

# HOW CHROMIUM, STRESS, INSULIN AND LAMINITIS ARE CONNECTED



## About 90% of laminitis cases are related to metabolic disorders and insulin dysregulation.<sup>1</sup>

**The big picture:** Laminitis is not an isolated disease, it's a syndrome that is the result of other systemic issues including:

- Stress
- Inflammation
- Insulin Dysregulation or Hyperinsulemia due to metabolic disorders such as Equine Metabolic Syndrome (EMS) or Pituitary Pars Intermedia Dysfunction (PPID) – often referred to as Cushing's Disease.

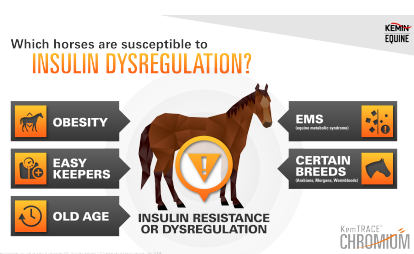
## Stress → Inflammation → Insulin Dysregulation

Chronic stress (environmental, physical, or disease) can cause systemic inflammation which can trigger insulin dysregulation or hyperinsulemia – a condition in which a horse has unusually high levels of insulin in the blood stream.

EMS and PPID have also been shown to negatively impact insulin dynamics.

EMS is not a disease, but rather a description of risk factors for the most common type of laminitis. Insulin dysregulation is a key component of EMS and often results in hyperinsulemia. EMS is typically seen in middle-aged horses, which these horses are more likely to be obese, suffer from hypertension and exhibit increased fasting triglyceride levels (a type of fat found in the blood).<sup>2,3</sup>

PPID is an endocrine or hormone disorder and is usually seen in older horses. Studies have shown that horses with PPID are more likely suffer from hyperinsulemia and laminitis.



## Insulin Dysregulation → Laminitis

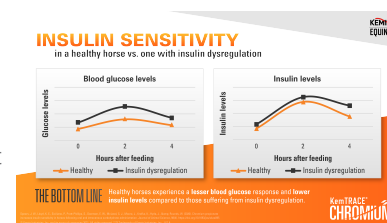
Models indicate that hyperinsulemia is associated with laminitis, which has led to different theories.

One theory is that high levels of insulin in the blood create a cascade of events that lead to the constriction of blood vessels in the tissues in the hoof. This limits nutrient and oxygen flow to the tissues, which could result in laminitis.

Another theory is that abnormally high insulin levels trigger excess production of specific growth factors that weaken certain tissues in the hoof, again leading to the onset of laminitis.

## What Can You Do?

First, consult your veterinarian. They will be able to diagnose whether your horse has EMS, PPID, or other issues that can lead to insulin dysregulation. If your vet identifies an issue, a team made up of a veterinarian, nutritionist and feed company representative can be utilized to develop a proper management and nutrition plan for your horse.



Any “at-risk metabolic horse” with a history of laminitis or documented insulin dysregulation should be fed diets low in soluble nonstructural carbohydrates (NSC), i.e., sugars and starches. Both lush, fast-growing and frost-stressed pastures are higher in NSC and should be avoided. The NSC content of hays should also be monitored, and if needed, hay can be soaked in water to reduce soluble carbohydrates.

## Can Chromium Help?

Daily chromium propionate supplementation, in combination with the management plans discussed, can be part of a comprehensive support solution. Chromium propionate has been proven to improve insulin sensitivity and may lead to better outcomes in these horses.<sup>4</sup>

### References

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3. Kritchevsky, J. E. (2019, April). Overview of equine metabolic syndrome - metabolic disorders. Merck Veterinary Manual. Retrieved January 17, 2022, from <https://www.merckvetmanual.com/metabolic-disorders/equine-metabolic-syndrome/overview-of-equine-metabolic-syndrome>
4. Jerry W Spears, Karen E Lloyd, Paul Siciliano, Shannon Pratt-Phillips, Ellen W Goertzen, Sarah J McLeod, Jennifer Moore, Kristi Krafka, Jill Hyda, Whitney Rounds, Chromium propionate increases insulin sensitivity in horses following oral and intravenous carbohydrate administration, Journal of Animal Science, Volume 98, Issue 4, April 2020, skaa095, <https://doi.org/10.1093/jas/skaa095>

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