

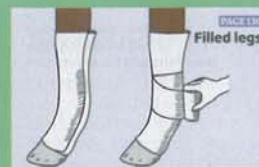
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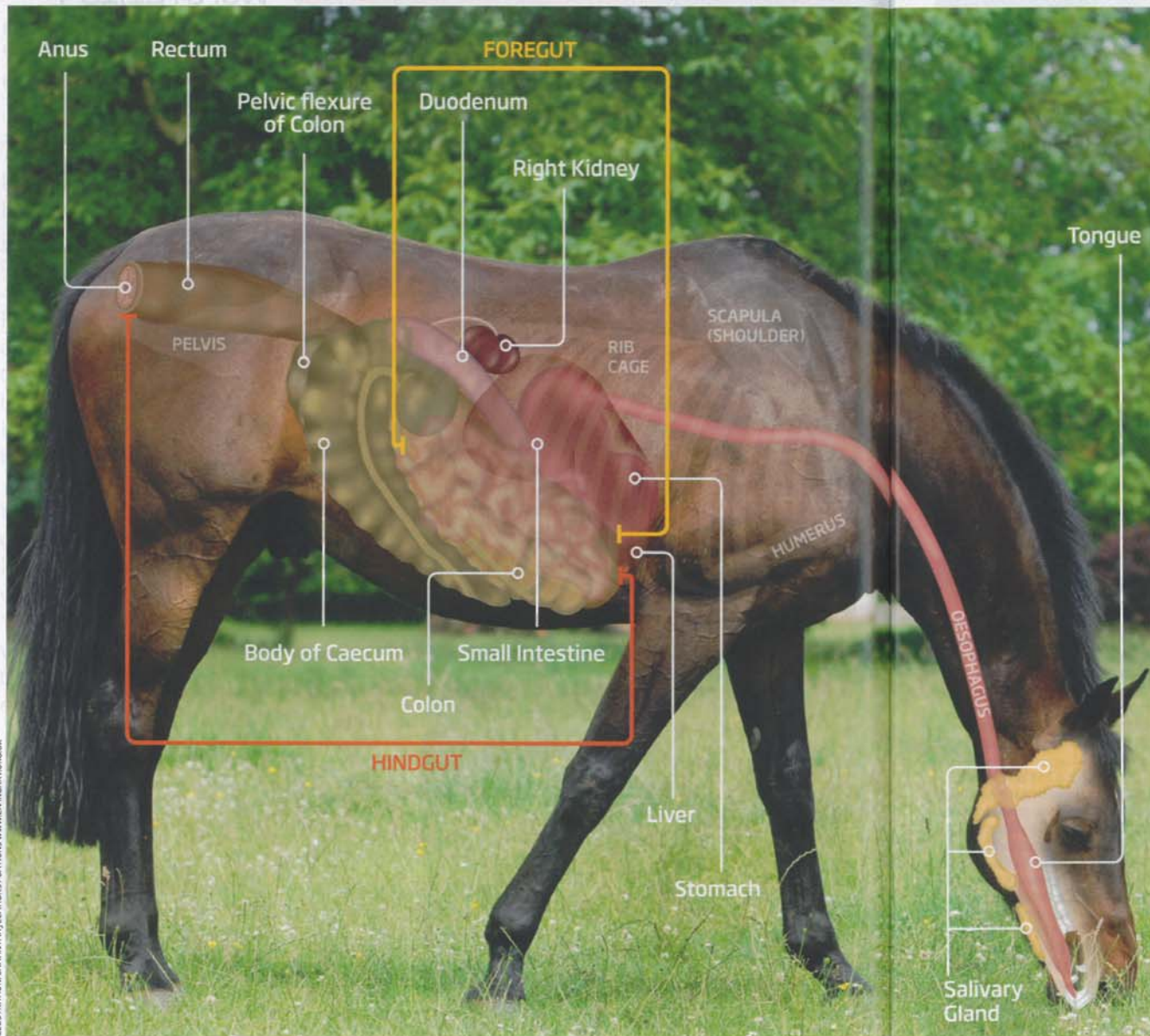


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Eat like a horse

Your horse's food goes on quite a journey from mouth to muck heap - we delve into his digestive system to see how it works

Words Katy Islip

Put simply, your horse's digestive system is responsible for turning food into the energy he needs to function. Also called the alimentary canal or the gastrointestinal tract, this system starts at your horse's mouth, where he takes his food in through grazing, masticating (chewing) it with his teeth before it's passed into his oesophagus and swallowed into his stomach.

