

# Relieving Metabolic Problems

## *Feed management is the key*

“That little chestnut filly looked like she could really run, but she tied up so bad, we had to take her out of training.”

“I did everything I could think of to care for that horse, and he got laminitis anyway. I tried to nurse him through it, but I finally had to have him put down.”

“My gelding gets really shaky sometimes, to the point of almost falling over. We used to have so much fun, but now I’m afraid to ride him anymore.”

These stories of uncomfortable horses and disappointed owners have a common thread: some type of metabolic disorder is to blame in each case. While the problems may be different, changes in carbohydrate intake can have a significant positive impact for each of these horses. Knowing what to feed, and in what amount, is often the key to overcoming metabolic disorders.

**Understanding carbohydrates.** With today’s emphasis on carbohydrates in the human diet, there’s a lot of confusion about “good” and “bad” carbs, as well as why a low-carb diet



seems to be such a great idea. Jumping on the popular bandwagon, horse feed manufacturers have come out with an array of low-carb feeds pointed at horse owners. The unspoken message seems to be, “If you love your horse, you’ll give him this product because it’s better for him.” In actuality, low-carb feeds are not necessarily right for many horses. They do, however, have a very important place in the management of some metabolic disorders.

PHOTOGRAPH | MARK LLEWELLYN

Right: Obese horses that are predisposed to metabolic disorders will often benefit from a reduction in calories and an appropriate exercise program. For pastured horses, this might mean using a grazing muzzle to limit grass intake.



PHOTOGRAPH | MARK LLEWELLYN

Racehorses are sometimes afflicted with the metabolic syndrome known as RER, recurrent exertional rhabdomyolysis. A diet with moderate to high energy and a generous allotment of fat usually helps horses diagnosed with RER.

*To provide vitamins and minerals, a supplement such as I.R. Pellet, manufactured by KERX, should be fed.*

As they relate to equine diets, carbohydrates can be divided into three groups. First comes

the hydrolyzable carbohydrate group (CHO-H). This includes simple sugars, sucrose, and some starches that are readily digested in the horse's small intestine. Digestion of these substances produces a rise in blood glucose. The second group is made up of rapidly fermentable carbohydrates (CHO-FR). Processing of these carbohydrates yields mostly lactate and propionate. Falling into this group are starches that escape digestion in the small intestine (a significant factor in some cases of laminitis) as well as galactans, fructans, and pectin. The third group, slowly fermentable carbohydrates

(CHO-FS), includes cellulose, hemicellulose, and lignocellulose. Acetate and butyrate are produced by this group.

The hydrolyzable carbohydrate group is important because blood glucose is a major source of energy for muscular effort. However, in some horses with metabolic problems, too much glucose in the blood may have serious consequences. Muscle cramping or weakness, lack of energy, growth problems, excessive weight gain or loss, and repeated bouts of laminitis can all be traced to defects in the way glucose is metabolized. A solution for each problem involves thoughtful choices as to the type and amount of feed to provide.

### **Different problems, different answers.**

Equine Cushing's disease (ECD), a problem seen most often in older horses, is caused by a tumor or tissue overgrowth in the pituitary gland. It is also known as pituitary pars intermedia dysfunction (PPID). Horses with ECD have high levels of adrenocorticotrophic hormone resulting in increased secretion of cortisol from the adrenal glands. These horses are at higher risk of developing laminitis and may develop cortisol-induced insulin insensitivity. Clinical signs of disease are a heavy hair coat that does not shed properly, excessive thirst, excessive sweating and urination, lethargy, and loss of appetite. Pergolide, a drug that suppresses growth of abnormal pituitary tissue, is often used in treatment.

Cushing's horses that are insulin insensitive require feeds with a low glycemic response (relatively mild increase in blood glucose and insulin following a meal). Carb-rich pasture and grain meals may quickly lead to laminitis in horses with ECD, but these horses must still meet their requirement for basic nutrients.

For overweight horses with ECD, hay should make up the bulk of the diet. To provide vitamins and minerals, a supplement such as I.R. Pellet (KERx, [www.kerx.com](http://www.kerx.com)) should be fed. In trials with Thoroughbreds, a lower glycemic response was seen when the horses were given hay plus I.R. Pellet than when hay alone was fed. Some ECD horses have trouble maintaining body condition. For those horses that need to gain weight, it's still important to use feeds that produce a low glycemic response. A high-fat, low-carb ration like Re-Leve (KERx, [www.kerx.com](http://www.kerx.com)) provides extra calories with-

out boosting carbohydrate intake. The addition of vegetable oil to a horse's grain ration greatly reduces glycemic response, and rice bran also has a low glycemic index. A note of warning: So-called "senior" feeds often contain molasses and other ingredients that are high in sugar, making these products a less desirable choice for ECD horses.

