

Food Allergy

Food allergies account for approximately 5-10% of all skin disorders in cats and dogs and 31% of non-seasonal canine dermatitis cases.²⁰ It is the third most common cause of allergy after flea bite allergies and atopic dermatitis. Symptoms occur in animals as young as four months, up to 12 years of age; 50% of food-allergic patients are younger than one year when diagnosed.²¹

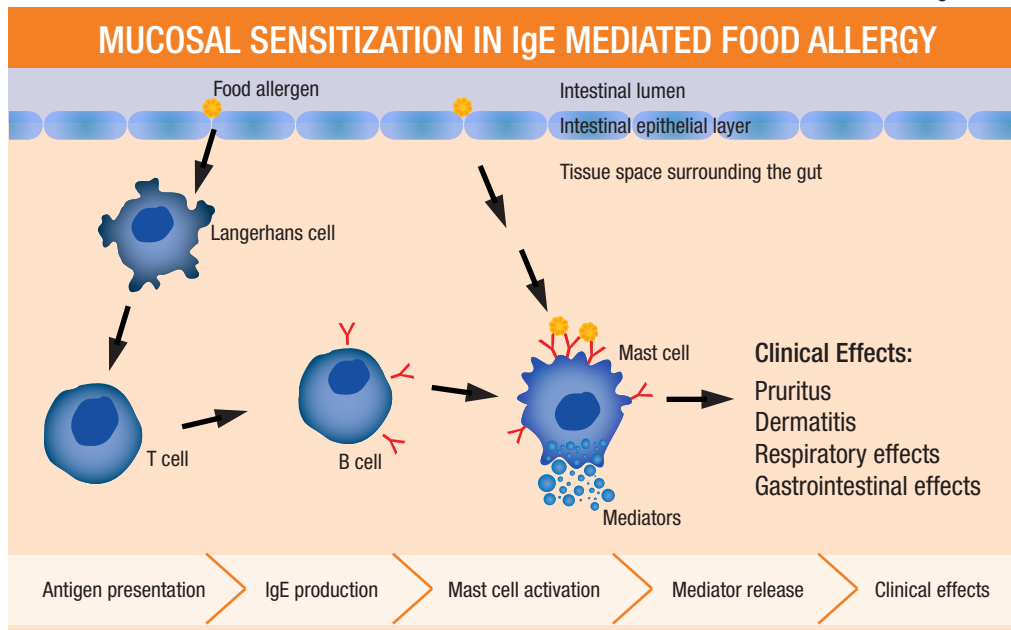
Many animals with food allergies also have concurrent atopy due to environmental allergens. The primary symptom in a food-allergic dog or cat is very itchy skin. Symptoms also frequently include chronic or recurrent ear infections (generally caused by secondary yeast infection), hot spots, face rubbing, hair loss and secondary staphylococcal infections that respond to antibiotic treatment but recur after treatment has ended.

Allergic symptoms can improve dramatically through simple changes in the affected animal's diet.

Food-allergic dogs engage in excessive licking and chewing of the feet and tail areas, likely due to intense pruritus. Gastrointestinal symptoms also occur in food allergic animals, though not as often as dermatitis, and include vomiting and diarrhea. Though typical clinical symptoms of food allergy are sometimes difficult to distinguish from atopy or flea bite hypersensitivity, a few important discriminating features can really help to make a proper diagnosis:

- Non-seasonal; year-round symptoms
- Symptoms first observed out of season (Winter)
- Moderate to severe symptoms occurring before one year of age
- Intense pruritus; tail-rubbing and feet-licking
- Primary focal areas affected: ears, base of tail and feet (“ears, rears and feet”)
- Recurrent ear infections (yeast otitis)
- Poor response to antihistamines and steroids

Figure 1.11



The seven most common food allergies in dogs:

- Beef
- Chicken
- Milk
- Eggs
- Corn
- Wheat
- Soybean

Serum IgE Testing in Food Allergy

Food allergy is an important component of allergic dermatitis. Serum IgE testing for food allergy is a useful tool in allergy management. Following identification of offending foods, appropriate diet changes can be made, which often results in immediate relief from symptoms. While traditional elimination/provocation food trials remain the classically accepted, definitive method for identifying food allergies, it is extremely difficult for many owners to comply with the restrictions and lengthiness (minimum of six to eight weeks) of a properly conducted food trial.

For veterinarians who prefer to conduct food elimination trials in patients with suspected food allergy, serum IgE testing provides crucial support in demonstrating the need for dietary restrictions, and may help to improve owner compliance during a lengthy food trial.

