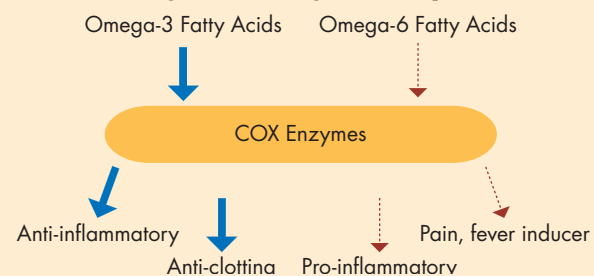


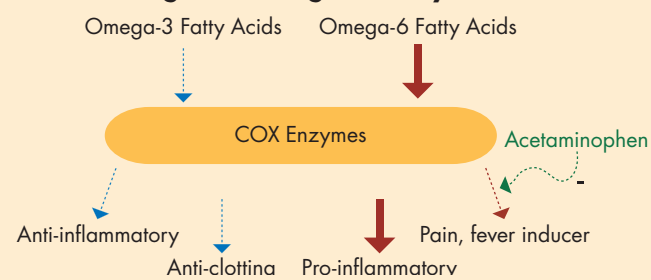


Diet High in Omega-3 Fatty Acids



A diet enriched in omega-3 fatty acids promotes the production of anti-inflammatory and anti-clotting mediators while simultaneously discouraging pro-inflammatory, pain, and fever-inducing mediators.

Diet High in Omega-6 Fatty Acids



A diet high in omega-6 fatty acids encourages the production of pro-inflammatory, pain, and fever-inducing agents while preventing the formation of anti-inflammatory and anti-clotting compounds. Administration of acetaminophen blocks one portion of the n-6 pathway only, resulting in reduction in pain and fever. However, unlike diet-induced, global changes, this drug therapy does not alleviate the pro-inflammatory condition of the cell, nor does it encourage the n-3 pathway.

The Omega-3 Fatty Acid Link

Incorporation of omega-3 fatty acids into cell membranes may help modulate inflammation and reduce the risk of inflammation-related diseases.

For example, O'Neill et al.¹⁰ demonstrated that supplementing horses with flaxseed for six weeks altered omega-3 profiles in hair and reduced allergic skin test responses, as well as inflammation.

Linking the inflammatory response to lipid metabolism requires an understanding of the process by which lipids regulate cellular activity. This is generally accomplished by assessing the genes that control the generation of pro-inflammatory cytokine mediators and enzymes that produce inflammatory products.

Nutragenomics

Platinum Performance™ Inc. is actively involved in nutragenomics - the study of how diet affects gene expression, an area that also is being investigated in humans with chronic diseases¹¹. One important area of nutragenomics is the effect of different feeds on the level of inflammation in the body and their role in the development or progression of various diseases.

Two important inflammatory markers are tumor necrosis factor-alpha (TNF-α) and interferon-gamma (IFN-γ). Both TNF-α and IFN-γ are required for horses to adequately respond to substances that cause illness

or disease, such as bacteria. However, continued or over-expression of TNF-α and IFN-γ can cause the inflammatory responses that characterize various acute and chronic diseases¹²⁻¹⁶. For example, increases in TNF-α have been documented in horses with acute traumatic joint disease and osteochondritis dissecans¹⁶, colic¹², and laminitis¹⁴. In addition, both TNF-α and IFN-γ are increased in horses with lower airway disease¹³.

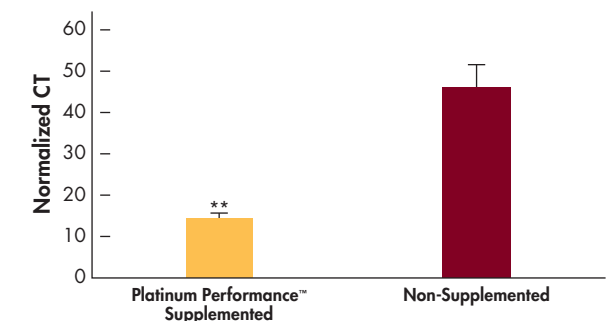
Drug Therapy compared to Nutritional Therapy

While most anti-inflammatory drugs block a single point in the enzyme cascade that regulates lipid mediators of inflammation, this process works as a short-term blockage of these mechanisms. In contrast, dietary manipulation of the substrates used by these enzymes alters the rate of mediator production by limiting the reactants entering the pathway. As a result, dietary modulation is a more flexible and longer lasting method for modulating inflammation (Sidebar).

To investigate the potential effects of supplementation with Platinum Performance™ on inflammation, researchers at the University of California at Davis recently conducted an observational study comparing levels of TNF-α and IFN-γ in 63 horses on different diets. Expression of TNF-α and IFN-γ genes in horses consuming oat hay and alfalfa supplemented with Platinum Performance™ were ~60% lower than horses consuming other feeds (Figures 2 and 3).

