Prospective Clinical Evaluation of Food Allergic Dogs and Cats

Previous recommendation of a 3 week elimination diet trial was empirical. Initial recommendation in this study was to feed a home-cooked restricted diet for 60 days. In several instances the results were equivocal after 60 days and the diet was fed an additional 30 days.

**Data Collected**
- Time elapsed before maximal clinical response on diet
- Time elapsed before return of initial clinical signs when fed previous diet
- Age, breed, sex, clinical signs
- Responsiveness to glucocorticoids
- Concurrent disease conditions
- Final treatment diets

**Diets Fed**
- Formulated based on known past exposure
- Avoided any previously consumed foods
- Consisted of home cooked foods

**Canine diets**
- Protein sources - lamb, venison, moose, elk, rabbit, duck, goose, goat, ostrich, emu, alligator, kangaroo, pinto beans
- Carbohydrate source - rice, potatoes, sweet potatoes (yams), rutabagas, oats, barley

**Feline diets**
- Protein sources - rabbit, venison, lamb, duck, goose, ostrich, emu
- Carbohydrate source - green peas, rarely rice

**Results – Canine** - Time elapsed before maximal clinical response
- 1-3 weeks - 13 dogs
- 4-6 weeks - 25 dogs
- 7-8 weeks - 10 dogs
- 9-10 weeks - 3 dogs
Results – Feline - Time elapsed before maximal clinical response
1-3 weeks - 4 cats
4-6 weeks - 7 cats
7 weeks - 1 cat, 9 weeks - 1 cat
**Results – Canine** - Time elapsed before return of initial clinical signs
1-2 hours - 9 dogs
1-3 days - 32 dogs
7-9 days - 3 dogs
14 days - 1 dog
6 dogs never fed previous diet

**Results – Feline** - Time elapsed before return of initial clinical signs
15-30 minutes - 2 cats
24 hours - 2 cats
2-3 days - 4 cats
6-8 days - 4 cats
10 days - 1 cat

**Age At Onset of Clinical Signs - Canine**
Range of 4 months to 11 years
<1 year old - 17 dogs (33%)
1-3 years old - 26 dogs (51%)
4-11 years old - 8 dogs (16%)

**Age At Onset of Clinical Signs - Feline**
Range of 3 months to 11 years
<1 year old - 3 cats (23%)
1-2 years old - 3 cats (23%)
4 years old - 2 cats (15%)
6-11 years old - 5 cats (39%)

**Breeds Affected - Canine**
Soft-Coated Wheaton Terrier, Dalmatian, Collie, West Highland White Terrier, Chinese Shar Pei, Lhasa Apso, Miniature Schnauzer, Cocker and Springer Spaniels, Labrador Retriever, Golden Retriever, German Shepherd, Bichon Frise

**Breeds Affected - Feline**
Siamese, Domestic Shorthair, Domestic Longhair

**Clinical Signs - Canine**
Non-seasonal pruritus
Most commonly affects the ears/pinnae, feet, inguinal region, axillary region, proximal foreleg, face, neck, perianal/perineal region
Chronic, recurrent otitis externa a common problem (Serous Otitis Media observed in 81/104 children from 1-9 years of age related to food allergy in 1 study)
May develop secondary staphylococcal pyoderma or Malassezia dermatitis
Possible history of seizures (Food Allergy and seizures in humans: seafoods and soybeans)
– increased dopamine in CNS
Concurrent diarrhea rare, may have more frequent or softer feces
Only clinical sign on presentation:
Chronic recurrent pyoderma
Seborrheic dermatitis

Clinical Signs - Feline
Non-seasonal pruritus
Most commonly affects the ear/pinnae, pre-aural region, neck, periorbital region and face
Miliary type lesions most common ("Miliary dermatitis")
Eosinophilic plaques
Feline symmetrical alopecia
Severe excoriations can occur
Angioedema, urticaria, conjunctivitis

Response to Glucocorticoids
Complete cessation of pruritus
Dogs - 39% of cases
Cats - 64% of cases
Partial reduction in pruritus
Dogs - 44% of cases
Cats - 9% of cases
No reduction in pruritus
Dogs - 17% of cases
Cats - 27% of cases

Concurrent Primary Pruritic Skin Diseases
Flea Allergy Dermatitis
Atopic Dermatitis
Flea Allergy and Atopic Dermatitis
Flea Collar Hypersensitivity

