DOG AND CAT ALLERGIES
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Introduction
Allergic skin disease is one of the most common types of skin disorders. Allergies in dogs and cats are very common. It can affect quality of life for the pet as well as the pet parents. The pet is pruritic (itching) and uncomfortable and the owners want their pet to feel better. The most common skin allergies found in dogs and cats are fleas, atopy and food. Skin disorders are one of the most common reasons dogs and cats visit their veterinarian. It is estimated that 15 to 25% of visits are related to treating and diagnosing skin and coat problems.¹

Flea allergies
Flea allergy dermatitis (FAD) is the development of hypersensitivity reaction(s) and subsequent skin lesions accompanied by variable pruritus in response to exposure to flea salivary antigens. This is also known as flea bite allergy. It is reasonable to assume there is high variability within individuals as to how much flea exposure is required to induce clinical flea allergic dermatitis. The concept that one flea bite is all that is required to induce symptoms may not be entirely true. It is believed that cats have a similar mechanism as dogs.²

Prevalence
Flea allergies are the most common type of allergic skin diagnosed in dogs.² This is also one of the most commonly diagnosed skin disorders in cats.¹ Fleas can affect any breed and any age of dog or cat, but generally flea allergies do not develop before 1 year of age.²

Signs
Dogs and cats with flea allergy dermatitis have pruritus—they itch. It can be seasonal or non-seasonal depending on the geography where the dogs or cats live. For dogs, lesions can commonly be found on the lower back, tail head, posterior and inner thighs, but may be found over the entire body. Cats generally have miliary dermatitis lesions on the back, neck and face, but lesions may be found anywhere.²

Diagnostics
It is important to obtain a history, including clinical signs and diet history. When diagnosing flea allergies, look for the presence of live fleas or flea dirt; diagnosis may start as simply as a thorough combing with a flea comb, but possibly includes intradermal testing and ruling out other causes.²

Treatment
Treatment involves eradicating the fleas and prevention of re-exposure to fleas. Without fleas the pet will not be exposed to flea saliva, thus preventing an allergic reaction.² There are a variety of products available to treat fleas: topical, oral, shampoos, dips and environmental treatments. To treat pruritus, glucocorticoids can be
used short term to help with symptoms. If there is a secondary bacterial skin infection, systemic antibiotics are commonly used, with selection based on bacterial cultures and sensitivity tests.²

**Allergic dermatitis**

Dogs and cats may be allergic to allergens in the environment. These allergens are proteins that when inhaled or absorbed through the skin, respiratory tract or GI tract can cause an allergen-specific IgE production leading to allergy symptoms, such as inflammation.² New research in dogs suggests defects in the dermal barrier contribute to environmental allergens and microbes penetrating the skin, resulting in the epidermal immune system being stimulated. The immunologic response results in release of many inflammatory products.³ As cats have increased in popularity, the recognition of atopy in this species has increased.

**Prevalence**

Allergic dermatitis is one of the top claims submitted by Veterinary Pet Insurance (VPI) policyholders year after year. In 2012 alone, policyholders submitted over 68,000 claims for skin allergies in dogs, accounting for more than $5.6 million in medical claim amounts—making it the second highest claim submitted for dogs. Skin allergies also fall within the top 10 claims for cats (2012 data – VPI).⁴

The most commonly diagnosed breeds are: golden retriever, West Highland white terrier, Chinese shar pei, bull terrier, bichon frisé, and the Tibetan terrier.⁵ In cats any breed can be at risk, the Devon rex, purebred cats and orange cats or cats with orange color in their coats seem to be more predisposed than other breeds and colors.²,⁶ Most dogs are diagnosed with atopy from 6 months to 3 years of age.³ Cat seem to average less than 5 years at diagnosis, but age of onset can vary.²

**Signs**

Allergic dermatitis might be the cause if the pet has seasonal pruritus, lichenification (thickening of the skin which indicates chronic inflammation), hyperpigmentation. The feet, face, ears, flexural surfaces of the front legs, axilla and abdomen are most affected. Lesions can develop due to self-trauma. Also otitis, pyoderma or Malassezia dermatitis can be seen secondary to atopy.²

**Diagnostics**

Diagnosis for atopy involves eliminating other conditions with similar symptoms.³ This would include appropriate control for external parasites, and potentially elimination food trials. Intradermal skin testing or serologic testing can also be performed to identify possible antigens, but they are not a definitive diagnosis of atopy. Skin testing or serological testing is only used to guide immunological therapy after a diagnosis of atopy is made.