From there, the food's gradually digested and broken down into one of five basic nutrients - proteins, fats, carbohydrates, water, and vitamins and minerals. As it passes through your horse's system, specialised areas deal with the different processes involved in absorbing nutrients into the bloodstream, before waste matter is passed out at the far end, so we can enjoy a spot of mucking out or poo picking!

Your horse's digestive system is divided into the foregut and hindgut, with the majority of digestion taking place in the hindgut. That enables him to digest both concentrate feeds and turn cellulose, the hard fibrous structure that gives plants their rigidity, into energy for movement, tissue growth and repair and for maintaining body heat - the very business of life itself.

Read on to follow the passage of food through your horse's complex digestive system, find out what the nutrients he needs actually do, learn more about some common digestive problems and discover how you can support his digestive health so you can make sure your horse stays healthy and happy.

The anatomy of digestion

Join us for a journey through your horse's digestive system as vet Andrea Kilduff guides you through what's what, from the way in to the way out.

MOUTH

Your horse's mouth is the start of his digestive system. He uses his lips to gather blades of grass (or other kind of food) together before his front incisor teeth cut it and take it into his mouth, where his tongue moves it around. The back teeth (both premolars and molars) grind the food up and it's formed into a ball, called a bolus, which is then propelled into the oesophagus.

SALIVARY GLANDS

The process of chewing triggers the production of saliva in the mandibular, parotid and sublingual glands within your horse's head. Horses produce around 10-12 litres of saliva every day, which lubricates food and begins the digestion process.



OUR EXPERT

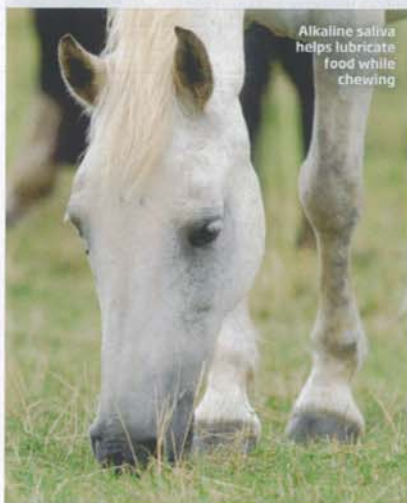
ANDREA KILDUFF works in equine veterinary practice at 608 Equine and Farm Vets in Warwick (a member of the XLVets group). She particularly enjoys internal medicine and ophthalmology. For more information visit www.608vetpractice.co.uk and www.xlvets.co.uk



Digestion begins with every mouthful



Your horse needs energy to fuel both his bodily functions and for movement



Alkaline saliva helps lubricate food while chewing

OE SOPHAGUS

When your horse swallows, the epiglottis blocks the trachea so food doesn't enter his airway, and his chewed food enters his oesophagus, also called the gullet. Between 1.25m and 1.5m long, the wall of the oesophagus has smooth muscle within it which contracts in a wave pattern to allow food to be pushed down to the stomach, in a process called peristalsis.

CARDIAC SPHINCTER

This is the opening between the oesophagus and stomach, and it acts as a one-way valve. It's very strong in horses, and in rabbits too, and is why your horse can't vomit.

STOMACH

Shaped roughly like a 'J', your horse's stomach is very small relative to his size, and compared to other species of a similar size. This is because your horse is designed to be a trickle feeder, eating little and often, plus the majority of digestion occurs in his massive hindgut. His stomach contains gastric juices and hydrochloric acid, which help break food down into 'chyme' so the rest of the system can work.

His stomach is made up of two types of tissue - the lower section is lined with glandular mucosa, which secretes acid to aid digestion, and this section contains in-built protection so the stomach acid doesn't damage it. The upper section is lined with what's called squamous mucosa, which doesn't

have this protection and is therefore vulnerable to irritation if it comes into contact with stomach acid. The two sections of the stomach are divided by a line called the margo plicatus, where the signs of stomach ulcers can often first be spotted. When food is ready to pass out of the stomach, it does so through another control valve called the pyloric sphincter.

SMALL INTESTINE

Most of the digestion and absorption of nutrients occurs in the small intestine, which is made up of three parts - the duodenum, the jejunum and the ileum.

The duodenum is the start of the small intestine and is around 1m long. Food is broken down into basic nutrients here, thanks to the secretion of enzymes from the pancreas and liver. Bile is also secreted direct from the liver, as your horse has no gall bladder to store it.

