



The clinical signs are often the following:

pruritus (itching)	face rubbing
alopecia (hairloss)	feet chewing
redness	licking

The classic age of onset is somewhere between 1 and 3 years of age. Symptoms may be seasonal or non-seasonal. Those that are seasonal may progress to non-seasonal over time.

The progression of allergic disease is complex, and depends on the following factors:

- accumulation of environmental allergen exposure over time
- inheritance of a genetic tendency to produce allergen-specific IgE
- impaired barrier function in the skin
- self-induced trauma (licking, chewing, scratching)
- secondary bacterial and yeast infections

### **Secondary Staphylococcal Infection**

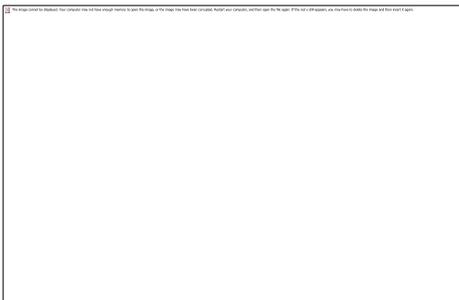
Animals with atopic dermatitis often have concurrent staphylococcal bacterial skin infections, mostly *S. intermedius*. Most doctors would agree that staphylococcal infections can cause inflammation and mild to severe itching even in normal pets, even independent of allergies.

There is a large amount of evidence that suggests a complex and close interrelationship between staphylococcal infection and atopy.

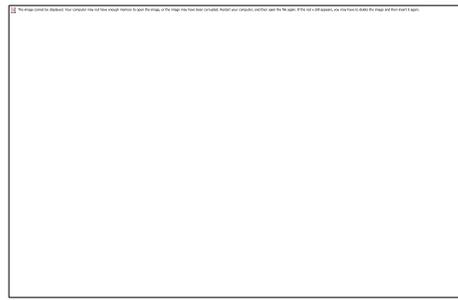
1. Higher numbers of staphylococcal organisms are found on the skin of atopic vs. normal dogs. Bacterial organisms are concentrated in the cornified upper layer of the epidermis (stratum corneum), known to be defective in atopic animals.
2. Dogs with recurrent superficial pyoderma (skin infection) secondary to atopy have significantly higher serum levels of anti-staphylococcal IgE than healthy dogs, or dogs with other kinds of skin infections.
3. In humans with atopy, staphylococcal exotoxins function as “superantigens” and are major contributors to the induction and maintenance of allergenic responses. Superantigens are powerful inducers of T-lymphocyte activation and amplification of skin inflammatory responses.

The clinical importance of staphylococcal infection in atopic dogs cannot be overstated. Early detection and treatment, along with vigilant, continuous infection control are absolutely critical to the successful lifelong management of atopy in our pets.

Dogs presenting with superficial pyoderma primarily have lesions confined to the trunk. The most common lesions identified included papules and pustules (Photo 1). Generally, pustules are small (less than 4 mm) and present in varying stages of eruption. Most pustules are confined to the axillae (armpit) and groin areas, but can also be located on the haired trunk. Sometimes, epidermal collarettes may be present (Photo 2).



(1) Staphylococcal pustules



(2) Staphylococcal collarettes

## **Secondary Yeast Infection**

*Malassezia* is unique. It is the only fungal species that is part of the normal cutaneous flora in humans and other mammals. It is a commensal organism that causes no harm to the host. Common sites are on the skin, interdigital spaces, ear canals, groin and underside of neck. However, *Malassezia* can cause disease in animals with defects in the skin that allow it to become an opportunistic pathogen. Atopic animals with defective epidermal barrier function are particularly susceptible to inflammatory skin disease caused by pathogenic *Malassezia* infection. This species has been shown to induce immediate hypersensitivity in dogs with atopic dermatitis. Significant improvement occurs in many atopic patients following systemic anti-fungal drug usage, illustrating that control of secondary yeast is absolutely critical to successful long-term management of this condition.

Clinical Signs:

Alopecia (hairloss)

Odor

Hyperpigmentation (grey discoloration)

Pruritus (itching)

Erythema (redness)

Lichenification (skin thickening)

Greasy Coat

Increased Scale Production



This figure shows alopecia, hyperpigmentation, and lichenification.



