

METABOLIC DISORDERS IN HORSES:

Understanding EMS, Cushing's & Insulin Dysregulation - Beyond the Buzz



UNDERSTANDING THE BASICS

In recent years, there has been a notable increase in horses diagnosed with metabolic disorders. These include Equine Metabolic Syndrome (EMS), sometimes referred to as “equine diabetes”, as well as insulin dysregulation, and Equine Cushing's Syndrome, also known as PPID (Pituitary Pars Intermedia Dysfunction).

Up until the 1980s, EMS and insulin dysregulation were completely unknown in veterinary literature. Cushing's was described as an extremely rare condition, occurring only in very elderly horses. Today, nearly half of all horses over 18 years old are diagnosed with Cushing's. However, it's important to note that not every horse showing EMS symptoms has

insulin dysregulation, and not every horse displaying Cushing's symptoms has a pituitary gland tumor.

To truly understand these conditions and their symptoms, we need to look more closely at the horse's hormonal system.

THE ENDOCRINE SYSTEM – A HIGHLY SENSITIVE AND SELF-REGULATING NETWORK

Much like an orchestra, the body's various endocrine glands work together in perfect harmony. The pituitary gland acts as the conductor of this orchestra, controlling all other hormone-producing glands including the thyroid, adrenal glands, reproductive organs (ovaries and testes), pancreas, and others. These glands, in turn, provide feedback to the pituitary gland and – additionally – influence each other, creating a complex system of checks and balances.

The Hormonal System: Connecting Distant Cousins

The thyroid gland influences the adrenal glands, which in turn regulate both themselves and the pituitary gland. This intricate system means that a disruption in one area can have far-reaching effects elsewhere in the body. Hormones are naturally produced substances that regulate various metabolic processes throughout the body. They are effective in minute quantities and work with remarkable precision, as only specific cells have receptors for each particular hormone. Cells without these receptors are essentially “blind” to that hormone, and different cells’ receptors vary in their sensitivity.

Insulins Role In Blood Sugar Control

When blood sugar levels rise after eating, insulin plays a crucial role in maintaining balance. This hormone, released by the pancreas, primarily targets muscle and liver cells - the body's most insulin-sensitive tissues. These cells act as natural glucose warehouses: they quickly respond to insulin by absorbing excess glucose from the bloodstream, effectively lowering blood sugar to normal levels. Later, when blood sugar levels fall, the liver releases its stored glucose back into circulation, while muscles tap into their reserves for energy production.

High-Sugar Diets Reduce Insulin Receptor Sensitivity

Unlike humans, horses can take up to six hours to normalize their blood sugar levels after eating concentrated feeds. This process becomes even slower in leisure horses with little exercise. Regular exposure to high-sugar foods - whether from grain, treats, or hidden sources like sugar-rich hay - can overwhelm this delicate system. Over time, the constant flood of insulin causes cells to become less responsive, much like a key wearing down its lock. When cells stop responding effectively to insulin, glucose remains trapped in the bloodstream, resulting in insulin resistance or insulin dysregulation - a condition similar to early-stage Type 2 diabetes in humans.

Selenium's Critical Role in Hormone Regulation

Chromium plays a vital role in helping muscle cells respond to insulin's signal to absorb blood sugar. However, excess selenium can displace chromium, causing muscle cells to become unresponsive to insulin. Until the 1990s, selenium deficiency in horses was rarely discussed since it wasn't routinely tested. When selenium testing became standard - with unfortunately too high reference ranges - a myth about selenium-poor soils emerged. As a result, nearly all commercial horse feeds are now fortified with selenium, and for the past decade, it's even been added to fertilizers - a concerning trend.

Blood Tests Don't Tell the Full Selenium Story

Testing for selenium status is more complex than it might seem. While blood tests are standard practice, they only tell part of the story. Think of it like a fuel gauge that doesn't quite match what's in your tank: blood levels can show “empty” while body tissues - particularly hormone glands, muscles, and liver - still maintain ample reserves. The opposite is also true: when horses receive selenium supplements, especially the organic form common in commercial feeds, tissues quietly stockpile the mineral before any changes appear in blood work. This hidden accumulation has led to a concerning trend of horses developing subtle, chronic selenium toxicity. The challenge? The line between helpful and harmful selenium levels is razor-thin, and many horses now unknowingly cross it through fortified feeds and supplements.

The Impact of Selenium Overload

Excess selenium accumulation in the liver or thyroid (possible even with low blood selenium!) can trigger excessive activation of thyroid hormones. Through natural feedback mechanisms, this may cause the pituitary to adjust thyroid hormone production, potentially leading to an undiagnosed hypothyroid condition. The elevated active thyroid hormones often increase production of adrenal glucocorticoids - the body's natural cortisone. This hormone begins converting proteins into sugar for energy, responding to the body's perceived energy crisis. Meanwhile, in muscles, excess selenium displaces chromium, promoting insulin resistance.