DIAGNOSIS
Treat suspected food allergy cases symptomatically for first 6-12 months before recommending an elimination diet trial

Rationale For Initial Symptomatic Therapy For 6-12 Months
51 food allergic dogs followed for 3 years
Only 3 dogs re-developed pruritus
2 dogs became flea allergic
1 dog became atopic
None of the dogs became pruritic due to the new hypoallergenic treatment diet
All dogs had been eating the initial sensitizing diet for 6-12 months or longer

Dogs Started On Elimination Diet Prior To 6-12 Months Of Pruritus
2 cases initially on beef/soy based diets
Placed on lamb based diets after 3 months
Pruritus controlled for 2 months
Pruritus re-developed and dogs found to be reacting to lamb

**Dogs Started On Elimination Diet Prior To 6 Months Of Pruritus**
1 case initially on lamb/rice based diet
Placed on venison based diet after 2 months
Pruritus controlled for 3 months
Pruritus re-developed and dog found to be reacting to venison

**Theory Of An Immunologic Window**
Patient is genetically programmed to become sensitized to commonly exposed antigens in the diet after a certain age
At this age, sensitization begins over a 6-12 month time period?
After this time period of programming, the sensitizing immunologic window closes

**Immunology of Food Allergy**
IgE mediated food allergy:
Common in children - peaks at 1 yr.
Consider skin testing and in-vitro serum testing in puppies?
Rare in adults
False negative skin tests in adults
Delayed hypersensitivity reactions to foods:
More common in adults
Consider patch testing with foods

**ELIMINATION DIET TRIAL** – MINIMUM 12 weeks in duration

**Protein hydrolysate formulated diets:**
Reducing the Molecular Weight (Daltons) of a specific protein in the diet
DVM Pharmaceuticals – Exclude - Hydrolyzed casein and chicken liver, oat groats, pinto beans
Purina CNM Diet - HA-Formula - Hydrolyzed soy, corn starch, canola/coconut oil
   Purina Gentle Snackers - Hydrolyzed soy, corn starch, canola/coconut oil, oat fiber
Hill’s Prescription Diets
   Canine z/d Ultra - Hydrolyzed chicken and chicken liver, corn starch, soybean oil
   Canine and Feline z/d Low Allergen - Hydrolyzed chicken and chicken liver, potato (canine), rice (feline), soybean oil
   Canine and Feline Hypoallergenic Treats - Hydrolyzed chicken and chicken liver, corn starch (dogs), rice (feline) soybean oil
Royal Canin Veterinary Diet (Waltham)
Hypoallergenic HP Canine – Hydrolyzed soy, rice, chicken fat, beet pulp, vegetable oil
Hypoallergenic HP Feline – Hydrolyzed soy, rice, chicken fat, beet pulp, fish oil

**Home-cooked Elimination Diet Trial**
Restricted diet fed for up to 90 days
Formulate based on known past exposure
Avoid any previously consumed foods

**Canine Diets**
Protein sources
- Lamb, venison, rabbit, duck, goose, goat, ostrich, emu, alligator, kangaroo, elk, moose
Cook by boiling, baking or broiling
Carbohydrate sources
- Rice, potatoes, rutabagas – boiled, No instant or minute forms
- Sweet potatoes - baked
Add nothing to the cooking water
Mix equal portions of protein and carbohydrate (50:50) to approximate the volume of the previous diet
1 cup of the cooked mixture per 10 pounds of body weight per day
Will need to increase the amount of carbohydrate 2-4 x for most dogs
Use carbohydrate and/or protein treat between meals
“Nothing else is to pass the dog’s or cat’s lips for the next 60 days”
Discontinue all:
- Table scrapes
- Dog and cat treats
- Chewable heartworm preventative
- Chewable vitamin supplements
- Essential fatty acid diet supplements

**Feline Diets**
Protein sources
- Rabbit, lamb, venison, duck
Cook by boiling or broiling
Carbohydrate sources
- Green peas
Often refuse rice or potatoes
Most often feed protein source alone

