

EMS, Insulin Resistance, Cushing - Modern Civilization Diseases

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In recent years diseases, which were hitherto unknown, are appearing in our horses and in veterinary literature, more and more there are metabolic syndrome diseases that our horses are suffering from. Veterinary medicine speaks of a syndrome when they have visible symptoms without knowing what causes these are based upon. This includes, for example, the Equine Metabolic Syndrome EMS. That is translated simply: "Equin" means: to do with the horse, "Metabolic" means: has to do with metabolism, and "syndrome" means: we have no idea what it is. A few years ago in veterinary medicine there was the principle: Horses do not get diabetes. Then suddenly horses with "EMS" appeared, and today it is called more or less insulin resistance behind closed doors - which is nothing more than the type II diabetes in humans. But it is not quite as simple because there are horses with EMS symptoms, without insulin resistance. Conversely, there are horses with insulin resistance, but without EMS symptoms. Not all horses have typical EMS symptoms with a blood sugar problem.

Among the more frequently diagnosed diseases in addition to EMS is also Equine Cushing's Syndrome, better known as "Cushing's". In the older veterinary literature Cushing's has been described as "rarely occurring disease in very old horses". Today almost every other horse over

20 is diagnosed with Cushing's. Veterinary medicine still believes that its cause is a tumor on the pituitary gland, called a pituitary adenoma. It is striking however, that for Cushing's and EMS the same symptoms are described. And that the two disorders are distinguished primarily on age: Horses under 15 years are diagnosed with EMS, horses for over 16 years with Cushing's. Also interesting is the fact that most of Cushing's horses react with a significant improvement in their symptoms, to a complete healing if you restored their metabolism. But in most Cushing's horses pituitary adenomas are unlikely to disappear due to a metabolic restoration. A much more natural statement would be that the symptoms of Cushing's are not about the consequences of a pituitary adenoma, but of a metabolic disorder and the interplay of hormones.

To better understand both diseases, you have to look a little closer into the hormone system of the horse. There are various endocrine glands in the body that play together as an orchestra the system is controlled by a conductor - the pituitary gland. This controls all the other endocrine glands in the body: the thyroid gland, the adrenal gland, the gonads (ovaries and testes), the pancreas and many others. All these glands in turn control the pituitary gland - so if enough hormone is produced, then it causes inhibition of the pituitary gland and thus a reduction in hormone production. To make things even more confusing, the endocrine glands also affect each other. Thus, the thyroid controls among other things the adrenal gland and the sex glands. The sex glands control the adrenal gland and the adrenal gland controls for itself - the adrenal cortex controls the adrenal medulla and vice versa - and, among others, the kidney and the pituitary gland. This complicated system ensures that any disturbance can lead to one point of the hormonal system impacting in a very different ending than it is meant to. We've known for years with dogs and cats that neutering both the male and the female in most cases leads to thyroid problems, which is why the animals are frequently so fat despite normal feeding.

Hormones are substances produced by the body to regulate its own metabolism. They are effective even in the tiniest amounts and work very specifically - by binding to receptors of their target cells and only causing an effect there. Cells without the appropriate receptor do not respond to the hormone because they virtually "blind" are for this hormone. Pour in the pituitary hormones to regulate the thyroid and they react only the cells of the thyroid gland receptive to the hormone but not the muscle, connective tissue or liver cells, which do not hold receptor sites for that hormone.

In addition, the receptors are differently sensitive to the matching hormones. Each cell of the body basically has insulin receptors, however, these receptors are the most sensitive in the muscle and liver cells. These cells, muscle and liver, also have the most insulin receptors. The muscle cells because they need plenty of sugar, and the liver cells because they convert excess sugar into storable forms. Now distributes the pancreatic hormone insulin - it binds primarily to receptors in liver and muscle cells. These muscle and liver cells respond to the insulin binding on its surface so that they begin to take up sugar from the blood. Thus, the blood sugar level drops. If this insulin receptor reaction is prevented at any point, the horse cannot regulate his blood sugar level lower, since the muscle and liver cells do not absorb enough glucose from the blood. This is called insulin resistance.