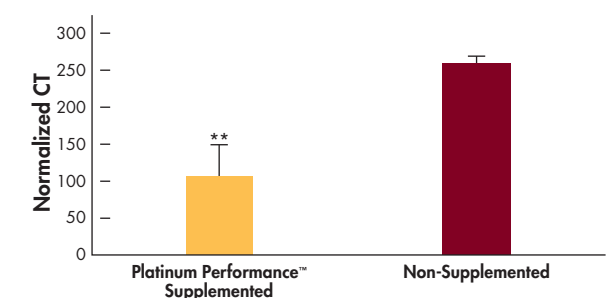
Inflammation and Disease

Figure 2. TNF-Alpha Gene Expression Among Horses Supplemented with Platinum Performance™ vs. Non-Supplemented Horses



**Significantly (p < 0.05) lower than Non-Supplemented value

Figure 3. IFN-Gamma Gene Expression Among Horses Supplemented with Platinum Performance™ vs. Non-Supplemented Horses



**Significantly (p < 0.05) lower than Non-Supplemented value

A further regression analysis suggested that individual dietary components significantly impacted expression of TNF- α (Table 2).

Table 1. **Fatty Acid Ratios in Platinum Performance™ Compared to Common Feedstuffs**

Feedstuff	Omega-3 :Omega-6 ratio
Grass	1 : 0.2
Platinum Performance™	1 : 0.4
Equine Commercial Feeds*	1 : 8.0
Corn	1 : 54.5
Oats	1 : 19.4
Barley	1 : 9.6
Soybean Oil	1 : 7.5
Soybean Meal, Fat Extracted	1 : 6.9

*Average of five equine commercial feeds tested by an independent laboratory. Adapted from Hallebeek.¹

Table 2. **Dietary Components Affecting TNF- α Gene Expression**

Diet Component	Affect on TNF- α Expression	Level of Significance
Corn Oil	Increased	P = .0004
Rice Bran	Increased	P = .042
Pasture Feeding	Decreased	P = .076

Bottom Line

Supplementation with Platinum Performance™ increases incorporation of omega-3 fatty acids in red blood cells, and lowers the expression of the pro-inflammatory cytokines TNF- α and IFN- γ . Lower levels of inflammation in the horse could potentially protect them from inflammation-related and other chronic diseases. In order to curtail excessive inflammation, it is important to maintain horses on an anti-inflammatory diet.

PUTTING IT INTO PRACTICE:

- Reduce feeds with an imbalance of omega-3 to omega-6 fatty acids, such as grains, corn oil and some commercial feeds.
- Avoid feeds with high levels of rancidity.
- Increase intake of forage and pasture grazing.
- Supplement with omega-3 essential fatty acids and antioxidants.

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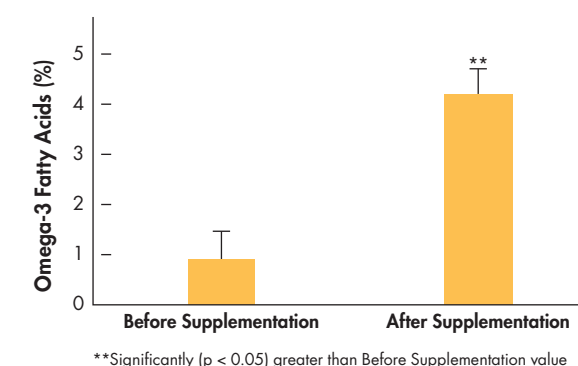
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Diet, Health and Defense Against Inflammation

Tara Hembrooke, Sina Wallace, University of California, Davis

At the cellular level, metabolites of omega-3 fatty acids are anti-inflammatory; whereas, metabolites of omega-6 fatty acids are pro-inflammatory. Horses in the wild consume up to five times as many omega-3 fatty acids as omega-6 fatty acids¹. In contrast, many of today's equine grains and complete feeds contain far fewer omega-3 and more omega-6 fatty acids¹ (Table 1). This dietary imbalance may predispose the horse to excessive inflammation, which has been implicated in diseases such as joint disease², laminitis³, colic⁴, and colitis⁵. One source of supplemental omega-3 fatty acids is fish oil; however, there is concern about heavy metal contamination in fish⁶⁻⁹. Therefore, plants, such as flax and algae, are more desirable sources of omega-3 fatty acids for horses. A supplement utilizing these sources of omega-3 fatty acids is Platinum Performance™.

Figure 1. **Omega-3 content in cell membranes before and after supplementation with Platinum Performance™**



In a recent study conducted at the University of California at Davis, percentages of omega-3 and omega-6 fatty acids in red blood cell membranes from five horses were compared before and after six weeks of supplementation with Platinum Performance™. Ingestion of Platinum Performance™ increased the amount of omega-3 essential fatty acids in the cell membranes by 78% (Figure 1), causing a 40% decrease in the ratio of omega-6 to omega-3 fatty acids.

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