**Treatment Diets - Canine**
Lamb, venison or vegetable and rice based dry diets (Nature’s Recipe)
Rabbit and rice based canned diet (Nature’s Recipe)
Duck, venison, or salmon and potato based dry or canned diets; lamb and rice based canned diet, egg and rice based dry diet (d/d, Hill’s)
Venison, duck, rabbit, or whitefish and potato based canned and dry diets (Innovative Veterinary Diets – Royal Canin - Waltham)
Vegetable and potato/oat/rice based dry diet (IVD Select Care Vegetarian Formula)
Vegetable and rice/oatmeal/barley/potato based dry diet (Natural Balance Vegetarian Formula)
Fish and potato based dry diet (Eukanuba Response Formula FP for Dogs)
Salmon, trout and rice dry diet (Purina CNM Diet: LA-Formula); Menhaden fish meal and rice dry diet (Royal Canin - Skin Support SS\textsubscript{21})
Kangaroo and oat based dry diet (Eukanuba Response Formula KO for Dogs)
Fish and sweet potato based dry diets
   Wellness Fish and Sweet Potato diet – whitefish, barley, rye flour, menhaden fish meal, canola oil
   California Natural Herring & Sweet Potato diet – herring, barley, oatmeal, herring oil, sunflower oil
   Natural Balance Sweet Potato and Fish diet – salmon, menhaden fish meal, canola oil
   Flint River Ranch “Fish and Chips” Trout and Sweet Potato diet – trout, millet, herring meal, oatmeal, canola oil
Duck and sweet potato based dry diet – Fromm Duck and Sweet Potato Formula – barley, rice, oatmeal, egg, millet, tomato pomace, canola oil, cheese, carrots, broccoli, cauliflower, apples, green beans, cranberries, blueberries, chicory root, alfalfa sprouts, garlic, parsley
Venison based dog treats – Nature’s Recipe Healthy Skin Venison Dog Treat – soy flour, molasses, garlic powder; Shaffer Venison Farms – Venison Dog Treats – 100% smoked venison
Sweet potato based dog treats – Sam’s Yams Sweet Potato dog Chewz – 100% dried sweet potatoes/yams

Treatment Diets - Feline
Rabbit and rice based canned diets (Nature’s Recipe)
   Venison, duck, or rabbit and green pea based dry or canned diets (d/d, Hill’s)
Lamb and barley based canned diet (Eukanuba Response Formula LB for Cats)
   Venison, lamb, duck, or rabbit and green pea based canned and dry diets (Innovative Veterinary Diet – Royal Canin - Waltham)

Home Cooked Treatment Diets
Protein source
   Lamb, venison, rabbit, chicken, turkey, beef, duck, ostrich
Carbohydrate source
   Rice, potato, sweet potatoes, or rutabagas

   Essential fatty acid dietary supplement
   Derm Caps, EFA-Caps
   Dicalcium phosphate
   Non-flavored, additive free multiple vitamin and mineral supplement
   Taurine for cats

EXclude DIET TRIALS

Introduction
   Diagnosis of Food Allergy in Dogs Increasingly More Difficult
   Exposure to a wide variety of common and novel proteins and carbohydrates
Finding a novel food source an extreme challenge

**Study Purpose**
“To evaluate the effectiveness of a novel carbohydrate and hydrolyzed protein diet in controlling pruritus in previously confirmed food allergic dogs”.

**Patient Selection**
History of persistent, non-seasonal pruritus
Dogs initially exposed to numerous common and novel proteins and carbohydrates
Occurred prior to initiation of the home-cooked elimination diet trial

**Initial home-cooked diets fed (19 dogs):**
- Venison and white potatoes (8 dogs)
- Venison and sweet potatoes (4 dogs)
- Duck and sweet potatoes (3 dogs)
- Duck and white potatoes (1 dog)
- Lamb and sweet potatoes (1 dog)
- Rabbit and sweet potatoes (1 dog)
- Pinto beans and white potatoes (1 dog)
Initially fed the home-cooked diet for up to 8 weeks
Then re-fed the previous diet for up 14 days until pruritus recurred
Again fed the initial home-cooked diet until pruritus resolved

**Patient Selection – 19 dogs**
All dogs on treatment diets for >6 months prior to entering study:
- IVD - Venison/potato (8 dogs)
- IVD - Duck/potato (4 dogs)
- IVD - Lamb/potato (1 dog)
- IVD - Rabbit/potato (1 dog)
- Balanced home-cooked diets (5 dogs)

**Study Design**
Dogs initially examined and found to be free of any clinical signs or history of pruritus
All dogs fed the novel carbohydrate (pinto beans, oats) and hydrolyzed protein (casein = 99.7% < 1100 Daltons, chicken liver = 99.8% < 1400 Daltons) diet (EXclude®) for 30 days