Clinical Signs

Blood sugar often rises, feeding into a cycle that can worsen insulin resistance. The body then typically responds in one of two ways: Some horses appear deceptively “muscular” at first, as fat infiltrates between muscle layers. Only later do the classic EMS signs appear - those distinctive fat deposits along the crest of the neck and at the tail base. Other horses develop a different pattern, where compromised sugar metabolism leads to fluid retention in connective tissue. These horses don’t look traditionally fat, but instead appear puffy, with thick, hardened necks and swollen lymph deposits along their flanks. Over time, these hormonal disruptions manifest in a constellation of telltale signs in horses that we call “Cushing’s”. You might notice muscle loss, weakened immune function, tender tendons, recurring laminitis, crumbling hooves, skin problems, and the trademark thick coat that lingers well into spring.

Diagnostic Challenges

Each horse’s metabolic response varies, making these conditions tricky to diagnose. For suspected Cushing’s, vets typically measure ACTH - a pituitary hormone also is released during stress to activate the adrenal glands. ACTH levels naturally fluctuate throughout the day and rise in stressful situations like the vet visiting. Therefore, high ACTH alone doesn’t confirm Cushing’s (PPID).



EMS, insulin dysregulation, and most Cushing’s cases are essentially “lifestyle diseases” created by modern feeding practices. True healing comes from addressing the root causes rather than merely suppressing symptoms by administering drugs.

THE HIDDEN IMPACT OF SELENIUM OVERLOAD

Muscles, Liver & Thyroid:

Excess selenium accumulates in these tissues, triggering overproduction of active thyroid hormones.

Pituitary:

Responds by reducing TSH hormone production, leading to thyroid dysfunction (causing EMS symptoms). Meanwhile, excess free thyroid hormones trick the body into perceiving an energy crisis.

Adrenal Glands:

Increase glucocorticoid production, breaking down proteins into sugar for energy – causing insulin dysregulation and creating the classic Cushing’s symptoms.

Muscles:

Become insulin resistant due to selenium overload and constantly elevated blood sugar - often leading to laminitis.

Severely Disrupted Hormonal Balance with all known symptomatic effects.



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MANAGING METABOLIC ISSUES: WHERE TO START?

When treating EMS, Cushing's, or insulin dysregulation, the first step is always to evaluate and improve your horse's diet and living conditions. Modern feeding practices like limiting hay or relying on haylage and processed feeds can compromise gut health. This disruption creates metabolic stress, triggering increased ACTH production and hormone imbalances.

Cut Back on Sweets

Processed grains and generous treats like carrots, apples, bananas, or commercial treats can promote insulin resistance. Watch out for hidden sugars in pasture and hay as well as feed-ingredients like apple pomace.

Skip Selenium Supplements

Be cautious of organic selenium supplementation based on blood tests alone - it's often the final straw that tips metabolic balance. Even in horses with otherwise healthy diets, too much selenium can trigger insulin resistance. What's more concerning: this disruption can persist for years after supplementation ends, even when blood values appear normal.

Focus on Fiber and Gut Health

Start by switching to a forage-based diet with plenty of low-sugar hay, appropriate turnout, and balanced minerals. Then support digestive health to reduce stress on the immune and detoxification systems.

Restoring Natural Metabolic Balance

OKAPI PankrEMS helps improve insulin sensitivity in muscle and liver cells, supporting healthy blood sugar regulation.

As cellular function normalizes, we can begin gentle detoxification with **OKAPI Spirulina** (in pellet or powder form) and **OKAPI Detox Herbs**. Supporting hindgut health with **OKAPI Prodic** and providing essential amino acids through **OKAPI Lymeth** completes the recovery process, helping restore healthy metabolism and rebuild lost muscle mass.

Gentle craniosacral therapy helps rebalance the hormonal system naturally. For ongoing nutritional support, consider **OKAPI Four Season Feed** - a pure herbal blend that changes with the seasons, replacing traditional concentrates while cleverly disguising any needed supplements. If your horse shows muscle loss from Cushing's, **OKAPI Sainfoin** offers the perfect solution: rich in protein yet completely grain-free.

IN SHORT:

Like any metabolic disorder, EMS, insulin dysregulation and most Cushing's cases can be managed successfully. With proper feeding and targeted support, horses can return to healthy metabolic balance.

Please contact us before starting any therapy. We will be happy to connect you with a qualified therapist from the Sanoanimal network who can create an individualized treatment plan for your horse: office@sanoanimal.com.