**Treatment**

Treatment consists of supportive care and long term aggressive management. Supportive care consists of antihistamines, bathing, fatty acids and barrier replacement products. Antihistamines can be tried first; these have been shown to be minimally effective, but may decrease the amount of corticosteroids. Omega 3 & 6 fatty acids
decrease the amount of other treatment options, reduce the amount of medications and reduce the transepidermal water loss.\textsuperscript{7} Bathing with a nonirritating shampoo is helpful to soothe and rehydrate the skin, remove trapped allergens from the hair coat and deliver skin barrier replacements.

Corticosteroids are effective at providing immediate relief from severe pruritus. Short-term side effects are well known (polyuria, polydipsia, polyphagia, and panting). Longer-term side effects can include obesity, musculoskeletal problems (muscle wasting, cruciate rupture), iatrogenic hyperadrenocorticism, and opportunistic infections (urinary tract infection, demodicosis).

Allergen-specific immunotherapy (ASIT) is the practice of administering gradually increasing quantities of an allergen extract to an allergic subject. The allergens to use in the extract are based on responses to intradermal skin testing or serological testing. Immunotherapy can be used when it is impossible to avoid contact with suspected allergens.\textsuperscript{3} The serum can be given by SQ injection or sublingually, whichever is easiest for the pet owner to administer.

Antihistamines can be tried first; these have been shown to be minimally effective, but may decrease the amount of corticosteroids used.

Atopica\textsuperscript{®} (Cyclosporine) is an FDA approved capsule that is prescribed by veterinarians in order to treat atopic dermatitis for dogs that are over 4 lbs. The safe use of Atopica\textsuperscript{®} in dogs below 6 months of age has not been established. Atopica\textsuperscript{®} should be given 1-2 hours before a meal and without food. Once signs have decreased the dose can be reduced. Atopica\textsuperscript{®} fights the underlying cause of skin allergies and related skin conditions by targeting the immune cells involved in an allergic reaction. Side effects such as vomiting, diarrhea, and lack of appetite have been reported. Other less common side effects include muscle cramps, muscle weakness, and change in hair coat. Signs of an allergic reaction include facial swelling, difficulty breathing, hives, scratching, vomiting, diarrhea, and pale gums. Atopica\textsuperscript{®} can suppress the immune system at high doses causing more susceptibility to infection. \textsuperscript{8}

Apoquel\textsuperscript{®} is for the control of pruritis in dogs at least one year of age. It provides relief within 4 hours and controls itch within 24 hours. Apoquel\textsuperscript{®} is a different class of medication that specifically targets the cytokines involved in itch and inflammation associated with allergic skin conditions, with minimal negative impact on immune function. The most common side effects are vomiting and diarrhea. It can be used with other medications and used safely with parasiticides, antibiotics and vaccines. Treatment starts with a loading dose BID for 14 days and then treatment is given SID; it can be given short or long term. Apoquel\textsuperscript{®} can be given with or without food. The company that manufactures Apoquel\textsuperscript{®} has had supply issues, so it is not widely available yet.\textsuperscript{9}

**Food Allergy**

Adverse reactions to food, include food allergies and food intolerances. The pets’ immune systems are reacting to a protein source in the food. The offending proteins have usually been in the pet’s food for years and are only now starting to cause some problems.

**Prevalence**
Only 1% of all skin diseases dogs and cats are due to food allergy. Ten percent of allergic skin disease in dogs is due to food allergy. It is the third most commonly diagnosed skin disease after flea allergy and atopy. In cats, it is the second most frequent cause of dermatitis after flea allergy. Concurrent allergies may occur in 20-30% of cases in dogs and cats: atopy, flea, food etc. Ten to 15% of these cases will have GI symptoms. 

