Lecture overview

- Classification (pathogenesis)
- Prevalence
- Causes
- Signalment
- Clinical signs
- Diagnostic methods
- Implications for practice

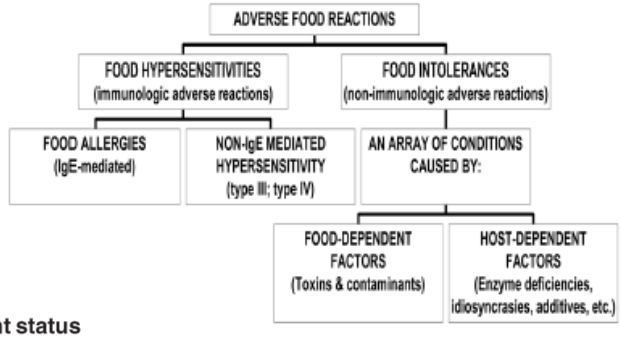
1

Classification (pathogenesis)

- In human medicine, "food allergy" refers to adverse food reactions involving a clearly demonstrated humoral response (mediated by immunoglobulin E).
- Other food hypersensitivities involve cellular immune responses (mediated by T lymphocytes).
- Food intolerance, by contrast, is non-immunologic.
- The term "adverse food reaction" (AFR, an aberrant reaction after ingestion of a food or additive, regardless of the pathogenesis) is preferred in veterinary medicine.

2

Classification and terminology most frequently used in human medicine in North America



Mol. Nutr. Food Res. 2007, *51*, 135 – 147 DOI 10.1002/mnfr.200600132

Review

IgE-Mediated food allergy diagnosis: Current status and new perspectives

Riccardo Asero[1*], Barbara K. Ballmer-Weber[2*], Kirsten Beyer[3*], Amedeo Conti[4*], Ruta Dubakiene[5*], Montserrat Fernandez-Rivas[6*], Karin Hoffmann-Sommergruber[7*], Jonas Lidholm[8*], Tihomir Mustakov[9*], Joanne N. G. Oude Elberink[10*], Richard S. H. Pumphrey[11*], Per Stahl Skov[12*], Ronald van Ree[13*], Berber J. Vlieg-Boerstra[14*], Reinhard Hiller[15], Jonathan O. Hourihane[16], Marek Kowalski[17], Nikos G. Papadopoulos[18], Jean-Michel Wal[19], E. N. Clare Mills[20] and Stefan Vieths[21*]

3

Critically Appraised Topics (CATs) on AFRs

- Some of what is taught to us is handed down from one practitioner to the other without critical appraisal of its scientific value.
- Bad tips and habits are picked up and are never corrected.
- Royal Canin is strongly committed to evidence-based medicine and improving effectiveness in veterinary practice.
- With the objective of reviewing existing knowledge and dogmas on adverse food reactions in dogs and cats, the available scientific evidence has been reviewed to produce a series of critically appraised topics, which will hopefully debunk some of the veterinary dermatology misconceptions surrounding food allergies.
- Publications were funded by Royal Canin.
- Royal Canin had no involvement in the production of these articles.
- All articles have undergone the journal's standard peer-review process.
- CATs can be accessed free-of-charge at: https://www.biomedcentral.com/collections/catsfoodreactions

4

Prevalence

- Critically Appraised Topics on Adverse Food Reactions #3 (2017)

Olivry and Mueller *BMC Veterinary Research* (2017) 13:51
DOI 10.1186/s12917-017-0973-z

BMC Veterinary Research

RESEARCH ARTICLE Open Access

Critically appraised topic on adverse food reactions of companion animals (3): prevalence of cutaneous adverse food reactions in dogs and cats

Thierry Olivry[1*] and Ralf S. Mueller[2]

Prevalence

- The prevalence of cutaneous adverse food reactions (CAFRs) in companion animals is not precisely known.
- In a systematic review of the literature, it varied based on the type of diagnoses made.
- Among dogs and cats with any disease < 1%
- Among dogs and cats with skin disease +/- 5%
- Among dogs and cats with pruritus 15-20%
- Among dogs and cats with allergic skin disease 10-25%
- It is also estimated to be around one third of dogs with atopic dermatitis.