This figure shows alopecia, erythema, and increased scale production.

When treating secondary skin infections it is important to treat for a minimum of 21 days. Typically treat for at least 7-10 days beyond complete clinical resolution of symptoms. Often prophylactic treatment with topical medications (shampoos, lotions, etc.) is ongoing. It is imperative to follow the recheck recommendations of your veterinarian.

## **Types of Allergens and Routes of Exposure:**

Our environment is filled with a vast array of different types of allergens. Exposure can be seasonal (pollens) or non-seasonal/year-round (foods, molds, dust mites, animal dander, fibers). Seasonal allergies are not so seasonal in areas of the United States where snow cover during winter does not predominate for extended periods of time. In recent years, studies have shown that allergen exposure is cumulative and that the route of exposure does not determine lesion distribution.

**Flea Allergy**---This is the most common skin allergy seen in small animal veterinary medicine and is caused by the saliva of the flea and can often lead to severe hair loss, itching, and secondary skin infections. It is important to consider a single flea bite from up to 2 months prior to signs can result in a severe reaction. Also, flea allergic pets often remove any evidence of fleas by over-grooming. Needs to be managed by keeping fleas off! They never reach a “zero” level of itchiness.

**Inhaled Allergy**---This is caused by substances that an animal inhales from the environment, such as airborne pollen, mold spores, and dust mites. They can often occur seasonally (ragweed, grass, etc); however, others are year-round (molds, dander, dust mites).

Contact Allergy---This is the leading source of irritation and allergy to a substance. They are most frequently triggered by grass, weeds, and tree pollens. Also can involve wool carpets. Animals with a contact allergy may have small cracks/defects in the skin's surface that are invisible to the naked eye. These openings allow allergens to gain entry to the body. Since most pets are not bathed daily, offending allergens can remain on the skin for days to weeks at a time, causing continued irritation, itching, and other signs.

Food Allergy---This accounts for approximately 30% of non-seasonal canine dermatitis cases. Symptoms can occur in animals as young as 4 months and up to 12 years of age. About 50% of food-allergic patients are younger than 1 year when diagnosed. The primary symptom is very itchy skin; but, can also include chronic or recurrent ear infections, hot spots, face rubbing, hair loss, and secondary infections. Gastrointestinal symptoms are also seen. The seven most common food allergies in dogs are: Beef, Chicken, Milk, Eggs, Corn, Wheat, and Soybean.

\*\* In cats, atopic dermatitis is not as well understood. While cats are affected by allergy-induced skin problems, they also have a higher incidence of respiratory (asthma) symptoms. A common behavior in allergic cats is over-grooming, which likely results in higher allergen exposure by ingestion. Therefore, allergen exposure in cats can occur by ingestion, inhalation, and through contact with the skin. It is not known which allergen exposure route is predominant.

## **Diagnosis:**

Atopy (allergic dermatitis) is a disease characterized by complexity. Before a definitive diagnosis can be made, 3 criteria must be met:

1. Thorough physical exam and dermatological history must be completed.
2. Clinical signs of atopic dermatitis must be present.
3. All other known causes of pruritus must be ruled out.

The diagnosis of atopic disease is made more difficult by the common occurrence of co-existing allergic diseases. Skin scrapings, cytology, biopsies and therapeutic trials should be attempted in the course of trying to diagnose allergies. Failure to alleviate the "itch," despite these controlled measures, provides a high index for suspicion of atopic disease.

## **Treatment:**

It is important to remember that there is no overnight "fix" for allergies. Management of this condition requires a lot of communication between you and your veterinarian and frequent follow-up visits to evaluate response to treatment. There is also some expense involved with diagnosing and treating atopy. All animals with atopic dermatitis have occasional flare-ups, which will require visits to the vet.

