# Atopic Dermatitis in the 21<sup>st</sup> Century: Information to Help Your Allergic Westie

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A topic dermatitis is a skin disease associated with an allergic response to a number of environmental allergens, including pollens, molds, dusts, danders, mites, and in some dogs, foods as well. West Highland White Terriers are one of many breeds predisposed to atopic

dermatitis, and there is no cure for this chronic disease. Successful management IS possible, however, and it is very important to make the diagnosis early in life and to institute a control program that will allow these lovely little dogs and their owners to live a good life. It is



important to realize that while allergies cannot be cured, they can be managed.

We have learned a lot about canine atopic dermatitis in the last 15 years. We used to think that dogs were exposed to their allergens through the mucus membranes of their nose and mouth. and that somehow, these proteins made their way to the skin to cause the allergic reaction. We now know that dogs absorb most of their allergens through their skin, which explains why we see the lesions where we do: the skin of the feet, the axillae, the abdomen, and groin, as well as around the eyes and mouth. Some dogs will also have itchy ears and itchy rumps as well. Atopic dermatitis is a chronic inflammatory disease that is associated with genetic predispositions, and is caused by abnormalities in immune function and in the skin barrier. Because atopic dermatitis in dogs is very similar to that in people, we can use the research done in humans and mice to understand the canine disease, and use this understanding to improve our options for treatment.

We now know that the genetic predispositions associated with atopic dermatitis are caused by polymorphisms in genes that affect skin structure and function as well as immune function. Animals and people with atopic dermatitis have a deranged immune system that over-reacts to environmental antigens that do not affect normal individuals. The prevailing hypothesis is that the immune system is balanced between two types of response (and maybe more!). The T helper 1 response (T helper are a type of white blood cells that provides help to other cells in the *immune response)* is meant to help battle viruses, bacteria that live within cells,

fungi, and cancer cells; we call this cell-mediated immunity. The T helper 2 response is meant to help us make antibodies to battle bacteria outside of cells as well as some parasitic infections; we call this humoral immunity. When these two responses are balanced, we and our pets are healthy. In patients with allergic disease, the T helper 2 response overwhelms the T helper 1 response. One byproduct of this overactive immune response is the production of the allergic antibody IgE, which is what we measure in skin testing or serum allergy testing. But this response is much more complex than just overproduction of an allergen specific IgE antibody. It involves overproduction of a variety of chemicals (cytokines, chemokines, lipid mediators) released by cells to create the inflammation and itch we see with atopic dermatitis. One of the problems associated with an overactive T helper 2 response is increased susceptibility to staphylococcal and yeast infections of the skin. Instead of killing bacteria and yeast, dogs with atopic dermatitis become irritated and/or allergic to them.

We have recently learned that the skin barrier is also abnormal in atopic dermatitis. The skin barrier is made up of the corneocytes, the very top layer of cells in our skin, and a lipid (fat) that surrounds them. We call this the "bricks and mortar" model, because the surface cells (the bricks) are surrounded by this lipid emulsion (the mortar). The skin barrier acts as a physical and chemical barrier by preventing proteins from allergens like pollens, bacteria, and yeast from penetrating into the skin; it also helps to keep water in the skin. In addition, the normal skin barrier has a number of small proteins that act as natural antibiotics. There are numerous skin proteins that are abnormal in the skin of human atopics, particularly one called filaggrin. We are still learning about these abnormalities in dogs. Another abnormality identified in humans is a decrease in a lipid called ceramide. We

have identified these decreases in dogs as well, and it gives us one more target for treatment of dogs. Third, we know that the natural antibiotics in the skin of atopic people and dogs are decreased. These skin barrier abnormalities allow

allergenic proteins into the skin, they allow for bacterial and yeast overgrowth, and they allow water to get out, leading to dry itchy skin.

This new information has helped us develop a new approach to the treatment of atopic dermatitis. We know that each dog needs to have a treatment program

that is individualized to his or her needs. We call this our multimodal approach, and we focus on the following 5 parts: avoidance of allergens when possible, identification of allergens and the use of allergen-specific immunotherapy (ASIT), control of ectoparasites and infections, repair of the skin barrier, and last but not least, control of the itch that makes these dogs so uncomfortable.