Top 10 most commonly claimed conditions

- Statistics from Veterinary Pet Insurance (www.petinsurance.com)

Dogs	Cats
5.9 millions (35% of households)	7.9 millions (38% of households)
1. Ear infections	1. Urinary tract infections
2. Skin allergies	2. Gastritis and vomiting
3. Pyoderma and «hot spots»	3. Pyoderma and «hot spots»
4. Gastritis and vomiting	4. Enteritis and diarrhea
5. Enteritis and diarrhea	5. Skin allergies
6. Urinary tract infections	6. Diabetes mellitus
7. Benign skin tumors	7. Colitis and constipation
8. Eye inflammation	8. Ear infections
9. Osteoarthritis	9. Respiratory infections
10. Hypothyroidism	10. Hyperthyroidism

7

Main commercial pet food ingredients
Pet food sustainability

- Main ingredients are animal proteins and grains.
- In the meat/poultry/fishing industries, muscle tissue and a few organs are used for human consumption, while the remaining parts (by-products) are used as the main source of animal proteins in pet foods.
- They are submitted to a thermal process known as rendering that separates fat from bone and lean parts to obtain meat and meat-and-bone meals that are clean, disease free, nutritious, and palatable.
- "Pet foods made with by-products are more sustainable than those made purely from human-grade ingredients; they use animal parts that might otherwise be dumped in landfills, where they could emit tons of carbon dioxide and methane" WWF, 2016.

8

Definition of a trophallergen

- A trophallergen (food allergen) is a usually harmless heat-stable, water-soluble glycoprotein of animal or vegetal origin which can trigger an allergic reaction in a sensitized patient.
- More than 90% of food allergies in humans are caused by only a dozen of ingredients.
- The role that play carbohydrates, lipids, and food additives is controversial and poorly defined.

9

Causes

- Critically Appraised Topics on Adverse Food Reactions #2 (2016)

Mueller *et al. BMC Veterinary Research* (2016) 12:9
DOI 10.1186/s12917-016-0633-8

BMC Veterinary Research

RESEARCH ARTICLE Open Access

CrossMark

Critically appraised topic on adverse food reactions of companion animals (2): common food allergen sources in dogs and cats

Ralf S. Mueller[1], Thierry Olivry[2*] and Pascal Prélaud[3]

Causes

- In a systematic review of the literature, at least one offending food allergen source was reported in each of the 297 dogs included in the selected studies.
- The most frequently reported food allergens involved in CAFRs in dogs were beef (102 dogs, 34 %), dairy products (51 dogs, 17 %), chicken (45 dogs, 15 %), wheat (38 dogs, 13 %) and lamb (14,5 %).
- Other less commonly reported offending food sources were soy (18 dogs, 6 %), corn (13 dogs, 4 %), egg (11 dogs, 4 %), pork (7 dogs, 2 %), fish and rice (5 dogs each, 2 %).

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Causes

- At least one food allergen was identified in each one of the 78 cats reported in the selected studies.
- The food sources most frequently causing CAFR in cats were beef (14 cats, 18 %), fish (13 cats, 17 %), chicken (4 cats, 5 %), wheat, corn and dairy products (3 cats each, 4 %) and lamb (2 cats, 3 %).
- Egg, barley and rabbit were also reported as offending allergens in individual cats.

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Causes

- This evidence does not allow an estimation of the real prevalence of offending allergens in dogs and cats with CAFR, as animals were usually only challenged with a small number of - but not all - allergens.
- The true prevalence of each offending allergens is likely to be higher than that reported above.
- Actual prevalence will need to be reevaluated with prospective studies performing controlled sequential provocations in a larger number of animals with a detailed dietary history.

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The truth about grain allergy in veterinary medicine

- Some pet food companies or salespeople warn owners against corn, wheat or soy for marketing reasons.
- They are looking for ways to distinguish themselves from their competitors by developing a mythology about why these grains are harmful to pets.
- In reality, there are very few confirmed cases of grain-related cutaneous adverse food reactions in companion animals.

14

Celiac disease and gluten-related disorders

- Celiac disease, also known as gluten-sensitivity enteropathy, is common in people.
- Whereas celiac disease is associated with gastrointestinal signs, gluten-related disorders affecting multiple body systems in humans have been described.
- It is an autoimmune disorder, not an allergy or intolerance to gluten, and damage to the small intestines occurs because of the immune system producing antibodies against gliadin, which is found in gluten, a protein present in wheat, rye and barley.
- Gluten-free diets have garnered widespread attention in human medicine.

