Equine Insulin Resistance
And the Role the Farrier Plays with this Disease

The most common cause of Laminitis today is via the disease Equine Insulin Resistance. Horses of any age can be effected by it. Older horses (>15 years old may have this problem and Equine Cushings disease together. Equine Insulin Resistance (EIR) leads to a pathological elevation of blood Insulin leading directly to Laminitis. Studies just a few years ago in Australia documented that a bolus of Insulin given IV caused Laminitis in all four feet within twenty-four hours.

Signs of EIR:

1. Overweight, Fat pads on butt/shoulders
2. Easy keeper – little food but large
3. Laminitis on grass, now on dirt lot while others outside
4. Sore feet after routine trims from talented farrier
5. Stretched white line – high Insulin stretches laminae so bonds are not strong
6. Chronic white line disease
7. Laminitis – acute and chronic
8. High blood Insulin
9. Sore on hard ground or frozen ground
10. On Pergolide but still founders

What causes Insulin to be so high to create Laminitis? Due to several possible triggers, there has been interference with Insulin's normal action. Insulin has several roles, with carbohydrate (sugar) transport to cells being its main job – sugar absorbed from the meal enters the blood stream, signaling the Pancreas to send out Insulin to escort nutrients to cells. Once at the cell, a lock and key system is in place, with Insulin the key opening the lock to allow glucose sugar inside. When the lock and key setup is interfered with, the Pancreas sees that glucose is still in the bloodstream, so it pours more and more Insulin out into the bloodstream to force glucose in – basically more keys put into play. As this level of Insulin rises, Laminae are damaged, leading to Laminitis. The body tolerates the normal rises in Insulin with meals, but very high pathological Insulin blood levels lead to damage. As time goes on, elevated Insulin damages laminae more and more and an event occurs pushing the horse over the edge into acute Laminitis.

Insulin's other big job is fat production. It escorts fat to fat cells, promotes fat production, and blocks fat breakdown. High Insulin means more fat - so fat pads, cresty necks, fatty sheaths are seen. A University of Virginia study shows cresty horses are nineteen times more likely to have EIR.

Triggers to make Insulin sky high:

- Genetics – certain breeds like Morgans, Paso, and Rocky Mountain Horse are more predisposed but can be any breed.
- Overweight – large fat deposits pour inflammatory components into the bloodstream interfering with Insulin leading to Insulin surging.
- Poor Diet Management – long periods (even 1-2 hours) of no food leads to huge Insulin surge at re-feeding. This problem can be seen especially in the morning if the horse has not eaten since midnight, for example.

- Pain – any painful event leads to Insulin surge – a kick, an accident, colic, or Laminitis will create more Insulin. In Laminitis, a vicious cycle of pain, Insulin up, Laminitis, pain, Insulin up…..
- Hormones – High ACTH in Equine Cushings plus Cortisol in stress plus high Insulin (Insulin at high levels interferes with Insulin) all jump up EIR. A horse that is on the edge with high Insulin and damaged laminae gets a "jolt" of Insulin that sends it into full blown Laminitis.

Feeding – 2 easy steps

1. Hay - Long, slow hay eating 24 hours a day by weight. The horse's needs are 2% body weight in hay, so a 1000 pound horse get 20 pounds or 10 pounds in the morning and 10 pounds in the afternoon, but must last between feedings via slow hay feeders, nets, or nibble nets. If the horse wants hay at 3 AM, it needs to have it there.

   Often, hay varies from harvest to harvest, so it is a good idea if you can get a large batch tested to see sugar content. Can test hay at equi-analytical.com. Ask for the "Trainer" hay profile. Some hays with high sugar may need soaking to remove sugars to help lower blood glucose, hence lower Insulin. Good Hays: Timothy, Alfalfa (Low carb – go to equi-analytical.com to see this), Brome, Bermuda, Orchard.

2. Ration Balancers – no hay is complete. These are low carb, low fat, higher protein but concentrated. A 1000 pound horse gets one pound a day = 50 cents a day = three baking measuring cups. There are dozens of choices from all major feed companies. There is a chart of these on our website – check one close to you.

Testing – Recent advances at Tufts and Minnesota Veterinary Schools have come up with a single tube, simple, easy test. In the past (even one year ago) horses were misdiagnosed with normal Insulin, when, in fact, they were EIR. Now with the new Glucose Challenge/Insulin Response test, we can find cases easily and compare a horse in California to a horse in Connecticut. The procedure is in the AAEP 2012 edition, but basically it is feeding hay at night as usual, skip breakfast, and in the morning only, squirt 7cc per 100 pounds of horse Karo Light (Blonde) Syrup (red label – not "lite" with blue label). Have the Veterinarian test 60-70 minutes later. Example – squirt at 8:00 AM 70 cc of Karo in the mouth (20+20+20+10) for a 1000 pound horse, and test at 9:00 AM. We know the peak of Insulin in normal horses – if the results are under, the horse is normal. If the results are over, it is EIR.

Good Labs in the USA:

Cornell Vet School – 607-253-3673

Michigan State Vet School – 517-353-1683

Canada:

Guelph – 519-824-4120

Europe:

Royal Vet College – 01707666208

Snacks – This is one of the best parts of having a horse. Some are ok for EIR and some are to be avoided:

Good Snacks: Roasted peanuts in the shell, sugar-free lifesavers, strawberries, cherries without the pits, pumpkin seeds, chopped up hay cubs, alfalfa pellets, and celery.

Bad Snacks: Horse Cookies (human type too), candy, apples, carrots, applesauce, watermelon, jelly beans, yogurt, pretzels, chips, lawn clippings, and frosted mini-wheat.

Things to Avoid:
Bran – huge carbs (5-7 times more than hay). Higher fat – 16%. Beet pulp is good but not ANY bran.
Hay with high sugar – Wheat, barley, oat hay
Copious Oils – Insulin makes fat – horses do not need more in diet.
Oats – Cause a large Insulin surge, can keep Insulin levels up longer than corn.

Supplements – there are many on the market.

Chromium – There is not one case of a chromium deficiency in a horse, according to Nutritional Requirements of Horses. It is not going to hurt, but it is of little value.

Direct clients to products that show pre and post testing of Insulin with real black and white results. If Insulin is not dropping, the laminae are not being protected.

Return to Grass

Recent studies highlight the benefits of turnout. Australian wild Brumby horses can travel long miles, but in a large paddock, most horses walk 3-5 miles. Exercise uses up Insulin and the horse can't go far in a dirt lot.

In a field, horses play more, which is exercise. Grass has large amounts of vitamins and minerals. Grass is "free" food to owners and not costly hay. Grass fields are where horses are meant to be and play. Stomping flies and hence losing shoes in a dirt lot does not help farriers. Grass is softer and easier on joints.

Once the horse's feet are protected with the right shoes and trimming schedule, once the right hay and ration balancers are on board, once the right supplements (if needed) are added, then blood tests can see if Insulin numbers are ok to allow turnout and retesting should be done to see if the horse is handling the turnout. Muzzles are options to lower grass intake in studies by 50% and many are helpful.

Farriers are the front line of defense in preventing EIR Laminitis via recognizing signs not just in the feet, but all over the body. Owners appreciate information from the farrier on diet and testing of their horse to see if EIR. Farriers and owners want to avoid EIR Laminitis and not treat it, but if Laminitis occurs or has been seen in the past, they want to know what to do to avoid it again.

Dr. Frank K. Reilly
A Quick Version of EIR for the Farrier
For more in depth information, go to: equinemedsurg.com. Click on Articles and Updates and there are 30 pages of information on EIR.