“Serology may be helpful in the management of dogs with suspected adverse food reactions by identifying suitable candidates for limited-antigen dietary trials, and in the selection of the most appropriate diet.”

Dr. Richard E.W. Halliwell
Professor Emeritus, University of Edinburgh
Royal (Dick) School of Veterinary Studies
Edinburgh, UK

Allergen Cross-Reactivity

Cross-reactivity occurs when allergens from one species (plant, insect, mold, mite or food) cause allergic reactions in a patient to allergens from a different species.

A major focus in allergy research has been to learn the structure of proteins in plants known to cause allergy, in order for scientists to “map” protein relationships between, and within plant families. Nature does not do unnecessary work; many proteins in different plants within the same or related plant families are very similar to one another. Similarity between proteins explains allergen cross-reactivity, because IgE antibodies recognizing an allergenic protein in one plant will also recognize a similar protein in a related plant. Allergen cross-reactivity works the same way in mold, dust mite and insect families. For example:

- Grass pollens are the most abundant worldwide. They are extremely cross-reactive among different grass species, indicating that grass family members are close relatives. If a dog is allergic to one grass species, she is usually allergic to other grasses as well.
- Among the trees, oak is the highest pollen producer. Oak is related to beech, alder, hazelnut and birch; allergy to any of these could indicate allergy to any other in the cross-reactive group.
- Weed families also contain many cross-reactive plant members. One of the most prodigious pollen-producing weeds, ragweed, is cross-reactive with marsh elder, povertyweed and cocklebur.

Because of abundant antigenic cross reactivity among major grass, tree and weed pollen families, effective immunotherapy treatment can be formulated without the need to treat every individual allergen identified by allergy test results.

Veterinarians and pet owners should be aware of possible cross-sensitivity between plants and certain foods, particularly fruits. For example, birch tree pollen cross-reacts with apple and avocado; short ragweed pollen cross-reacts with cantaloupe and banana.

Cross-reaction occurs in two ways:

- Antigenic cross-reactivity among families (related species)
- Pan-allergen cross-reactivity (unrelated species/families)



Birch tree

Cross-reaction →



Apple



Short ragweed

Cross-reaction →



Cantaloupe

Pan-allergens

A pan-allergen is a type of protein that is found throughout the plant and animal kingdoms. The structure of these “universal” proteins is highly conserved across plant and animal species so that vital protein functions remain stable and unchanged. Consequently, cross-reactions can occur between related or unrelated families and species. For example, a positive score to birch (tree) may be reflected as a positive score to apple in the food panel, even though the animal has never eaten apple.

A deeper understanding of allergen cross-reactivity plays an important role in the successful treatment of your patient’s allergies.

Bio-Medical Services has researched this topic extensively to share this insight with our veterinary clients and their pet owners. We believe it is vital that our veterinary partners understand how we arrive at our treatment recommendations, and why your test results may, at times, look different than expected.

Cross-reaction is important in considering:

- Immunotherapy treatment formulation
- Diet selection
- Avoidance strategies

The following chart illustrates several common pan-allergen and other cross-reactions seen in serum IgE testing. The nature of immunological relationships between allergens is particularly important in the understanding of IgE food test results, when pollen and food allergens cross-react.

Figure 2.3

| PAN-ALLERGENS AND OTHER ANTIGENIC CROSS-REACTIONS BETWEEN FOOD AND POLLENS | |
|--|---|
| If your pet is allergic to: | She could also be allergic to: |
| Beef, cow’s milk, chicken, turkey, duck, egg, lamb, pork, rabbit, venison | Albumin <i>(pan-allergen)</i> |
| Tomato, potato, tobacco leaf | Mugwort / sagebrush <i>(pan-allergen)</i> |
| Apple, pear, potato, tobacco, carrot, kiwi, hazelnut, plum, banana, peach, parsley, cherry | Birch <i>(pan-allergen)</i> |
| Barley, corn, oats, wheat, rice | Grass pollens <i>(cereal grains are cultivated grasses)</i> |
| Green pea, green bean, peanut, soybean | Mesquite, alfalfa pollen, red clover <i>(cross-reactive members of the legume family)</i> |
| Beets, spinach | Kochia, lambsquarters, russian thistle <i>(cross-reactive members of the goosefoot family)</i> |

For more information on cross-reactive allergen families, see Appendix A.

Albumin is an animal kingdom pan-allergen that functions as a carrier protein for nutrients and helps to maintain blood volume in the arteries and veins of different animal species, including humans.