### **Specific Therapy for Atopy**

#### ***Allergen-specific Immunotherapy***

This is sometimes considered the mainstay of therapy for canine atopic dermatitis. This is based on an allergy test panel, which measures a pet's reaction to certain allergens depending on the region. In general, the maximum number of allergens, that your pet is likely to be exposed to, are included. The typical protocol involves starting at a low concentration and slowly increasing to the highest concentration. Clients should be able to observe their dogs for the first 30 minutes and preferably 1 hour after each injection and report any reaction to your veterinarian. Since allergen-specific immunotherapy has not been associated with any organ disease or increased incidence of infections, this therapy does not require monitoring the results of complete blood counts, serum chemistry profiles, or urinalyses. The disadvantages include the need for injections to be given by clients, initial allergy test cost, and there may also be a lag time (some times even 9 months) to show a beneficial response. Some studies demonstrate an efficacy in about 60% of dogs, while other studies show slightly lower percentage.

## **Non-specific Therapies for Treatment of Atopy Symptoms**

### ***(1) Allergen Avoidance***

Reducing allergen exposure should always be one of the main goals in an allergy management program. Unfortunately, avoidance measures are usually not effective alone, since most environmental allergens are ubiquitous. Most owners are not equipped to devote the time, effort and expense that must be invested to achieve complete and effective removal of offending organisms from the pet's environment.

Fleas –

Use appropriate flea control at all times.

Use commercial extermination to remove fleas from indoor and outdoor areas every 3 weeks.

Vacuum and mop floors regularly to remove any flea larvae or eggs from indoor environment.

Wash pet bedding at least once a week in HOT water.

Remove organic matter (leaves, feces, grass clippings) from yard and keep grass short.

Molds –

Keep pets away from freshly mowed grass, leaf litter, hay, wooded areas, mulches, etc.

Keep pets out of basements, laundry rooms, bathrooms since high humidity favors mold growth.

Keep pet kennels clean and dry.

Keep relative humidity of the indoor environment at less than 50%.

Storage Mites –

Keep pets away from areas where grains are stored (esp in farm environment)

Store dry dog food in airtight containers. Immediately discard pet food bags outside of the house.

Do not stockpile dry pet foods (max store time is 30 days), because storage mites propagate in dry food.

Keep dry pet foods in areas of low humidity (<50%) and cool temperature (<70 degrees).

Avoid using low quality foods with noticeable particulate debris at the bottom of the bag.

House Dust Mites –

*\* It is impossible to totally eliminate house dust mites from the indoor environment.*

Avoid the use of carpet for indoor floor areas. Tile or wood floors are preferable.

Minimize or remove all materials that “collect dust”.

Keep pets from the bedroom, because bedrooms have the highest counts of dust mites in the home.

Wash pet bedding at least once a week in HOT water.

If possible, encase bedding in mite-proof covers. This includes mattress, box spring, dog beds, etc.

Change furnace and air filters often (usually recommended to be done once a month).

Vacuum and mop floors regularly.

### ***(2) Antihistamines***

Antihistamines work to block the inflammatory effects of histamine, which is released when mast cells degranulate in response to allergic sensitization. They are readily available, inexpensive drugs that can be safely taken over a lifetime. Response to antihistamine therapy is variable. Success with a particular antihistamine in one dog, for example, is not necessarily replicated in another. Only 20-30% of dogs show good response to antihistamine therapy. Several different drugs may need to be tried in order to find one that is helpful. Using the generic formulation should not decrease the efficacy.

Diphenhydramine 25 mg tablets (Benadryl nonchildren's)----- \_\_\_\_\_ tablet(s) by mouth every 8-12 hours.

Chlorpheniramine 4 mg tablets (ChlorTrimeton)----- \_\_\_\_\_ tablet(s) by mouth every 8-12 hours.

Clemastine 1.34 mg tablets (Tavist)----- \_\_\_\_\_ tablet(s) by mouth every 12 hours.

Loratadine 10 mg tablets (Claritin)----- \_\_\_\_\_ tablet(s) by mouth every 12-24 hours.

Cetirizine 10 mg tablets (Zyrtec)----- \_\_\_\_\_ tablet(s) by mouth every 12-24 hours.