Avoidance of allergens is always best whenever possible. Practically speaking, it is feasible to avoid foods that are associated with atopic dermatitis. We can sometimes reduce allergens like house dust mites or wool or molds in our environment. We can't do much about pollens though, and in some parts of the country, the pollen seasons are year-round. For those dogs, moving to a different state can help. As an example, one of my allergic Westies, born in Houston, TX, moved with me to Denver, Colorado, which reduced her polleninduced symptoms so significantly we could control her allergies with bathing alone. Moving is rarely an option for

most dogs. Therefore, for dogs with significant disease that lasts longer than 5-6 months, one of the most critical parts of our treatment plan is the identification of the allergens causing the disease and the use of allergen-



specific immunotherapy (an allergy vaccine). Allergy testing is not done to make a diagnosis of atopic dermatitis. We make the diagnosis by the history of itch developing in a young dog, the appearance of the appropriate clinical signs, and ruling out itchy diseases caused by fleas, mites, or pure food allergies. We use our allergy testing to find out to what the dog is allergic so that we can tailor-make an allergy vaccine for that specific dog. In the past, we believed that intradermal skin testing was the best tool. Now we know that serum allergy testing, with all the improvements made in the last 20 years, provides excellent information. There are at least 4 papers in our literature that suggest that success with immunotherapy based on serum allergy testing is equivalent to that based on skin testing. It is likely that for some dogs, skin testing will be preferred, particularly if they are young (1 year of age or less), but for other dogs serum allergy testing will provide better results. Intradermal skin testing, although considered the gold standard, is not a perfect test. Some dogs just have poor

quality tests that are difficult to interpret. The major disadvantage for skin testing is that we have to stop antihistamines and/or steroids for several weeks in order to get a good test result, and this is not possible for many dogs. Serum allergy testing opens up specific diagnosis to

many veterinarians and can be used with confidence to make allergy vaccines. In the past, allergy vaccines were always given by subcutaneous injection (subcutaneous immunotherapy or SCIT). Most dogs tolerate these injections quite well, but some people are uncomfortable giving injections and in a few dogs, the injections are associated with side effects of increased itch or hives. We now have available to us allergy drops given in the mouth (sublingual immunotherapy or SLIT). These drops are given under the tongue or sprayed onto the mucus

membranes of the mouth twice daily. A recent study by Dr. Douglas DeBoer at University of Wisconsin showed that SLIT was just as effective as SCIT. It may work faster than SCIT and can be effective in some dogs that have failed to respond to SCIT. These allergy vaccines are now available through several of the allergy companies that provide serum allergy tests. It is important to realize that this type of therapy is very flexible. If the original dosing and frequency of injections is not working, we can change it. We can reformulate vaccines as needed as well. The good news as well is that if allergy vaccines can be started when dogs are young, there is a reasonable chance we may be able to reduce the frequency of injections during the 2nd or 3rd year. And in some dogs, after several years, we may be able to stop therapy. We know less about the allergy drops, but for humans, 5 years of oral allergy drops

may be sufficient to permanently tolerize against the allergens, so that the allergy vaccine can be stopped.

We have found that one of the major trigger factors for atopic dogs is flea exposure. Many dogs that are doing can create havoc in an allergic dog is the Sarcoptes mange mite. The presence of this mite can be very difficult to demonstrate with skin scrapings; the only way to rule it out is by treating for it. A clue that sarcoptic mange may be present is the sudden loss of control of itch in an

otherwise well-controlled atopic dog. Dogs of all ages can develop sarcoptic mange, and because the reaction to the mite is an allergic reaction, atopic dogs are at risk. It is sometimes hard to know where the exposure to the mites occurs, but we know that urban wildlife can be a source. And most of the products we routinely use for flea control will not kill these mites.

Infections with Staphylococcus pseudintermedius (the dog Staph. bacteria) and/or Malassezia yeast make the itch of atopic dermatitis at least 10 times worse and

it is critical that we treat and control these infections effectively. In the past, the treatment of bacterial infections was simple; we used antibiotics and our dogs got better. Now treating bacterial infections is more complicated because of methicillin resistance. Methicillin resistance has jumped into the dog S. pseudintermedius, and causes antibiotic resistance. The more we treat with antibiotics, the greater the risk of developing resistant infections. These infections require a culture and sensitivity, and often the choices of antibiotics are expensive and have significant side effects. We therefore are moving more toward bathing as therapy.

There is nothing better we can do for an allergic dog than bathe it frequently. Bathing removes bacteria and yeast as well as pollens and other allergens, thus reducing itch substantially. It is not true





reasonably well with their allergies will

decompensate and become very itchy

after exposure to even a low number

of fleas. It is very important that all

dogs with atopic dermatitis receive

flea control every 30 days throughout

live in a part of the country where fleas

are rare. In some exquisitely sensitive

dogs, flea control may need to be used

especially, when the number of fleas

every 2 weeks during the spring and fall

increases dramatically in places like the

living in more northerly climates should

are many options available now, both oral

and topical, and the choice of flea control

product should be based on the individual

southeastern United States. Even dogs

have flea control every 30 days. There

dog's needs and what is working well

in his/her particular geographic area.