15

The truth about gluten sensitivity in veterinary medicine

- Gluten-related disorders are rare in veterinary medicine. Reports describe clinical signs primarily affecting the gastrointestinal tract in Irish setters (enteropathy) and the neurologic system in border terriers (paroxysmal gluten-sensitive dyskinesia, formerly known as canine epileptoid cramping syndrome).
- There is a single case report of presumptive gluten sensitivity-induced pruritus and otitis in one 2-year-old border terrier.
- Gluten sensitivity has not been reported in cats.

A presumptive case of gluten sensitivity in a border terrier: a multisystem disorder?

M. Lowrie, M. Hadjivassiliou, D. S. Sanders, O. A. Garden Veterinary Record (2016)

16

Signalment and cutaneous clinical signs

- Critically Appraised Topics on Adverse Food Reactions #7 (2019)

Olivry and Mueller *BMC Veterinary Research* (2019) 15:140
https://doi.org/10.1186/s12917-019-1880-2

BMC Veterinary Research

RESEARCH ARTICLE Open Access

Critically appraised topic on adverse food reactions of companion animals (7): signalment and cutaneous manifestations of dogs and cats with adverse food reactions

Thierry Olivry[1*] and Ralf S. Mueller[2]

Age of onset

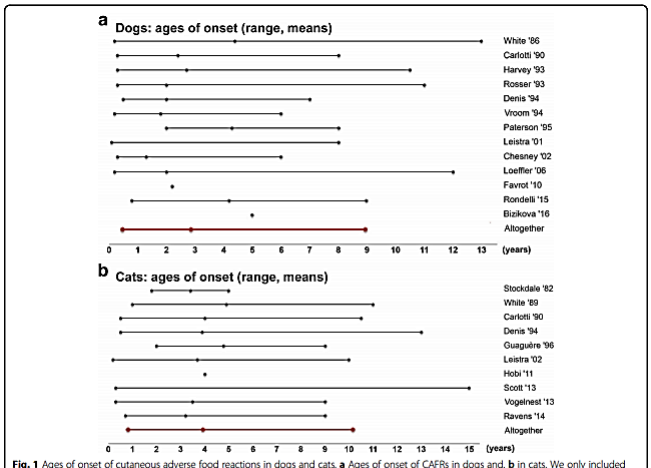

Fig. 1 Ages of onset of cutaneous adverse food reactions in dogs and cats. **a** Ages of onset of CAFRs in dogs and, **b** in cats. We only included studies reporting information on more than one animal and from which relevant data was usable. The lines represent the range and the dot inside each line depicts the means stated in that study. The red lines indicate the average of study means, as well as the minimal and maximal values of the mean ranges

Gender predisposition

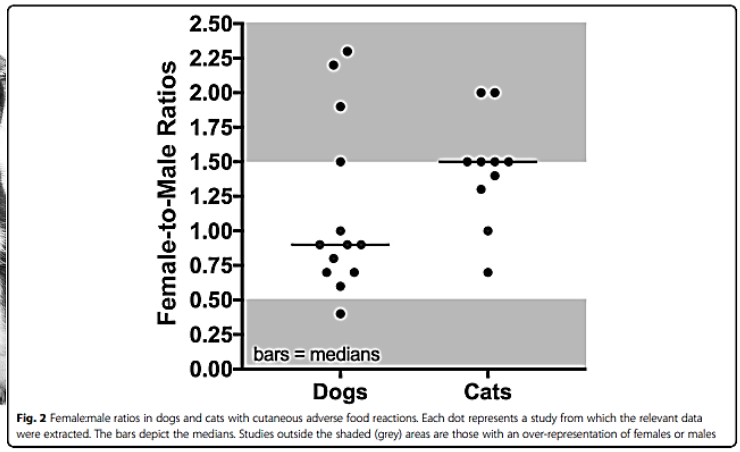

Fig. 2 Female:male ratios in dogs and cats with cutaneous adverse food reactions. Each dot represents a study from which the relevant data were extracted. The bars depict the medians. Studies outside the shaded (grey) areas are those with an over-representation of females or males

Age of onset and gender predisposition

- Age of onset of cutaneous signs in dogs and cats varies greatly.
- In dogs:
  - From less than 1 to 13 years of age.
  - Mean age of onset = 2.9 years.
  - Onset of signs by 1 year of age in 38% of dogs.
- In cats:
  - From 4 months to 15 years of age.
  - Mean age of onset = 3.9 years.
  - Onset of signs by 1 year of age in 23% of cats.
- CAFRs affects both male and female dogs and cats in a proportion that varies greatly also.

