

## RATIONALE FOR THE FORMULATION

Target IR was formulated by the veterinary consultant to the Equine Cushing's and Insulin Resistance Group and meets the specifications and recommendations of the group.

<http://pets.groups.yahoo.com/group/EquineCushings/>

Ground stabilized flax seed is a rich source of the essential fatty acids gamma-linolenic (omega-3) and gamma-linoleic (omega-6) in proportions that closely match those present in the horse's evolutionary diet, grass. The amounts provided per serving are also designed to replace the essential fatty acids lost when hay is dried and cured.<sup>6</sup>

Red beet powder is an excellent flavoring agent and highly appealing to horses. It has the added benefit of being a rich natural source of folate, a B vitamin essential in the production of nitric oxide. Folic acid supplements are poorly absorbed in horses and natural sources are preferred.<sup>7</sup> Red beet is also rich in betaine and other plant antioxidants, and intake has been linked to lower levels of markers of inflammation in the blood.<sup>8,9</sup>

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## FEEDING THE INSULIN-RESISTANT HORSE

Target IR™ was developed to correct the deficiencies and imbalances commonly encountered in hay or pasture-based diets across the United States and Canada.

In the ideal situation, hay fed to insulin-resistant horses will be analyzed for sugar, starch, and all nutritionally important minerals and then correctly supplemented to guarantee mineral intakes are both adequate and balanced. However, many owners are faced with the situation of having to buy hay frequently and having limited storage, which makes balancing to actual analysis unfeasible since the hay is constantly changing. Owners of newly diagnosed horses who will eventually be balancing to analysis need a supplement to get them started on their comprehensive diet plan. The Target IR supplement is targeted to those groups, and is also appropriate for any horse on a predominantly hay diet.

Growing horses and pregnant or lactating mares should receive protein and comprehensive balanced mineral supplements as needed on top of this base diet to meet their unique needs. Seek professional guidance in developing a comprehensive nutrition regimen.



## ADVICE FOR OWNERS OF INSULIN-RESISTANT HORSES

Cutting calories too drastically actually interferes with weight loss in overweight horses and makes insulin resistance worse. The type of calories provided is actually more important than the reduction of calories.

### Feed 1.5 to 2 lbs. of hay

Feed the horse a diet of low nonstructural carbohydrate hay and small amounts of beet pulp with the hay at a rate of 1.5 percent of the current bodyweight, or 2 percent of ideal bodyweight, whichever is greater. That means 1.5 to 2 pounds of hay per 100 pounds of bodyweight.

↓  
per 100 lbs.  
of bodyweight

Iodized salt (sodium chloride) should be provided free choice.

## KEY FEATURES OF TARGET IR™

**Designed specifically for horses on predominantly grass hay with little or no commercial grain or concentrate mix and small amounts of beet pulp as a carrier in the supplement.**

**Designed to match the most commonly encountered mineral problems and other deficiencies in grass hays.**

**Targets the special needs of insulin-resistant horses but is also appropriate for any horse on a predominantly hay diet.**

**Compatible with the recommendations of the 2007 NRC Nutritional Requirements of Horses.**

**Uses mineral forms of maximum bioavailability in horses, with minimal risk of iron contamination.**



## VITAMINS

### Vitamin E

Insulin-resistant horses require elevated levels of vitamin E. Dr. Nicholas Frank, University of Tennessee, a leading researcher, recommends 1,000 IU per 500 pounds body weight (1,000 IU per 10 pound hay dose). A leading equine nutritionist reports that powdered E is poorly absorbed and "because of their high requirements, horses get into trouble with E deficiency when only on a powdered supplement. 'Water soluble' forms are available and would be acceptable but are costly." The vitamin E in Target IR is a water dispersible source to ensure availability.

### Biotin

Biotin is very important to structural integrity of the hoof. Together with folic acid and pyridoxine, it is also an essential cofactor for the production of nitric oxide. Nitric oxide production inside blood vessels by the cells lining the vessels (endothelial cells) is critical to maintaining vessels in an open or dilated state. Nitric oxide also plays a critical role in insulin sensitivity.<sup>1</sup> Lowered endothelial nitric oxide production is well documented with insulin resistance in other species and may contribute to laminitis.

### Vitamin A

Vitamin A is an antioxidant usually present in sufficient amounts in hays but may be borderline to low in hays over one year old. It is included in the formulation in a conservative amount to protect against such deficiencies.

### Methionine

Methionine is an amino acid which the horse's body cannot synthesize. Levels vary in hays depending on the type of hay and the protein content. Methionine is a sulfur-containing amino acid that is essential for maintaining hoof strength. Sulfur-containing amino acids also play a part in the body's antioxidant defense mechanisms.

### Arginine

The body can normally manufacture enough of the amino acid, arginine, but under conditions of stress or illness, supplementation may be required. Arginine is a versatile amino acid with many functions but the main reason for supplementing it is that arginine is the amino acid used to manufacture nitric oxide.



## MINERALS<sup>2,3,4,5</sup>

The mineral composition in Target IR is specifically formulated to complement a diet that is based on grass hay and beet pulp as a carrier for the supplement.

### Phosphorus

Phosphorus is commonly at borderline levels in grass hays. Leading equine nutritionists prefer monosodium phosphate over mono- or dicalcium phosphate salts because calcium deficiency is rarely a concern in hay-based diets and calcium phosphate salts are usually highly contaminated with iron. Beet pulp is a rich calcium source.

### Magnesium

Magnesium has been shown in many other species to be a critical anti-inflammatory mineral, necessary for energy generation and energy storage in cells. It is very commonly deficient in the diets of insulin-resistant horses and studies suggest a 2:1 ratio of calcium to magnesium is ideal for absorption. However, few hay sources provide adequate levels of magnesium.

### Zinc and Copper

The trace minerals zinc and copper are critical for normal antioxidant/anti-inflammatory defense and immune system function. These minerals are commonly deficient and the deficiency is exacerbated by high levels of iron and manganese, which can have negative effects on zinc and copper levels in the body.

Copper is the least soluble inorganic mineral in alkaline pH in the small intestine and colon and should be provided in a protected polysaccharide coated form.

Zinc oxide is very bio-available in horses and is preferred over sulfate in a broad-spectrum supplement because of high levels of sulfate contamination of well water in many areas.

### Manganese

Manganese is high more often than low, but areas with alkaline soils may have borderline levels so a low amount is included in the formula.

### Selenium and Iodine

Selenium and iodine deficiency is common in many areas, and leads to compromised ability of the horse's body to deal with inflammation and oxidative stress. Both selenium and iodine are required for normal functioning of the thyroid gland. Inadequate thyroid hormone levels can worsen insulin resistance. Low thyroid functioning is commonly seen with insulin resistance and recovery to normal functioning depends on adequate nutritional support from these two minerals.

### Iron

Target IR does not contain supplemental sources of iron or mineral forms known to be highly iron contaminated. A study designed to determine body iron levels in horses and ponies with insulin resistance and the influence of trace mineral balancing and supplementation showed that insulin-resistant horses on unbalanced diets have higher indices of iron load than normal or insulin-resistant horses on balanced diets. The study concluded insulin-resistant horses often have higher body burdens of iron than normal horses and insulin-resistant horses on diets that are tightly mineral balanced have iron indices that do not differ from normal horses. Target IR provides balanced trace minerals without added levels of iron.