

Regularly paying attention to the consistency and form of your horse's manure will tell you if things in their hindgut are largely OK.

Manure can be scored from '1 - profuse watery diarrhea', through to '6 - dry and hard'.

A score of '4 - soft and semi formed' or '5 - normal and formed', are the scores that typically indicate good hindgut health!

Here is a manure scoring cheat sheet for you:

| Scoring Manure  |   |
|---|---|
| <b>1. WATERY DIARRHEA</b><br>   | <b>2. DIARRHEA</b><br>                |
| <b>3. SOFT &amp; UNFORMED</b><br>  | <b>4. SOFT &amp; SEMI-FORMED</b><br>  |
| <b>5. NORMAL &amp; FORMED</b><br>  | <b>6. DRY &amp; HARD</b><br>          |

# FAECAL PH

The second way we can measure hindgut health is by testing faecal pH. **pH is simply a measure of acidity or alkalinity**, and can tell us if there is excess production of acids in the hindgut.

The pH in a horse's hindgut during slow fibre fermentation stays relatively neutral, hovering around a pH of 6.5 to 7. And this means... their faecal pH should be around this pH 6.5 to 7 too!

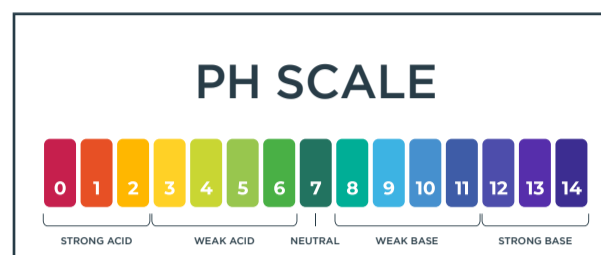
In contrast when your horse's hindgut is overrun by bad bacteria rapidly fermenting starch and producing acids, the pH will drop!

**If faecal pH drops to 6.2 or less, your horse's fibre fermenting microbes will be in a world of hurt and starting to die *en masse*.**

**If you do measure a faecal pH of less than 6.2, you need to make dietary changes immediately** to put more fibre and less starch into the hindgut!

Faecal pH is SUCH a handy tool for tracking hindgut health... AND it's super easy to measure!

You can either use a digital soil pH meter which you can buy online for a few hundred dollars OR a cheap little soil pH test kit that can be easily ordered online, or you can grab one from your local gardening or hardware shop.



# FAECAL MICROBIOME

The third way you can easily measure hindgut health is to do a full faecal microbiome analysis.

High quality microbiome testing will show you exactly which microbes your OTT has in their gut, the balance of good to bad microbes, AND the level of microbe diversity!

For the highest quality and most comprehensive analysis in Australia, you can send samples to EquiGI - <https://www.equigi.com/home>

Plus, watch 'Video 16 - Allay: The First 12 Months' where we look in detail at one OTT's hindgut microbes as they change over her first 12 months off the track!

## THE IMPORTANT BITS

Your OTT's hindgut health potentially has a bigger impact on their overall health, wellbeing and behaviour than anything else!

So it is ridiculously important to keep their hindgut and its resident microbes healthy!

To achieve this, remember:

- 1. There are 3 groups of microbes in your horse's hindgut; the good, fibre fermenting bacteria, the good fibre fermenting fungi and the bad starch fermenting bacteria.**
- 2. A healthy hindgut is one that has lots of the good microbes (bacteria and fungi), lots of different types of good microbes and very few of the bad bacteria!**
- 3. To create a healthy hindgut, feed lots of fibre, feed lots of different types of fibre and minimise the amount of starch in the hindgut!**
- 4. To do this, feed an abundant amount of forage, feed lots of different types of forage and add alternate fibres to the diet.**
- 5. Plus, minimise grain and only ever feed cooked grains; and**
- 6. Regularly monitor your OTT's hindgut health by checking their manure score, measuring faecal pH and testing their faecal microbiome.**

My approach to maximising hindgut health with my horses is to always think about feeds and forages in terms of 'how is this going to affect my horse's hindgut microbes'? Will it support the good microbes? Or will it harm them?

So from now on, whenever you are choosing new forages or feeds, please do the same... Ask yourself 'if I feed this, is it good or bad for my OTT's hindgut and its resident microbes'?!

Always making feeding choices that support hindgut health will give you a calm, super healthy and happy off the track!

ENJOY THE  
JOURNEY