Breed predisposition

- There is no reliable evidence of unique canine and feline breed predispositions to develop CAFRs.
- Four canine breeds (German shepherd dogs, Labrador retrievers, Golden retrievers, and West Highland white terriers) account for over 40% of dogs with CAFR.
- Outside of the domestic shorthaired cat that is ubiquitously listed, Persian, Siamese, and Burmese cats represent 5%, 4% and 2% of cats with CAFR, respectively.

Cutaneous clinical signs - Dogs

- Nonseasonal pruritus reported in more than 90% of dogs.
- Pruritus described as glucocorticosteroid-responsive in two studies.
- Varies from generalized (50% of dogs) to localized (ears, feet, ventrum).
- Perineal pruritus affects only a minority (4 to 25%) of dogs with CAFRs.
- Most common manifestations are recurrent/chronic pyoderma, otitis externa, atopic dermatitis, and pyotraumatic dermatitis (acute moist dermatitis, "hot spot").
- Multiple manifestations often coexist in the same patient.
- *Malassezia* dermatitis, urticaria (wheals) and perianal furunculosis (fistulae) are reported in a surprisingly small number of dogs.

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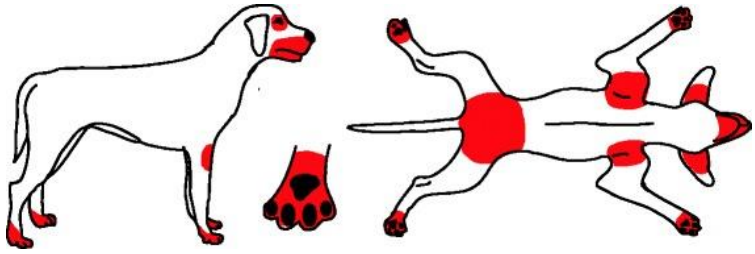
Cutaneous clinical signs - Dogs

- CAFR is indistinguishable clinically from canine atopic dermatitis.



Common distribution of clinical lesions and pruritus associated with canine AD and CAFR

Hensel *et al. BMC Veterinary Research* (2015) 11:196
DOI 10.1186/s12917-015-0515-5

BMC Veterinary Research

CORRESPONDENCE Open Access

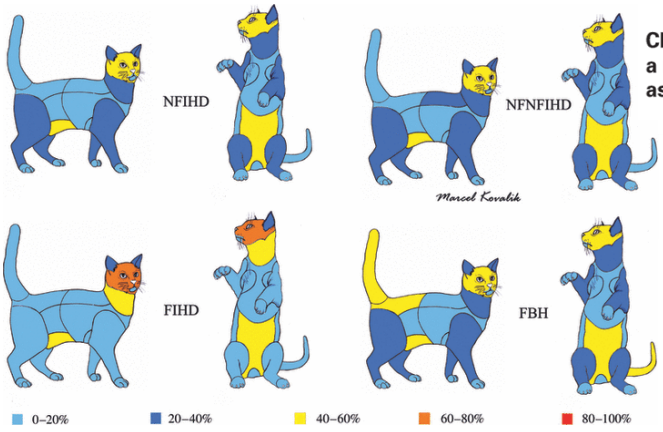
Canine atopic dermatitis: detailed guidelines for diagnosis and allergen identification

Patrick Hensel[1*], Domenico Santoro[2†], Claude Favrot[3†], Peter Hill[4†] and Craig Griffin[5†]

Cutaneous clinical signs - Cats

- Nonseasonal pruritus reported in nearly all cats.
- Pruritus described as generalized in only a small (5 to 12%) percentage of cats.
- The face/head region is pruritic in 53% of cats.
- Other commonly pruritic areas are the ears, the ventrum, and the feet.
- Perineal pruritus affects only a minority (10 to 15%) of cats with CAFRs.
- Most commonly described clinical presentations are a presumed self-induced/often-symmetric alopecia, a head-and-neck erosive/ulcerative/crusted dermatitis, a papulo-crusted miliary dermatitis or variants of eosinophilic dermatoses.
- Cats diagnosed as having a concurrent non-flea-associated hypersensitivity (atopic dermatitis) in 19 to 100% of cases.