Selenium

Selenium plays an important role in the reduction of blood glucose by insulin. This trace element was completely ignored 50 years ago in diagnostics. Selenium deficiency was unknown in horses, since selenium values were not determined by default. At the end of the 1980's screenings of cattle were held that came to the conclusion that in these high performance animals selenium deficiency was very common. This realization was followed by the addition of selenium to the feed for dairy and beef cattle. Then we also conducted screening in horses, and in most horses selenium deficiency was also diagnosed. Here, each laboratory uses its own limits just as, these values, have been determined by different authors in different studies. These values vary so strongly that a value at one laboratory which is found to be in the normal range, may be at other laboratories already outside the limits upwards as well as downwards.

Selenium levels in the blood plasma according to different authors:

author	limits
Ullrey (1987)	80-120 ug / l
Meyer (1990)	60-140 ug / l
Meyer (1990)	60-80 ug / l
Pulse (1994)	140 - 250 ug / l
Dietz and Huskamp (2006)	8-133 ug / l

Although these studies seem rather questionable because of the limit values used, in the 1990s they began to add the first selenium to the horse's food. Since the beginning of the 20th century added selenium in horse's food is standard. They were looking for the most obvious explanation for the consistently low selenium levels in blood counts and since then it means that our soils are poor in selenium. The industry has reacted to this discovery and since 2003 selenium is added to the fertilizers to make accumulate in the soil. Thus, the selenium content in feed increases from year to year. All this has meant that the horses get fed today, in most cases, far too much selenium - in cereals, pellets, mineral food and various food supplements. Here, a variety of studies have long shown that the selenium in plasma value has nothing to do with the selenium levels in the tissue. A large number of studies conclude that the value of selenium in plasma cannot be used for the diagnosis of selenium supply, because it decreases first and increases as a last resort. The horse may be in the "deficiency" in the blood plasma long ago but in the tissues in which the selenium is needed clearly in excess. Nevertheless a selenium supplement is fed once the "selenium deficiency" in the blood picture is diagnosed. Here, the lack of selenium in the

blood picture only shows actually that something is out of whack in metabolism. Instead of looking for the cause, treatment is only focused around the symptoms.

But what makes this selenium in the body? In small amounts it is required at various points in metabolism, especially as a radical scavenger. In larger given quantities - but still below the toxic amount - it very quickly hurts the organism at many and very different places. It has long been shown in animal studies and in studies in humans that selenium interferes with insulin signaling. If selenium absorbed in the basic amount of food through the present and beyond into a longer time leads both in mice and in humans to a significantly higher risk of diabetes type II, this means that adding selenium continuously over time means to develop insulin resistance. The continuous addition of selenium in all commercially available horse food is logically associated with the appearance and increase the EMS cases in the horse.

At the same time selenium accumulates mainly in the glandular tissue. The glands include not only the liver, but also all of the hormone producing glands. And here we come to our diseases, which are due to disorders of the endocrine system: selenium accumulates particularly in the liver, thyroid, adrenal glands and reproductive organs. An excess of selenium in liver and thyroid tissue (which may present simultaneously with a selenium deficiency in the blood plasma!) leads to too much normally bound thyroid hormones being released and circulating in the body. This results in a negative feedback loop, it brakes the pituitary thyroid hormone production. The result is an underactive thyroid (hypothyroidism). This sub-function now leads to an up-regulation of adrenal hormones, the glucocorticoids. This body's own cortisone is responsible for ensuring that everything that is circling in the body is converted into sugar. These mainly include proteins whose deficiency is responsible for the visible symptoms such as: muscle loss, weak immune system, brittle tendons, laminitis, poor hoof horn, bad skin and hirsutism, which is often associated with Cushing's plush fur - symptom. Simultaneously the blood sugar level rises and these large amounts of sugar cannot be utilized. This can have several effects. The pathologically elevated blood sugar levels can cause insulin resistance, which we see in the blood picture. Alternatively, the biochemical approach is taken to form fat from the excess sugar and store it, which can lead to the typical fatty deposits on the neck and on the rump. As a third possibility, the body can break down the sugar uncleanly and store this in the connective tissue. This then leads to the occurring of "fat" looking horses that have not stored fat, but large amounts water in tissue as counter-regulation of the acidity. Which of these paths is taken, is individual, so we can find so many different symptoms of the same underlying cause.