**Owner to monitor each of the following:**
- Palatability
- Gastrointestinal signs
- Weight
- Dermatologic signs and pruritus
RESULTS
All dogs re-examined in 30 days:

Palatability
Readily consumed (18 dogs); Refused diet after 9 days (1 dog)

Gastrointestinal signs
Diarrhea/soft feces (7 dogs)

Weight - diet fed at a rate of 1/2 cup per 20# body weight
Weight loss (11 dogs)
Corrected by increased volume of food for each feeding except 1 dog
Weight gain (0 dogs)
Maintained weight (8 dogs)

Dermatologic Signs and Pruritus
Pruritus well controlled (18 dogs)
Re-developed pruritus (1 dog)
Occurred within 7 days of feeding
Original treatment diet - Balanced home-cooked pinto beans and potatoes

Conclusions
EXcludeR adequate for controlling pruritus in a sizable number of known food allergic dogs
May be a suitable substitute for a home-cooked elimination diet
Problems encountered are similar to those when feeding a home-cooked elimination diet

Treatment of Diarrhea/Soft Feces
Submit fecal sample ASAP for direct exam
Diff-Quik stain - Clostridial overgrowth
Change to a home-cooked bland diet - Usually chicken and rice or potatoes
Plain cultured yogurt added to diet
Pepto-Bismol tablets - adult dosage
Metronidazole (Flagyl) - 10 mg/kg BID x 7 days

Foods Associated With Exacerbation of Clinical Signs
Any food items being prepared in the kitchen
Meats, cheeses, cooking oils, margarine, breads, odors from various cooked foods
Peoples favorite snack foods
Popcorn, pretzels, peanuts, cookies (Oreo), potato chips, corn chips, doughnuts, pizza, french fries
“The Hoover Hound”

New Dilemma
Many patients with a possible food allergy that have already eaten and been exposed to “everything but the kitchen sink”
Possible cross contamination of commercial diets during processing
Prescription and non-prescription hypoallergenic diets
Patients reacting to various ingredients used in the processing of commercial diets

Treatment of Food Allergy
Breast feeding exclusively for > 6 mos
Decreased food allergy, atopic dermatitis, allergic rhinitis
Oral cromolyn sodium (Gastrocrom)
Increased G.I. permeability
   - Enzyme potentiated desensitization
Beta-glucuronidase + food Ag intradermally
Enzyme treated foods – rice

Gut sterilization treatment protocols
Clostridium sp., Helicobacter sp.
Decreases bowel inflammation and thereby decreases GI absorption of dietary allergens
“Triple Therapy Regimen” - Canine
   - Metronidazole - 15 mg/kg BID x 28 days
   - Amoxicillin - 20 mg/kg TID x 28 days
   - Bismuth subsalicylate (Procter) - 1 ml/kg QID x 28 days

Food Allergy Potpourri
Food challenge can be dose dependent
Negative at small doses, positive after a large meal
Children with egg allergy can react to mother’s breast milk after eating eggs
Cat with penicillin allergy can react to cow’s milk containing penicillin

Unique Food Related Reactions
Onion powder in baby food
Heinz body anemia in cats
Allergenic food additives - Tartrazine (azo dyes), Na benzoate (preservative), MSG (flavor), Na bisulfate (anti-oxidant)
Cutaneous vasculitis - Potatoes, green beans, peas, eggs
Lupoid onychodystrophy, paronychia
Reactive cutaneous histiocytosis
Sterile granuloma/pyogranuloma
Footpad hyperkeratosis with eosinophils
Nasodigital hyperkeratosis
Pinnal vasculitis, urticarial vasculitis
Sebaceous adenitis
Obsessive/compulsive disorders - Separation anxiety, Kleenex shredders, Lick granulomas
Lethargy, depression, aggressive behavior
**Unique Reactions to Foods**
Food allergy to fish
Exacerbated by inhalation of fish odors/fumes
Food allergens in house dust
Egg, milk, sugars

**Cross Reactions With Foods**
Pork-cat syndrome
IgE reactions to pork meat and cat dander
Bird-egg syndrome
Bird feather allergy (asthma), followed by food allergy to eggs
IgE mediated oral allergy syndrome
Cross reactivity between pollens (birch, grass, mugwort) and foods (fruits, vegetables, nuts)