Cutaneous clinical signs - Cats



Veterinary Dermatology
DOI: 10.1111/j.1365-3164.2011.00962.x

Clinical characteristics and causes of pruritus in cats: a multicentre study on feline hypersensitivity-associated dermatoses

Stefan Hobi*, Monika Linek†, Geneviève Marignac‡, Thierry Olivry§, Luc Beco¶, Claudia Nett**, Jacques Fontaine††, Petra Roosje‡‡, Kerstin Bergvall§§, Sveta Belova¶¶, Stefanie Koebrich***, Didier Pin†††, Marcel Kovalik‡‡‡, Sabrina Meury*, Sylvie Wilhelm*,† and Claude Favrot*,†

NFIHD = non food induced hypersensitivity dermatitis (HD); NFNFIHD = non flea, non food induced HD; FIHD = food induced HD; FBH = flea bite hypersensitivity

Non-cutaneous clinical signs

- Critically Appraised Topics on Adverse Food Reactions #6 (2018)

Mueller and Olivry *BMC Veterinary Research* (2018) 14:341
https://doi.org/10.1186/s12917-018-1656-0

BMC Veterinary Research

RESEARCH ARTICLE Open Access

Critically appraised topic on adverse food reactions of companion animals (6): prevalence of noncutaneous manifestations of adverse food reactions in dogs and cats

Ralf S. Mueller[1*] and Thierry Olivry[2]

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Non-cutaneous clinical signs - Dogs

Table 1 Non-cutaneous clinical signs of AFR in dogs

Clinical sign	Number of animals (% of all reported non-cutaneous AFR)	Strength of evidence
Diarrhoea [9–19, 22–27, 32–44, 47, 48]	391–490[a] (70–88%)	Strong in 36–39[a] [9–19, 48] Moderate in 151–189[a] [22–27, 47] Weak in 204–212[a] [32–44]
Vomiting [9, 11, 13–15, 17, 18, 22–27, 33, 34, 40, 42, 43]	28–115[a] (5–21%)	Strong in 6–47[a] [9, 11, 13–15, 17, 18] Moderate in 5–43[a] [22–27] Weak in 17–25 [33, 34, 40, 42, 43]
Increased frequency of defecation [23, 24, 45]	33 (6%)	Strong in 16 [45] Moderate in 17 [23, 24]
Tenesmus [45]	11 (2%)	Strong in 11
Paroxysmal gluten-sensitive dyskinesia of Border terriers [49]	5 (1%)	Strong in 2 Weak in 3
Symmetrical lupoid onychodystrophy [50]	4 (1%)	Strong in 2 Weak in 2
Anaphylaxis [40]	1 (0.2%)	Weak
Conjunctivitis [12]	1 (0.2%)	Strong
Asthma [27]	1 (0.2%)	Moderate
Sneezing [14]	1 (0.2%)	Strong

[a] Minimal and maximal number of dogs, as in some studies, the specific number of dogs showing some of the individual clinical signs was not reported

Non-cutaneous clinical signs - Cats

Table 2 Non-cutaneous clinical signs of AFR in cats

Clinical sign	Number of animals (% of all reported non-cutaneous AFR)	Strength of evidence
Diarrhoea [5, 7, 20, 21, 27–31, 51]	25–49[a] (28–55%)	Strong in 11–16 [20, 21] Moderate in 14–33 [5, 7, 27–31] Weak in 1 [51]
Vomiting [4, 5, 7, 20, 21, 27–29, 31]	26–46[a] (29–52%)	Strong in 15–20 [20, 21] Moderate in 8–27 [4, 5, 7, 28, 29, 31, 51]
Conjunctivitis [4, 7, 46]	3–20[a] (3–22%)	Strong in 1 [7] Moderate in 1 [4] Weak in 1–18 [46]
Salivating [46]	1–18 (1–20%)	Weak
Respiratory signs [7]	4 (4%)	Moderate
Flatulence [5]	3 (3%)	Moderate
Hyperactive behaviour [6]	1 (1%)	Strong

[a] Minimal and maximal number of cats, as in some studies, the specific number of cats showing some of the individual clinical signs was not reported

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Non-cutaneous clinical signs (mainly gastrointestinal)

- Vomiting and diarrhoea are reported in more than 20% of dogs and cats.
- In dogs, anaphylaxis, conjunctivitis, increased frequency of defecation, symmetric lupoid onychitis, and sneezing are reported less commonly.
- In cats, uncommon non-cutaneous signs are conjunctivitis, salivating, flatulence, hyperactive behaviour and respiratory signs.
- The probability of AFR is likely to increase if patients exhibit more than one of non-cutaneous signs.

Diagnostic methods in veterinary medicine

- Critically Appraised Topics on Adverse Food Reactions #4 (2017)

Mueller and Olivry *BMC Veterinary Research* (2017) 13:275
DOI 10.1186/s12917-017-1142-0

BMC Veterinary Research

RESEARCH ARTICLE Open Access

Critically appraised topic on adverse food reactions of companion animals (4): can we diagnose adverse food reactions in dogs and cats with in vivo or in vitro tests?