The jejunum is a longer and more folded section of the small intestine, measuring around 19m long. The chemical breakdown of food is finished here, with nutrients absorbed into the bloodstream to be used by the body or stored in the liver.

The ileum is the final part of the small intestine, and is around 1m long. It continues the absorption of nutrients and controls the passage of partially-digested food, or 'ingesta' (now only containing fibre and water), into the large intestine.

Which nutrients do what

CARBOHYDRATES: These are the most common nutrient fed to horses, and provide up to 90% of his energy. Carbohydrates come in three forms - cellulose (the fibre found in tough grasses and roughage), which is digested in the caecum to produce steady, slow-release energy; starch (found in grains and legumes), which is broken down in the small intestine to produce quick release energy; and sugar (found in cereals such as oats or corn, lush grasses and fruit and veg), which is digested in the stomach and small intestine

to provide instant energy.

FATS AND OILS: A rich source of slow-release energy, oils and fats also add body condition without the bulk of carbohydrates.

PROTEIN: This is required by every cell in the body for growth, repair and renewal, and forms the basis for bone, muscle, cartilage and skin. It's also essential for the structure of red blood cells, resistance to infection, antibody function, and the regulation of enzymes and hormones. If a

horse doesn't have enough carbohydrates or fats in his diet, once he's used his fat stores up then protein will be used for energy, but this leaves a deficit for repair and renewal, leading to poor condition.

VITAMINS AND MINERALS:

These are a vital part of a balanced and healthy diet. Some vitamins can be synthesised in the caecum, while others come from food, and minerals come from plants, which absorb them from the soil as they grow.



Water is also vital for good digestive health and function

LARGE INTESTINE

This area of the digestive system is around 8m long and is made up of multiple parts - the caecum, large and small colon and the rectum.

The caecum is a vital organ for the horse. It's very large (up to 35 litres by volume) and is the equivalent of the human appendix, only in horses it has a distinct function. It's basically a very large vat containing many millions of specially-adapted bacteria, called gut flora, which break down cellulose. By breaking this down into simple compounds, the caecum allows your horse to digest and retrieve nutrients from it. Your horse relies on gut flora and can't survive without them, but they're very sensitive, which is why you should only introduce dietary changes gradually.

From the caecum, food enters the colon where the reabsorption

of water is a key function. The colon is around 3.5m long and has a capacity of some 90 litres, but has to fit into a small space in the abdominal cavity.

The twists and turns this requires means this organ is vulnerable to blockages and impactions - there are four sections with three sharp bends within the large colon, called the sternal, pelvic and diaphragmatic flexures. Blockages often occur because of a change in regime, such as a horse going from being out 24/7 to being stabled.

The small colon continues the absorption of water and electrolytes, and any ingesta left then passes into the rectum, which is around 30cm long and stores faeces ready for passing out of the body through the anus - another sphincter muscle, controlling the passing of faeces.



Food's journey from mouthful to muck is a complex one



SUPPORT HIM

Wild horses would roam miles every day selecting food from a wide range of sources to provide all their nutritional and energy requirements. We need to support our domesticated horses with nutritionally-balanced diets containing everything he needs.

Advice online

For more Horse Care advice and videos head online to www.yourhorse.co.uk or use the QR code:



A DELICATE BALANCE

Ingested food which enters the caecum is fermented by no fewer than 44 species of bacteria, and these gut flora are the only organisms which can break down the tough fibre left after other nutrients have been absorbed in the small intestine.



The caecum turns cellulose into vital energy

Common digestive problems



WORRIED ABOUT WORMS? Intestinal parasites, in the form of worms, can have a huge effect on your horse's long-term digestive health, not to mention his overall wellbeing. Get the lowdown on worms and worming by grabbing issue 367 - call 0844 8488872 for a back copy.



SPOTTING THE SIGNS OF CHOLIC If you missed our guide to spotting and coping with colic in issue 364 call 0844 8488872 for a back issue.

It might sound surprising in an animal intended to graze almost non-stop, but the equine gastrointestinal tract is actually quite badly designed - there's a lot packed into the abdominal cavity, and the gut is only fixed in place in a few spots, meaning there's a lot of scope for things to move around.

It's also quite a complex system, which relies on very delicate balances of bacteria to function properly, but with a little care and attention, it's possible to support your horse's digestive health simply and effectively. Read on for a quick guide to some of the more common digestive health issues which affect horses, as well as Andrea's guide for keeping his gut in great condition.

