

NEWS LETTER #1

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As we look outside our windows many of us are seeing the emergence of Spring a welcome relief to the drudgery of winter. But for those of us who suffer from allergies this time of year is often accompanied with itchy eyes, a runny nose and a fogginess in the brain that overall just makes you feel blah. More and more I encounter horses who are also suffering from allergies, most often in the form of a sudden outbreak of hives. Recurrent airway obstruction (RAO) can also be a problem. Common in stabled horses, resulting from a hypersensitivity to dust and mould spores in their environment; RAO may lead to inflammation and obstruction of their airway. It can also result due to pollen sensitivities. What exactly is an allergic reaction and what causes these reactions?

An allergic reaction or hypersensitivity refers to excessive, undesirable reactions produced by the normal immune system in response to a normally harmless substance (allergen). There are two arms of the immune system involved in allergies known as Th1 and Th2. It is the Th2 part of the immune system over reacting which results in an excessive activation of mast cells, a type of white blood cell, which in turn triggers an extreme inflammatory response. Activation of mast cells releases histamine which causes edema (swelling), heat, redness and irritates nerve endings to cause itching. The reaction to a mosquito bite is a good example of a histamine reaction with the production of a red itchy swelling. Mast cells also release several mediators for example prostaglandin which leads to airway constriction. Allergens are typically proteins or polysaccharides and come in many forms; pollens, dust, moulds, certain foods, insect venom and occasionally medications. Reactions include; hives, RAO, welts from bites and other skin conditions. Allergic reactions are termed immediate hypersensitivities (Type I hypersensitivity) occurring quickly after exposure to the allergen.

Diagnosis of allergies is made by your veterinarian and is typically based on clinical presentation and patient history. Just because your horse has hives it does not mean it has allergies. Suspected allergens may be identified through the use of either intradermal (IDT) or serologic testing methods. Serological testing, where a sample of blood is analyzed for allergen hypersensitivity is preferred by some owners as it is cheaper, and does not involve clipping the horse and your regular veterinarian can draw the sample and ship it to the testing lab. However, some research suggests that serologic testing is not as reliable as intra-dermal testing. In intra-



An example of hives

dermal testing a solution containing a single allergen or mix of allergens is injected under the skin and then the injection site is evaluated at intervals to measure the extent of reaction. Neither of these tests is thought to reliably predict reality when it comes to food allergies which need to be investigated by carrying out elimination diets where suspected allergens are removed from the diet and gradually reintroduced to determine the reaction. In reality few owners complete the complete process for diagnosing food allergies because if their horse responds favorably to removal of a dietary ingredient, few owners are willing to reintroduce that ingredient back into the diet for fear of triggering another reaction. However without the reintroduction, an allergy to that ingredient can not be truly confirmed.

Treatments aim to reduce the inflammatory process. Hives are typically treated with corticosteroids however this is not without the risk of potentially serious side effects such as laminitis. Antihistamines are also given as treatment and prevention and their side effects are typically far less severe. If suspected allergens are identified and it is thought that the horse may suffer from a long term issue with allergies, some owners opt to use allergen-specific immunotherapy (ASIT). This is where the horse is given “allergy shots” a high allergen dose vaccination strategy, which aims to reprogram the horse’s peripheral tolerance to the allergen. This causes the horse to make allergen-specific antibodies which in turn block the interaction of actual allergen with the part of the immune system that would trigger the mast cells. Treatment is typically for a year and if successful horses may need to continue treatment for life. Clearly treating allergies is a potentially expensive endeavor and can become very frustrating especially if you are left being unable to feed your commonly available hay and other feeds.