Hydroxyzine-----not available over the counter

### **(3) *Glucocorticoids (Prednisone, Dexamethasone, Methylprednisolone)***

Glucocorticoid drugs are highly effective for short term management of symptoms related to atopy uncomplicated by secondary infections. Their use poses a high risk of side effects, some of which can be serious. They are characterized by potent anti-inflammatory properties, including “good” inflammation that protects against infections (immunosuppressive). Animals on chronic therapy should be monitored every 3-4 months for evidence of secondary bacterial infection. Also, your veterinarian may recommend regular monitoring of bloodwork to monitor for possible life-threatening adverse effects (diabetes, Cushing's, kidney disease). It is important to follow provided directions and not abruptly discontinue use of this medication.

### **(4) *Essential Fatty Acids***

Essential fatty acids (EFAs) are a good adjunctive treatment modality for treatment of itching. They should always be used as a part of a comprehensive management plan and are not a good stand-alone treatment option. They synergize well with antihistamines and glucocorticoids. EFAs are considered nutritional supplements and often require at least 8 weeks before noticeable clinical benefits are seen. We are particularly interested in Omega-3 fatty acids, which can be found in fish oils. The only exception to their use is in animals known to be allergic to fish.

### **(5.) *Cyclosporine (ATOPICA<sup>®</sup>)***

Cyclosporine is an immunosuppressive drug developed from a soil-derived fungus. This drug is used to provide relief from autoimmune disorders such as rheumatoid arthritis and psoriasis. It is also used to relieve pruritus associated with atopic dermatitis. Unlike glucocorticoids, which affect virtually every cell in the body, producing many undesirable side effects, cyclosporine affects only inflammatory cells, which limits the severity and scope of adverse effects associated with this drug. Common side effects are vomiting, diarrhea, and loss of appetite. Unfortunately, this drug remains quite expensive, which makes it less attractive treatment option for large dogs. It generally takes 4-6 weeks to see an adequate treatment response. Since T lymphocytes (which are the cells targeted by cyclosporine) play an important role in tumor surveillance, this medication should be avoided in any animals previously diagnosed with any type of tumor.

### **(6.) *Apoquel***

Unlike common therapies, such as steroids, cyclosporine, or antihistamines, Apoquel is a new drug class specifically designed to go straight to the source of the itch, a key signal in the nervous system. It targets a particular step in the cascade that leads to itching and decreases the associated inflammation, redness or swelling of the skin. Therefore, it has minimal effect on other parts of the body. It is currently only approved for use in dogs at least 1 year of age. However, it is safe to use in the short and long term, and does not interact with medications. Typical side effects are vomiting and diarrhea, but they were only seen in a very small percentage of dogs.

## Summary:

Treatment	Specific/Nonspecific	Advantages/Disadvantages
Allergen Avoidance	Nonspecific	-Only effective in animals w/ minimal sensitivities -Not effective for pollen allergies.
Allergen-specific Immunotherapy	Specific	-Treats the disease while reducing symptoms. -Reduces or completely resolves symptoms in more than 70% of cases. -Side effects are rare. -Requires \$\$ and long-term owner commitment.
Essential Fatty Acids (Fish Oil)	Nonspecific	-Minimal side effects. -Inexpensive -Only effective in 20-30% of cases (may help overall skin health and improve healing).
Antihistamines (Benadryl, Claritin, Zyrtec)	Nonspecific	-Minimal side effects, safe for long-term use. -Inexpensive -Only effective in 20-30% of cases (may help decrease signs).
Glucocorticoids (Prednisone, Dexamethasone)	Nonspecific	-Resolves symptoms in more than 95% of cases. -Inexpensive -Highly nonspecific; affects all organs in the body. -Possible severe side effects when used long-term.
Cyclosporine (Atopica)	Nonspecific	-More specific than glucocorticoids. -Effective in about 70% of cases. -Potential for severe side effects. -Expensive, especially in larger dogs.
Apoquel	Nonspecific	-Interrupts itch sequence directly, without impacting other body functions. -Safe for short or long term use. -Side effects are rare. -Expensive.

## How to Conduct a Food Allergy Diet Trial

Food allergy is an abnormal response to food that is triggered by a specific reaction in the immune system and results in certain clinical signs. The allergens in food, responsible for this reaction, are typically the proteins. They are usually resistant to cooking, stomach acid, and intestinal digestive enzymes. They survive, cross the gastrointestinal lining, enter the bloodstream, and go to target organs causing reactions throughout the body.