Equine metabolic syndrome (EMS) is a condition characterized by insulin resistance and an increased risk of pasture-associated laminitis. EMS horses epitomize the term "easy keeper" and often have an obese, cresty appearance. Like overweight horses with ECD, EMS horses need to lose weight while still meeting their nutritional requirements. Hay or limited grazing can meet the forage requirement, and supplementation with a balancer such as I.R. Pellet can be used to assure proper nutrition. Except in cases where the horse is lame from laminitis or other causes, exercise should be increased gradually to encourage weight loss.

Recurrent exertional rhabdomyolysis (RER) is an inherited condition that involves abnormal intracellular calcium regulation during muscle contraction. Horses with RER suffer from painful muscle cramping when they exercise. This "tying-up" is sometimes triggered by excitement or stress, and is seen somewhat more often in young, nervous fillies than in colts in race training. Horses with RER are often training and exercising at an intense level, so they usually have a need for more calories than can be supplied by the forage portion of the diet. At the same time, high grain intakes are associated with tying-up. Research conducted at the University of Minnesota in conjunction with Kentucky Equine Research

## Low-carb not the same as low-energy

Before choosing a feed product for a horse with a metabolic problem, be sure you aren't heading for trouble on the energy front. A feed that's advertised as low-carb may simply contain lots of coarse fiber—some of which is necessary in the equine diet—and very little else. It has a fashionable low-carb label, but it doesn't meet your horse's requirements because it provides a very low level of nutrients and energy. Growing and exercising horses often need the energy provided by concentrates, so when manufacturers remove calories by using less grain in a feed, they should include higher levels of fat and/or fermentable fiber. These feed components provide plenty of get-up-and-go to keep your horse moving, but energy from these dietary sources won't trigger the metabolic upsets caused by overconsumption of hydrolyzable carbohydrates. For a low-carb feed that doesn't short your horse on energy, look for a product that contains rice bran, soy hulls, or beet pulp.

# Glycemic Index: What Is It?

Glycemic index is a number assigned to a type of grain, hay, or product indicating the rate of carbohydrate absorption after consumption of that dietary component. A concentrated feed that is rich in grain has a relatively high glycemic index, while various types of hay have the lowest numbers. Horses with some metabolic diseases stay healthier when their diets are made up of feeds with lower glycemic indices. The table below lists common feeds and forages and the glycemic index for each, where whole oats has been given the value of 100.

<b>Feed or forage</b>	<b>Glycemic index</b>
Sweet feed	129
Whole oats	100
Commercial feed for “senior” horses	100
Molassed beet pulp	94
Cracked corn	90
Unrinsed beet pulp	72
Orchard grass hay	49
Rice bran	47
Ryegrass hay	47
Alfalfa hay	46
I.R. Pellet (KERx) and orchard grass hay	34
Rinsed beet pulp	34
Bluestem grass hay	23

(KER) suggested that using a low-starch, high-fat feed such as Re-Leve instead of traditional grain mixes significantly reduced the amount of muscle damage in horses with RER.

Polysaccharide storage myopathy (PSSM) is most commonly seen in horses with Quarter Horse breeding, and also in some draft and warmblood breeds. It is characterized by abnormal glycogen accumulation in muscle tissue caused by a hypersensitivity to insulin. Physical problems range from muscle quivering and cramping to sudden collapse. Horses with PSSM are best managed on a program similar to that of RER horses, with energy and nutrients provided by a low-starch, high-fat feed like Re-Leve. Because these horses typically do not need the same high plane of energy required by RER horses, Re-Leve Concentrate was designed to deliver dietary fortification at a lower daily intake.

Developmental orthopedic disease refers to a set of skeletal problems related to improper development and maturation. Joint problems like osteochondritis dissecans (OCD), cysts in cartilage, swelling, and lameness are some manifestations of defects in the process by which a young horse’s bones grow and harden. Research from KER has shown that feeds producing high levels of blood glucose and insulin are linked to higher than average levels of OCD. While there is more to be learned about the causes of OCD, there is some evidence that digestion of large grain meals may increase a young horse’s risk. One theory is that high levels of blood insulin affect the maturation of cartilage cells, possibly leading to altered cartilage growth or faulty mineralization. The use of concentrates with a low glycemic index is suggested to support growth in young horses without causing a potentially dangerous starch overload. 🏠