As a nutritionist, the questions I am asked by owners of allergic horses are whether I can help build a diet that avoids certain feeds and whether there is something else they can be doing nutritionally to help support their horse, and reduce the risk of an allergic reaction. There are certainly steps that can be taken to help insure that your horse’s immune system has the basic building blocks it needs to be balanced. I always recommend insuring that the diet be assessed to insure there are no deficiencies or imbalances, reformulating when necessary to optimize health. It is not uncommon for zinc to be deficient in a horse’s diet, and zinc is known to play a role within the immune system. Magnesium, which has been found to be beneficial for people with asthma and may help horses with RAO may be deficient or out of balance in the equine diet. Diets containing good quality grass hay or alfalfa often provide excess protein and research using mice has shown that excess protein can lead to over stimulation of the Th2 arm of the immune system. When mice were sensitized to an allergen and then fed twice the normal protein level versus being fed a normal or deficient level of protein, a higher level of allergen specific immune factors were observed and it was concluded that excess dietary protein could cause immune functions to become Th2 predominant, resulting in an increased risk of Type I hypersensitivities (allergies).

Vitamin E an antioxidant is often deficient in the diet of horses with no access to fresh pasture. Horse’s with no access to pasture also need a source of omega-3 fatty acids. Omega-3 fatty acids are essential nutrients meaning the horse is unable to make them and therefore they

must be provided in the diet. Grass contains about 6% fat and has a higher proportion of omega-3 to omega-6 fatty acids, however hay has only 3% fat and these omega fatty acids tend not to survive the hay curing process leaving the horse with a lower than ideal amount of omega fatty acids in the diet. Often times horses are fed supplemental fat in the diet but these fats such as corn oil are typically high in omega 6-fatty acids. So out modern day diets often provide too much omega-6 fatty acid and not enough omega-3. Plentiful research has shown that omega-3 fatty acids have anti-inflammatory properties. Such properties can help to reduce the inflammatory reactions resulting from mast cell activation. Research has shown that feeding flax which has an omega fatty acid ratio almost identical to grass, (high in omega-3's), has beneficial effects for horses sensitive to biting midges. Insect bite related allergies are thought to be one of the most common sources of allergy. Researches from the University of Guelph in collaboration with the University of Melbourne, performed a pilot study where they fed 1 lb of milled flax seed per 1000lbs body weight to 6 horses with a history of itching. These horses tested positive to a skin test for *Culicoides* sensitivity. After 42 days of supplementation



Whole brown flax seeds.

with the flax the area of the skin lesion when the horses were re-tested was less in all but 1 horse. A prior report that looked at 17 horses supplemented with linseed oil found no positive effect on lesion size although owners felt that they saw an improvement. In the more recent study it is speculated that feeding the whole ground flax may have provided the horses with phytonutrients which may have had a beneficial effect and that these nutrients would not have been available in the linseed oil used in the earlier study.

Another source of omega-3 fatty acids that is currently receiving a lot of advertising attention is fish oil. Fish oil directly provides two compounds EPA and DHA that can be created from the omega-3 fatty acid linolenic acid found in flax and grass. Because creation of EPA and DHA from linolenic acid requires several steps the process is not as efficient as providing EPA and DHA directly (see figure 1).

A lot of the research in humans looking at the benefits of increasing omega-3 fatty acids in the diet has in fact come from researching the roles of EPA and DHA within the cell. Recent research from the University of Florida looking at the effects of dietary fish oil and flax shows that feeding 6g per 100kg body weight of total omega-3 fatty acids from each of these sources results in greater quantities of EPA and DHA being incorporated into cell membranes on the fish oil diet. The amount of EPA and DHA from fish oil provided per 100kg body weight in this research was 3g and 2.4g respectively or 15g and 12g for an 1100lb horse. Fish oil products currently marketed for horses often recommend a daily serving of 1oz however this would only provide about 7g of total EPA and DHA.

