



Equine Metabolic Syndrome (EMS) Testing

Young to middle aged horses with regional or general adiposity are characteristic of equine metabolic syndrome (EMS). Diagnosis is dependent on history, physical exam, and diagnostic tests. The diagnostic tests presently recommended for diagnosis and follow up of EMS are: Insulin, the Oral Sugar Test (OST), and Leptin. EMS and PPID (Pituitary Pars Intermedia Dysfunction or Cushing's syndrome)* may be seen singly or together. EMS is seen primarily in horses younger than 15 years, while PPID usually affects horses older than 15 years.

* A link with more information on Equine PPID/Cushing's Testing is located at:

http://ahdc.vet.cornell.edu/docs/Equine_Cushings_Tests.pdf



Insulin Baseline

Insulin levels are often elevated in EMS and Cushing's syndrome. Pregnancy, high energy forage, stress, and illness can also increase insulin levels. Insulin levels are often decreased in animals on low carbohydrate diets, poor forage with little grain, or on anti-inflammatory medications or some antibiotics.

Oral Sugar Test (OST): Insulin Testing

This test is more sensitive than a single insulin baseline for detecting EMS. The horse "must" be fasted overnight before performing this test. The baseline sample is optional. The Karo syrup may be administered by the client at the veterinarian's discretion.

1. *Optional Step:* Collect a baseline (or Pre) blood specimen into either a "plain" red-top or (purple) lavender-top collection tube and follow specimen processing as described below (Sample Collection and Processing Guidelines).
2. Give 0.15 mL/kg (approximately 75 mL) Karo Light corn syrup orally.
3. Collect blood specimens at 60 and/or 90 minutes after administration using either "plain" red-top tubes or (purple) lavender-top collection tubes. Process the specimens and submit all samples together as described below.

Leptin Baseline

Leptin is a hormone produced by adipocytes. It is expected to be increased in EMS horses, but generally returns to normal before insulin does in treated horses. Leptin is useful for separating hyperinsulinemia caused by PPID from other causes, such as laminitis, stress, or non-fasted samples. It is also useful for tracking weight loss. This test can be performed on the same sample used for the Insulin baseline or ACTH/Insulin combination test.

Thyroid Testing – T₄, T₃, and Free T₄ by Equilibrium Dialysis

The equine thyroid panel consisting of Total T₄, Total T₃ and Free T₄ by Equilibrium Dialysis is routinely used for assessment of overall health and for the initial evaluation of thyroid function in the horse. The T₄ baseline is recommended for monitoring horses on thyroid supplementation. Thyroid hormone supplementation is often recommended along with diet and exercise to help induce weight loss and increase insulin sensitivity. T₄ and T₃ levels are decreased by many anti-inflammatory medications and antibiotics. Free T₄* levels are generally not affected by these treatments. Serum is recommended for thyroid testing.

* Free T₄ may be falsely elevated in heated samples due to dissociation of T₄ from its carrier proteins. Special care should be taken when shipping samples in the summer.

Sample Collection and Processing Guidelines for Insulin, OST, Leptin and Thyroid Testing

1. Collect blood into a plain* red-top collection tube for serum or a lavender-top (EDTA) for plasma.
2. For plasma, gently invert the lavender-top blood tube several times immediately after collection to mix anti-coagulant and refrigerate specimen until centrifugation.
3. For serum, allow the red-top blood specimen adequate time to clot prior to centrifugation to avoid fibrin formation and ensure sufficient serum yield. This can be at room temperature or refrigerate if longer than one hour will be needed before centrifugation.
4. After centrifugation, immediately transfer serum or plasma into a vial suitable for shipping and frozen storage.
5. Frozen storage is recommended unless samples are being shipped the day taken. A frozen sample is not necessary but the samples should arrive chilled. Ship samples with cold packs using an overnight courier service.

*Avoid use of serum collection tubes with additives (i.e. separator gels, clot activators, inhibitors, etc.) due to potential assay interference.