This advice is best obtained from your

veterinarian. Another ectoparasite that

the year, unless they are fortunate to

that frequent bathing is bad for dogs. Dogs without skin disease may not need bathing, but dogs with atopic dermatitis cannot be bathed too frequently. We can use newer medicated shampoos that will kill bacteria and yeast without stripping the coat of its natural oils. We advocate weekly bathing for all allergic dogs, but when infection is present, daily or every other day bathing is best. For yeast infections, we can often use a course of oral antifungal drugs along with bathing to reduce the itch associated with yeast infections. These antifungal drugs can provide rapid relief; sometimes we use them in a pulse fashion, 2-3 times per week, to prevent recurrence of yeast overgrowth. Atopic dogs can become allergic to their bacteria and yeast. We can use a bacterial product called Staphage Lysate\* to help control recurrence of bacterial infection when the allergy vaccine alone doesn't help. We can also add Malassezia allergen to allergy vaccines to reduce sensitivity to yeast.

Skin barrier repair is one of the newest therapies we can offer atopic dogs. We base this therapy for dogs on its use in children and adults with atopic dermatitis where it has been shown that the use of emollient lotions and creams, including those containing ceramide, the missing lipid. Skin barrier defects can be primary (part of the disease) but they can also be secondary (resulting from infection). Skin barrier restoration for dogs can take many forms. We have recommended for years that dogs with atopic dermatitis take fatty acids, particularly fish oils. While oral fatty acids do not reduce itch rapidly, when used over time they do help the skin to repair itself. Fish oil can be delivered as a supplement, but it may be easier to use a diet enriched in fatty acids. These can include veterinary diets such as Hill's JD\*, Iam's Skin and Coat Plus (Response FP)\*, Royal Canin's Skin Support\*, or Purina's DRM\*. Alternatively, overthe-counter diets from these companies

could include those labeled "Sensitive Skin" or "Skin Support" or "Hair and Skin." These diets are fish-based diets or have fish oils added in ratios that current nutritionists suggest are optimal. When used over time, these diets have been shown to reduce the clinical signs associated with atopic dermatitis. It is important to note that these diets are not necessarily "hypoallergenic." Some dogs with atopic dermatitis do have food allergy as well. For those dogs, we need to know what diets they have eaten in the past, what treats they have, what flavored

medications they use, in short, everything that passes their lips! One of the myths associated with food allergy in dogs is that signs develop after a change in diet. This is not true. Dogs develop food allergies to diets they have eaten for some time. Another myth is that changing brands of diet will help you diagnose food allergy. What we truly want is a change to a novel protein source that the dog has not eaten before. A third

myth is that most dogs with food allergies are allergic to grains. Right now the most common food allergy would appear to be to chicken. Why is this? Because chicken is the most common protein used in dog food diets. The fourth myth to dispel is that we can use over-the-counter single protein diets for diagnosis of food allergy; we cannot because these diets have been shown to be contaminated by chicken, beef, and soy. The veterinary diets are more expensive because of the pre-production and post-production quality control that is done to assure that these diets are pure. These diets can be used as diagnostic diets for 6-12 weeks, then with some work using food challenges, we can learn what foods to avoid. Home cooked diets can also be used. Dr. Ed Rosser at Michigan State

University now recommends the use of ostrich and rutabaga as a completely novel diet for dogs! If used over a long period of time, it would be important to consult with a veterinary nutritionist to ensure that the diet is complete and balanced.

Topical therapy is the second way we can restore the skin barrier. As we have mentioned, bathing is one of the best things we can do for atopic dogs. Sogeval\* makes a line of shampoos, sprays, and other products containing a



skin lipid called phytosphingosine (the DOUXO line). When used regularly, these shampoos improve skin and coat quality, reduce the frequency of bathing, and reduce the recurrence of skin infections. Use of DOUXO shampoos in my own allergic Westie reduced her need for bathing from 2-3 times a week to every 10 days, and provided her significant comfort in her later years. Sogeval\* also makes a conventional line of medicated shampoos to which they are adding phytosphingosine. The second product we can use is a topical spot-on called Allerderm Spot-on\*. This product contains ceramide and fatty acids. When used over time, these products improve skin and coat quality. reduce the recurrence of bacterial and yeast infections, and in mild atopics, may help reduce itch. A third line of products, called Dermoscent\*, is a topical spot-on made from essential oils of herbs. These products have a pleasant herbal odor and when used regularly have also been shown to reduce the inflammation and itch associated with atopic dermatitis. Websites to visit to learn more about these products are given in the reference list below.