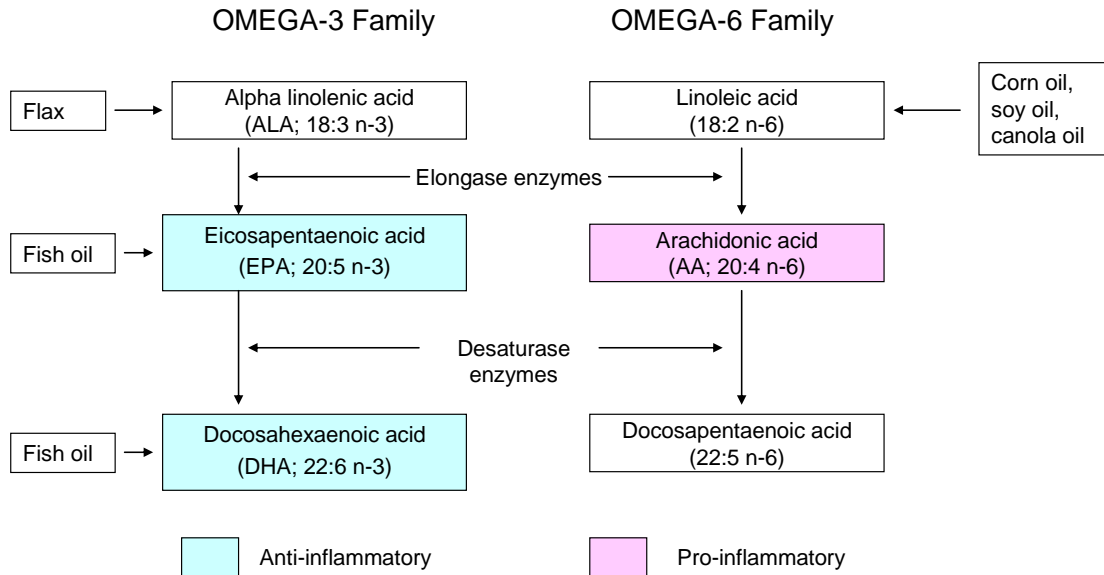


Figure 1: Conversations of omega-3 and 6 fatty acids

Other research from the University of Oregon found that corn oil increased pro-inflammatory prostaglandins compared to fish oil and speculated that fish oil could be of benefit in treating horses with RAO and other inflammatory conditions. These researchers were feeding fish oil at a level that provided 49.6g of total omega-3 fatty acid per day equivalent to about 7 ounces of the commonly available fish oil products. It may very well be the case that lower intakes of fish oil will also have these beneficial intakes but it does not appear that lower intakes have been researched. Supplementation with an omega-3 fatty acid needs to occur for at least a month before a change in plasma fatty acid profile occurs. Therefore if you feed an omega-3 fatty acid source in the hopes of reducing an inflammatory condition you may not see an improvement for several weeks.

In a recent email communication with one of the countries leading equine dermatologists and food allergists about a client's horse with allergies, I was surprised to hear him state that in the 20+ years that he has been in practice, he can only think of 5 horses that truly had food allergies. Even though a positive reaction to a feed on a serum or intra-dermal testing can not be considered a diagnosis of a food allergy towards that feed, many horse owners choose to eliminate these ingredients from their horses diets and state that they see an improvement to their horses condition. For performance horses with extensive reactions to a number of different feeds this can make finding a commercially formulated feed very difficult. Not all feed manufacturers offer fixed formula products which means that the ingredients may change batch to batch. Some companies also use collective feed terms like "forage product" so you have no idea what type of forage was used. This is little help if for example you are trying to avoid orchard grass hay. If you do not have access to a fixed formula, fixed ingredient feed, or a feed that doesn't include problem ingredients, your only option is to feed straight grains and feeds such as oats, wheat bran and beet pulp. However, you are then left needing to feed a

suitable supplement to insure that the overall diet is balanced and no mineral deficiencies exist. Some supplements also contain feed ingredients that may induce allergies such as soy. When commercial supplements are not an option I recommend formulating a custom supplement that is formulated to the specific needs of the individual horse. These often end up being economically priced and comparable to commercially available products.

Why do we seem to have more horses suffering from allergies? I'm not sure that we know the answer to that question. However, according to several studies it is likely that there is a genetic component to allergies and in the case of insect hypersensitivity as much as 35% may be due to genetics. Certain breeds such as Icelandic horses and Welsh ponies seem particularly susceptible. What we know from people is that the allergy you have may not be the same as the one your parent had. For example, your mother may have suffered from asthma and you may suffer from eczema.

If you have a horse who is displaying allergy symptoms contact your veterinarian for a consultation and to create a treatment plan. Also consider contacting an equine nutritionist who can work with you to insure that your horse's diet is optimal for allergy relief.



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