DENTAL HEALTH

It's really important to keep your horse's teeth in good condition as otherwise he may struggle to chew food properly, which can lead to problems such as choke (see above right) and can impair the digestive process or lead to blockages and colic. Younger horses can suffer cysts or abscesses as their adult teeth erupt, and tooth root infections can also occur, sometimes without visible cause.

Vets and equine dental technicians can check teeth and should do so every six to 12 months to check for any problems and ensure even wear. Horses' teeth eventually wear down and will fall out, but it is possible for horses to cope without their front (incisor)

teeth through careful feeding of plenty of short-chopped fibre.

CHOLIC

This is the main oesophageal problem suffered by horses, and occurs when food partially or completely blocks your horse's gullet, causing discomfort. It's usually a result of a horse bolting his food without chewing it properly or swallowing it in large lumps, which then get stuck in the long oesophagus. Most cases are resolved fairly easily, but complications can occur so if you think your horse has choke, always call your vet.

COLIC

This catch-all term is used to describe any disease which causes your horse abdominal pain. Because of the design of his digestive system, with its small stomach and tightly-packed intestines, if there's a problem somewhere it can all get over-full very quickly, which can cause colic. Colic is the most common cause of death in horses, and it's crucial to define which type of colic a horse is suffering from in order to treat him most effectively and prevent future episodes.

STOMACH ULCERS

These painful lesions are the most common equine stomach problem, and are caused by the strong stomach acid splashing onto the unprotected squamous mucosa area of stomach lining. Factors which can lead to the development

of stomach ulcers include hard work/training and stress.

To provide protection against ulcers it helps to stable your horse as little as possible so he can trickle feed as nature intended. If he's stabled, feed him little and often with high fibre feed so his stomach acid constantly has something to work on and is less likely to splash around. Minimise the use of concentrate feeds, and reduce stress - things like keeping the field hierarchy stable can help.

CONSTIPATION

If your horse is suffering from constipation he'll only be passing small amounts of hard, dry manure, which may be coated with mucus. It's usually caused by the stomach being overloaded with too much food, such as when a horse breaks into the feed room, or food that's indigestible or hasn't been chewed enough for easy digestion. Dehydration can also be a cause, and damage from worm infestations can also cause the digestive system to slow down or function poorly.

PROXIMAL ENTERITIS

An inflammatory condition affecting the small intestine, proximal enteritis will make a horse acutely ill, causing the affected part of the intestine to stop functioning properly. It's not entirely clear what causes this condition, which can be infectious in some cases, but it's thought it could be linked to an imbalance of gut flora. It can sometimes mimic a small intestine twist, because the malfunction stops the absorption of fluids, which instead accumulate in the intestine, causing dehydration

Your horse's poo can tell you a lot about his health



and leading to swelling which in extremis can lead to the rupturing of the intestine or stomach.

COLITIS

This is an inflammation of the horse's colon, causing a loss of function so water cannot be removed from part-digested food, causing severe diarrhoea. Bacterial colitis occurs when the normal balance of gut flora is disrupted, and can be caused by organisms including salmonella, clostridia and e-coli. This again causes severe diarrhoea and is a very serious condition, which can become life-threatening.

MELANOMAS

Older grey horses can be susceptible to melanomas (small cancerous growths) around the anus - they are usually slow-growing but can occasionally become large enough to cause an obstruction to the passing of faeces. Melanoma can also grow inside the abdomen so if there are some outside there are likely to be internal ones present too.

Next month

Don't miss our big vet feature next month where we bring you a hands-on guide to essential first-aid - on sale Jan 24.

Keep his tummy happy

Support your horse's alimentary system with our tips for top digestive health:

- Fibrous foods should form the mainstay of your horse's diet, so make sure he's getting plenty of grass and hay
- Feed little and often - horses are better equipped to digest small meals, rather than the convenient but artificial pattern of two main meals a day, and introduce any new feedstuffs gradually to allow his system to adjust
- Make sure you're not over-feeding your horse - if he's not in

hard work (for example, in training for eventing) he won't need large amounts of hard feed

- Keep things simple - the majority of pleasure horses don't need much at all, and if he doesn't need hard feed just give a low-calorie balancer to provide the right vitamins and minerals
- Always ensure he's got fresh drinking water available, and if your horse does hard work (for example eventing or an endurance event) it's important to add electrolytes to his water to avoid dehydration and replenish lost salts. ☑



Strong teeth get digestion off to a good start



Scoping can help confirm the presence of ulcers