Therapy

As in my articles to kryptopyrroluria (KPU) and polysaccharide storage myopathy (PSSM) is executed, so it is the same with EMS and Cushing's rule for "fed diseases". Very few horses have a genuine Cushing's, where a pituitary adenoma is based. These horses usually show rapid deterioration of symptoms despite medical therapy and usually have to be euthanized within 2-3 years after diagnosis. The other horses with Cushing's symptoms should be referred to as pseudo-Cushing's horses, show the Cushing's symptoms, but have a very different cause. The

reason is of course again in feeding. The same is true for EMS horses aided by feeding and a useful therapy back to a normal metabolic pathway.

That the horses react with Pseudo-Cushing's or EMS, is often due to a combination of different causes and triggers: Bad bowel movement by too little hay or Haylage feeding, whereby the intestinal flora is massively disrupted and the liver becomes overloaded. The resulting KPU with disturbances of liver detoxification and stress to the immune system, which can partly lead to considerable stress in the metabolism of the horse, and thus increase in ACTH.

Too much sugar in feeding by thermally digested cereals, generous carrots, apple, banana and treat feeding, which promotes the development of insulin resistance by high blood sugar fluctuations.

Feeding of large quantities of clover, soy (thiourea), Linseed or carrots (Nitrat!), all shown to also contribute to hypothyroidism.

Ample feeding of selenium via the commercially available "power feed" preparations or as selenium supplements from the vet.

The selenium feeding acts certainly often only as a trigger or as the straw that breaks the camel's back. As a result, the horse owner has a horse with EMS or Cushing's who are managed by partly strange "sugar-free" - more bad than good diet food or medicine gifts - but nevertheless still selenium enriched. This rule is again what the big Cranio-Sacral Therapist Sutherland at the time said: If you understand the mechanism, the treatment is simple. Key in these diseases is always the change to feeding on plenty of hay; pasture access according to symptoms and possibly mineral supply. Reduce power feed and prefer to give a high quality concentrated feed such as oats or Quetschgerste and only as needed. Then the colon needs to be rehabilitated, the liver needs to be supported in their detoxification and Entsäuerungsfunktion and the hormone system should be re- set to "Normal". This can be achieved with sensible food supplements and homeopathic support. Parallel to nutrition the horse can be treated with CranioSacral, a form of therapy that works very well on the autonomic nervous system, and thus also on the endocrine system. With proper feeding and meaningful therapy neither EMS nor Cushing is a death sentence, but can be set as any other metabolic imbalance again.

The theses from Dr. Fritz confirm the researches and observation of Academia Liberti. Many horse owners consider their horses too thick, but in the most cases it is large amount of stored connective tissue water, as a consequence of diseased metabolism, like Dr. Fritz writes. All horses kept in boxes or small paddocks have this problem (more or less visible). Their body is programmed to be in slow, grazing movement most of the time. When the grazing time or hay is limited then this problem gets only worse, the metabolism is even more disturbed in its function and the illness is only matter of time. In the case, that these horses would come into optimal

living condition, where they can eat and move according to their own rhythm - the body would heal and diseases would disappear. Feeding fruits and vegetables to the horses is not the problem of such diseases nor they would be boosted through it. Quite the contrary, as more vital substances we can offer to the horse, as less risk for them to get ill. Horses take the nutritional substances which they need for living. If they do not need something, they will simply stop eating. Like Dr. Fritz is describing, the artificial, industrialized food as well as lack of natural species appropriate food (pasture, hay, herbs, trees, bushes) - is one of the main causes of the diseases in our horses.

Maksida Vogt



Interview Maksida Vogt with Dr. Christina Fritz

https://www.youtube.com/watch?v=_EaEECoeUuw

Blogpost: "Horses are no athletes"

<http://www.maksidavogt.com/blog.php?flag=en§ionid=0&blogid=34>