

Cushing's Disease in Horses

The condition known as Cushing's Disease (aka PPID, or Pituitary Pars Intermedia Dysfunction or hyperadrenocorticism) in horses is caused by dysfunction of part of the pituitary gland and results in abnormally high levels of normal hormones to be secreted into the bloodstream. The hormone whose abnormally high level is most detrimental to the horse in PPID is cortisol. This steroid hormone is normally produced by the body in response to stress. Cortisol has several important effects on the body, all of which are useful in a fight-or-flight situation, such as running away from a mountain lion. When, however, cortisol is always inappropriately high, negative effects on the body include increased susceptibility to infections, increased risk of laminitis, muscle wasting, weight loss, decreased fertility, and insulin resistance. Another important sign of PPID is hirsutism (increased hairiness). This may start slow, as in horses that are slow to shed out fully in the spring, or horses that start to have unusually long hair on their legs, abdomen, and under the chin. They sweat easily, even in the winter. In time, if PPID is untreated, the coat progresses to the very long, curly hair coat which is characteristic of PPID. If insulin resistance develops concurrently with PPID, it is possible to see abnormal deposition of fat, especially in the crest of the neck, tail head and under the eyes while remaining thin over the ribs.

There are two major testing procedures in use for PPID. The simplest and most common is to take a blood sample and measure the body's concentration of Adrenocorticotropic Hormone (ACTH), which is the hormone released by the pituitary gland to increase the levels of cortisol in the body. ACTH levels are naturally higher in the fall, and may fall slightly outside of the reference range during that time of year, resulting in false positives. Additionally, ACTH levels may not yet be abnormally high in the early stages of disease, making it possible to miss early cases of Cushing's.

A second testing procedure is a low-dose dexamethasone-suppression test, in which dexamethasone (an exogenous steroid that mimics cortisol) is administered, and then ACTH is measured 12 or 24 hours later. This test measures the body's ability to respond to negative feedback, in other words, to down regulate its production of stress hormones in response to finding that levels are already higher than desired. In PPID, this feedback loop does not work, and the body will continue to produce stress hormones, no matter how high they get. This test has fewer false-positive results, but the administration of dexamethasone is thought to be one of the risk-factors for developing laminitis. Other testing protocols are possible in research settings, but not clinically available for use or impractical for use in the field due to sample handling limitations.

Insulin resistance is tested for by measuring concurrent concentrations of blood glucose and insulin, and comparing them in a ratio. This test is performed after fasting the horse overnight to induce a physiologic state where both glucose and insulin would be low in a normal horse.

PPID is usually treated with an oral medication called pergolide, which is a dopamine-agonist that functions indirectly to decrease the amount of ACTH and cortisol that is released. Dosing is variable and levels are adjusted as needed to fit the needs of the individual horse. Occasionally, pergolide alone is not sufficient to treat PPID, and

combination therapy with a second drug (cyproheptadine) may result in a better response to treatment. If there is concurrent insulin resistance, supplementing thyroxine to boost thyroid function and increase metabolism, may decrease insulin resistance and its associated risks of laminitis and obesity until the PPID is better controlled.

Although Equine Cushing's disease is most common in older horses, it has been identified in young horses as well. If you notice that your horse has increased the amount of water it is drinking or urine it is producing, develops an abnormally heavy hair coat or does not shed well, deposits fat in abnormal places as compared to other years, sweats easily, develops laminitis or starts to loose muscle mass despite being in work, testing for PPID or Insulin Resistance may be warranted. Please call if you have questions and would like to discuss your individual horse.