

The Number One Cause of Laminitis and Founder in horses is Insulin resistance. When the blood stream carries too much (high levels) Insulin, it irritates blood vessels leading to poor circulation and Laminitis – eventually can progress to Founder. **This is not the only time of year this is prevalent.**

Insulin is an *important hormone for distributing energy in the body for horses just as it is for ourselves. It is produced by an organ in the abdomen called the Pancreas. The Pancreas is located behind the girth line on horses, on the right side. It weighs approximately ¾ of a pound on avg. **15hh** horses. About **98%** of the Pancreas produces enzymes to break down food in the gut and only **2%** makes hormones such as Insulin.

*Insulin has many jobs and many targets. It has direct action on all cells in the body (except the brain), and helps in processing carbohydrate, protein, and fat products for entry into the cells. **Its main job involves carbohydrate metabolism.** Insulin release from the Pancreas is triggered by rising levels of carbohydrate in the bloodstream. High sugar intake is the primary cause of excess insulin. The carbohydrate that causes this Insulin outflow from the pancreas is called Glucose. Carbohydrates are often simply called “sugars” or “starches”. **Normally**, when Glucose levels rise, Insulin levels also rise. Then, as Glucose levels recede, less Insulin is released from the Pancreas and Insulin blood levels drop back down to normal.

There are several ways for Glucose levels to climb and by far the biggest rise comes after your horse eats. However, that is not the only cause by any means. In hay and grass, carbohydrates are the main type of nutrient, with protein being second and fat third. Insulin is crucial in helping Glucose in the bloodstream move into the cells and Glucose is the **major fuel** used by cells for energy. Insulin has many target tissues but the most important are muscle, fatty tissue, and the liver. The transport of Glucose into muscle and fatty tissue is 5 to 20 times greater in the presence of Insulin. **This highlights how important Insulin’s action is in obtaining energy for the cells.**

Too much Insulin will generally cause weight gain on your horse. ***A “warning bell” to remember is that when we do not allow our horses to graze for feed in an adlib fashion, as they are designed to do naturally, they often develop a habit of “woofing down” their intermittent feed - which generates a “surge” of insulin in their system.*** This can generate up to 300% of normally required insulin when they eventually get to eat and that exceeds their liver’s ability to metabolize it completely, which leaves too much insulin residing in the bloodstream. In our human world, we are not easily able to deal with this problem as we are often at work and have little time to properly attend to our horses. Although spring is a typical time we notice the problem it is not the only time we should be aware. As short winter days also cut our time with them shorter and often they are kept in their stables after dark, over night and when the weather is poor, providing little exercise. Box rest is another problem for them - **in many ways.** One practice that can help to slow the rate of carbohydrates input (somewhat simulating grazing) is to use multiple hay nets with

smaller openings, on an ad-lib basis. There are also new, more complex, feed disbursement products always being invented regularly.

Slow, steady eating helps protect your horse. Equine Insulin Resistance puts your horse on the edge of a cliff. Any stress such as surgery, vaccines, mild colic, diet change, weather changes, or infections can push them off the edge into Laminitis. Hay is essential in helping prevent Laminitis and "Soaking" it can lower Carbohydrate levels. Avoid Wheat hay, Oat hay, Barley hay as all have huge starch content.

Equine Insulin Resistance in horses is the correct term to use when they get pathologically high levels of Insulin. There are many other terms that have been used in the past that are inaccurate or confusing, such as: 1. Metabolic Syndrome, 2. Pseudo Cushings and Peripheral Cushings, 3. Diabetes and 4. Hyperinsulinemia - to name some.

Importance of Exercise: There are many benefits of exercise, all of which will decrease Insulin levels and help to prevent Insulin Resistance. Exercise, even just walking, will help lower Insulin. Walking burns 4 times the calories of standing. Walking also helps with circulation to the feet to help prevent Laminitis. Walking is also low impact on the joints. We use circular and or Oval shaped "horse walkers" at the Stud Farms anytime we can't allow the horses out for normal exercise in the paddocks and fields. On average, in the horse walkers, we have them walk, at varying speeds, for 30 to 40 minutes on each rein for about an hour and a half total walk daily. We do this, not just for the Stallions, but for all the horses. Some of the benefits of exercise are: **1.** the nervous system will lower Insulin output from Pancreas. In fact exercising for just one hour can drop it over 30%. **2.** Muscle has the largest number of receptors for Insulin and uses up much of the insulin, which efficiently lowers blood system levels of Insulin. **3.** Exercise can increase blood flow by 700%. Better circulation causes Insulin to move to the target cells faster and Glucose is delivered faster. ***Due to the nervous system, normally horses (and humans) already have a small amount of Insulin in the bloodstream and with more circulation it is able to work more efficiently and not cause the body to ask the Pancreas for to much Insulin.*** When a smaller amount of Insulin can do the work, this is called "increasing Insulin sensitivity". By increasing Insulin sensitivity, this leads to lower and lower levels of Insulin until you get back to normal levels. **4.** By lowering the excess levels of insulin, exercise helps prevent the irritation of blood vessels which leads to poor circulation and Laminitis / Founder. **5.** Exercise has the ability to keep blood Glucose levels slightly low for 6-12 hours after exercise. That is called "Hypoglycemic effect" and drops the levels of Insulin circulating in the bloodstream. *The effect of exercise lasts much longer than the time exercised.*
Try not to miss my June article for the continuation of this information.

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