Breeds reported to have a predisposition for adverse food allergies include West Highland white terriers, German shepherds, boxers, and the Rhodesian ridgeback, in addition to pugs. There is no breed predisposition for cats, although 30% of reported cases were Siamese cats. Age of onset of symptoms ranges from 4 months to 14 years for dogs and 6 months to 12 years for cats.

**Signs**

Food allergic dogs and cats have non-seasonal pruritus, having symptoms all year. In dogs it is common for food allergies to include recurrent ear infections, with bacteria or yeast common, especially only in one ear. Common areas affected for dogs include ears, feet, inguinal region, axillary area, proximal anterior forelegs, periorbital region and muzzle. Cats have similar signs; with the head and neck most affected. For food allergies skin and/or GI tract will be affected.

**Diagnostics**

Diagnosis for food allergies involves eliminating other conditions with similar symptoms. Serologic testing and intradermal testing for food allergies have been shown to be unreliable, so should not be used for diagnosing food allergies. The only reliable diagnostic for food allergies to date is a food elimination trial. If the pet has GI signs and/or non-seasonal pruritus, otitis externa, etc., adverse food reaction/allergy would be suspected and the appropriate diagnostic procedure would be to perform a feeding trial using a hydrolyzed or novel protein food.

**Treatment**

Once you suspect an adverse reaction to food or food allergy, the standard for confirming the diagnosis is with a dietary elimination trial. Although an individual dog or cat could develop an adverse reaction to virtually any pet food ingredient, you will want to pay particular attention to the protein sources that the pet has been consuming. Although we think most commonly of animal protein sources, a reaction can occur to vegetable protein sources as well. The key thing to remember is that the reaction occurs to protein sources, not carbohydrates or fats. Food allergy is not characterized by reacting to a food the pet has just started eating. Pets develop true food allergies to ingredients in foods they have been consuming for some time.

An appropriate diet for a trial would be either a food that does not contain any protein sources the pet has previously been fed, or a food with a hydrolyzed protein source. The trial food is typically fed for 6 to 12 weeks. If a pet has GI signs the trial is usually shorter with the pet responding in 2 to 4 weeks. A pet with food allergy that has skin disease would be expected to improve gradually over 4 to 12 weeks. During a food trial, no other sources of food should be offered. This includes chewable flavored medication (e.g. heartworm preventives), treats, table food or supplements. Final
confirmation of the diagnosis involves challenging the pet with the original food. If the clinical signs return, the diagnosis is confirmed.\textsuperscript{12}

Essential fatty acids help repair the skin barrier. Fatty acids contribute to the barrier function, bestow fluidity and serve as a source of energy. Functional fats participate in important structural or functional cellular processes, or are converted to an important derivative that regulates cell function. Examples of functional fats include linoleic acid, alpha-linolenic acid, arachidonic acid, DHA, conjugated linoleic acid (CLA), EPA and medium-chained triglycerides (MCT). Omega 6 fatty acids are important in forming the ceramides that are the “mortar” between the keratinocytes. Foods high in omega 6 fatty acids improve the appearance of the hair coat by providing nutrients needed to form the ceramides and decrease trans-epidermal water loss (TEWL). Omega-6 fatty acids are polyunsaturated (multiple double bonds) fatty acid that include the essential fatty acids linoleic acid and arachidonic acid. Good sources of linoleic acid include many vegetable oils; good sources of gamma-linolenic acid include evening primrose oil, borage oil and blackcurrant oil; good sources of arachidonic acid are animal fats.

Omega 3 fatty acids help manage inflammation. Omega-3 fatty acids are polyunsaturated (multiple double bonds) fatty acids. Good sources of alpha-linoleic acid include flaxseed or flax oil; good sources of EPA and DHA include cold water marine oils such as menhaden fish oil, salmon oil or herring oil.\textsuperscript{1}

**Summary**

Allergic skin disease is one of the most common types of skin disorders. Allergies in dogs and cats are common and may be environmental, or food related. It can affect quality of life for the pet as well as the pet parents. With diagnosis and treatment hopefully the pet can feel better and have a higher quality of life that the pet parent is able to manage, improving the human animal bond.

**References:**

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