Food allergy is a hypersensitivity reaction, which means the animal has been exposed to the allergen previously. Therefore, food allergies typically develop over time and are usually caused by something your pet commonly eats rather than by a recently introduced food/treat. Changing to another brand of pet food rarely helps since many ingredients are common to many pet foods. For this reason your veterinarian will recommend an at home diet trial.

A food elimination trial is the most important diagnostic tool in dogs and cats with suspected adverse reactions to food. Blood or skin allergy testing is not considered reliable for diagnosing food allergy. Ideally the first step is to produce an accurate diet history. This is a list of all proteins, carbohydrates, food colorings, and additives the pet has been/is currently exposed to. This should include the primary diet as well as any treats/snacks and table foods. However, due to the complexity of modern pet foods, this information has become much more difficult to ascertain.

So we typically begin an elimination trial with discontinuation of all components of the previous diet and introducing a new diet, which is usually a novel protein or hydrolyzed prescription diet. Food itself is antigenic so it is not possible to remove the allergenic response in its entirety. A diet can only be hypoallergenic if the animal was not previously exposed to the food components. So we choose a diet with a limited number of highly digestible proteins. We also use hydrolyzed diets, which means the proteins are altered in size to make them less antigenic. All additives should be avoided.

SUGGESTED DIET: \_\_\_\_\_

### Key Points:

- Slowly introduce the new diet by mixing with the original diet.
- Feed this new diet exclusively!
- Make sure all family members and friends know your pet is receiving a special diet.
- Feed all pets of the same species this food.
- Feed other species separately.
- If you need to use treats, use some of this diet.
- Keep pet out of the room during meals, especially if there are children in the house.
- If pills are prescribed, only use this diet to hide them. Otherwise consult your veterinarian.
- Keep on a lead if pet is in the habit of eating dropped food/garbage when exercised.

Pitfall of Pet Food --- Changing a pet, with suspected food allergy, from one brand of commercially available food to another is NOT a food elimination trial. This is because although a pet food label says "Salmon Dinner" it does not mean that salmon is the ONLY protein present in the food. Also, once unusual protein sources, like lamb and venison, have now become popular additions to commercially available pet foods. To make them appear "better".

Once the diet has been fed for the optimum time, 4-6 weeks minimum, it is recommended to begin to challenge the pet with proteins and determining if the cause a flare of signs. However, most owners are reluctant to alter a well-tolerated diet if it is balanced and acceptable to the pet.

## **Frequently Asked Questions:**

*If a patient responds well to steroid treatment, do you still recommend allergy testing?*

YES.....Steroid drugs are highly effective for short term management of symptoms, but their use also poses a high risk of serious side effects. They should be used sparingly and with strict adherence to the directions provided by your veterinarian. They do not treat the underlying allergy.

*What are the most common indicators of food allergy?*

Food allergies are typically non-seasonal, and can occur before 1 yr of age. They are frequently associated with recurrent ear infections and respond poorly to steroids and antihistamines. They generally cause intense feet licking, ear infections, anal gland problems, and face rubbing. Less common symptoms may include vomiting, diarrhea, and behavioral changes.

*How could a pet have food allergies if the animal has been on the same diet for years without symptoms?*

Allergies develop over time and it is possible that the animal could now be allergic to an ingredient that was not causing reactions previously.

*What is a hydrolyzed diet, and how could it benefit my food-allergic dog/cat?*

Protein sources in hydrolyzed diets have been subjected to a manufacturing process that breaks protein down into molecules too small to be recognized as antigens by the immune system. Therefore, hydrolyzed proteins are NOT allergenic. These diets cannot cause food allergy symptoms.

*How effective is immunotherapy treatment?*

Some reports say that 80% of animals have moderate to excellent responses to treatment. Failure to respond is most often due to secondary issues, such as untreated bacterial or yeast infections, or undiagnosed food allergy.

*How long should immunotherapy be continued?*

Based on recommendations by the American College of Veterinary Dermatology, a minimum of 3-5 years. Since relapse is likely once treatment has stopped, the best results are obtained by staying on desensitization throughout your pet's life. Remember there is no cure for allergies, only management.