Last but not least, one of the most important parts of our treatment program will include control of itch. It is the itch which makes our Westies so miserable. There are many ways to control itch and we can't emphasize enough that frequent bathing is one of the best tools we have. For some dogs, antihistamines can be helpful, although we don't have good published evidence for this. Certainly they are safe and worth trying. It is important to realize that histamine is only one of many mediators associated with itch, so it is our experience that antihistamines are not often that helpful in moderate to severe atopic dermatitis. Antihistamines work better as preventives than treatments, so it can often take several days to see a response to an antihistamine. Because of the way these drugs work, they need to be given continually to prevent itch, not on an "as needed" basis. Relatively high doses may be needed to control itch. Most dogs with itch will require either corticosteroids or cyclosporine (Atopica\*). Corticosteroids can be used safely in atopic dogs. Our goal is to use them at the minimal dose to control itch until the allergy vaccine is working. However, some dogs may always require a low dose of steroids to control itch. Steroids do not always have to be given orally or by injection. Sometimes we can get the great benefit of steroids by using them topically as a spray, a cream, or for dogs with itchy ears, as an ear drop. Cyclosporine, provides an alternative way to control itch, with fewer of the potential side

effects associated with long term steroid use. As for any treatment, it doesn't work well for all dogs and Westies in particular seem prone to the long term side effects such as gingival hyperplasia (a noncancerous thickening of the gums) and lichenoid psoriasiform dermatitis (some unusual skin reactions associated with bacterial infections). In my opinion, cyclosporine is a drug we would like to use as we wait for the allergy vaccine to work. It is a great choice for dogs whom we would like to skin test, because it controls itch but does not suppress a skin test. It is not a good option for young dogs as permanent therapy, although in older dogs that have not had the benefit of allergy testing early in life, it can be a lifesaver. For dogs with fairly focal itch spots, we can use a cyclosporinelike drug called tacrolimus (Protopic\*). This is available by prescription through human pharmacies and it has been shown to be quite helpful. Happily for atopic dogs, pharmaceutical industries are developing new medications to control itch that do not have the side effects of steroids and that may be more effective and less expensive than cyclosporine or tacrolimus.

As an owner of 3 atopic Westies over the last 30 years, I practice what I preach. My 3 dogs were allergy tested when young and responded well to allergy vaccines. I utilized bathing as my most useful tool to control itch and infections, and steroids as needed when times were bad for them. I am excited about the new research and I think we have much more to offer atopic Westies than ever before. It is important to be realistic about our expectations though to avoid disappointment. Atopic dogs will never be entirely normal, and they may itch more than a normal dog would. Nevertheless we can have a significant impact on their quality of life if we can implement our multimodal approach while these dogs are young.

If you are interested in more details about atopic dermatitis, please see the reference material listed below.

## **Reference Material:**

For our most current treatment recommendations, download this article at no charge.

Olivry T, DeBoer DJ, Favrot C, Jackson HA, Mueller RS, Nuttall T, Prelaud P, and International Task Force on Canine Atopic Dermatitis. 2010. *Treatment of canine atopic dermatitis: 2010 clinical practice guidelines from the international task force on canine atopic dermatitis.* Veterinary Dermatology 21:233-248. This article is available for download at no charge at the following URL:

### http://onlinelibrary.wiley.com/ doi/10.1111/j.1365-3164.2010.00889.x/ full

A recent review on what we know about atopic dermatitis has been published in the Journal of the American Veterinary Medical Association.

Marsella R, Sousa CA, Gonzales AJ, Fadok VA. 2012. *Current understanding of the pathophysiologic mechanisms of canine atopic dermatitis.* J. Amer. Vet. Med. Assoc. 241:194-207.

For additional information about topical lipids used for barrier repair, see the websites below.

#### Sogeval DOUXO line

(http://www.sogevalus.com/derm\_phyto. html)

#### Allerderm Spot-on

(http://www.virbacvet.com/virbac\_ dermatology/product/allerderm\_spot\_on/)

#### **Dermoscent products**

(http://www.dermoscent.com/?lpg=EN)

\*Product recommendations are those of the author and WFA does not endorse any service or products.