Ralf S. Mueller[1*] and Thierry Olivry[2]

Diagnostic methods in veterinary medicine

- Definitive dermatohistopathological diagnosis is not possible.
- Intradermal, serum food-specific immunoglobulin E/G, fecal food-specific immunoglobulin E, hair and saliva testing for food allergens are unreliable.
- Gastroscopic testing (observation of reactions on gastric mucosa after direct injection or application of food extracts) has insatisfactory accuracy, is an invasive method (need for general anesthesia) and requires expensive equipment.
- Lymphocyte proliferation testing has higher accuracy but is not offered by commercial laboratories.
- Patch testing has low positive predictability.

Diagnostic methods in veterinary medicine

Accuracy, positive and negative predictability[a] of various tests in privately owned dogs with naturally occurring adverse food reactions based on provocation with individual food allergens

	Accuracy	Positive predictability	Negative predictability
Intradermal testing with food antigens [4, 14]	63–76%	60–67%	62–77%
Serum testing for food-specific IgE [4, 5, 14]	58–87%	15–100%	61–86%
Serum testing for food-specific IgG [5]	77%	35%	84%
Lymphocyte proliferation tests [14]	94%	100%	93%
Patch testing with food antigens [5, 25]	81–90%	63–75%	88–99%

Accuracy, positive and negative predictability of various tests in privately owned cats with naturally occurring adverse food reactions

	Accuracy	Positive predictability	Negative predictability
Serum testing for food-specific IgE [15]	20%	0%	20%
Lymphocyte proliferation tests [15]	80%	100%	50%
Intradermal tests [15]	47%	100%	27%

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Commercial direct-to-consumer hair/saliva test

Veterinary Dermatology

Vet Dermatol 2019; **30**: 105–e28 DOI: 10.1111/vde.12716

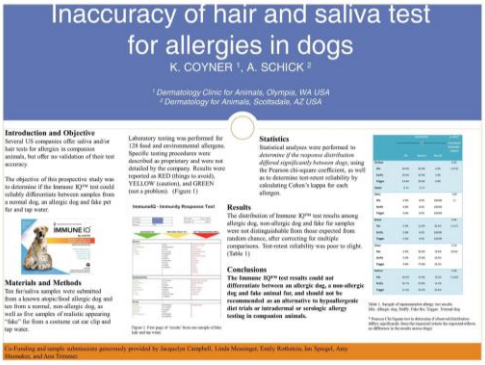
Hair and saliva analysis fails to accurately identify atopic dogs or differentiate real and fake samples

Joseph A Bernstein*, Kathy Tater†, Rodrigo C Bicalho‡ and Mark Rishniw†

- Glacier Peaks Holistics; Eureka, MT, USA.
- The allergy test performed no better than chance.
- The results were not reproducible.

Commercial direct-to-consumer hair/saliva test

Bordeaux
8TH WORLD CONGRESS OF VETERINARY DERMATOLOGY
MAY 31-JUNE 4 • 2016



Inaccuracy of hair and saliva test for allergies in dogs

K. COYNER [1], A. SCHICK [2]

[1] Dermatology Clinic for Animals, Olympia, WA USA
[2] Dermatology for Animals, Scottsdale, AZ USA

- Immune IQ™; Vet DVM, Boulder, CO, USA.
- The distribution of results among allergic dog, non-allergic dog and fake fur samples were not distinguishable from those expected from random chance.

The truth about diagnostic methods in human medicine

- Many human patients present to allergists with positive allergy tests results or may have engaged in self-diagnosis.
- Clinical history, percutaneous and allergen-specific immunoglobulin E serum testing can only suggest the likelihood of an adverse food reaction.
- Percutaneous testing (skin prick testing, SPT) is the quickest test.
- But how accurate is it?
- The positive predictive value of SPT for certain foods is +/- 50%. This means that there are about 50% false positives. In other words, positive skin test results indicate the presence of allergen-specific immunoglobulin E, but are NOT synonymous with clinical disease.

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The truth about diagnostic methods in human medicine

- The negative predictive value of SPT for certain foods is > 95%. In other words, negative skin test results essentially confirm the absence of IgE-mediated food hypersensitivity.
- Allergen-specific immunoglobulin E serum testing (ASIST) is the easiest and most convenient test, since it involves only a standard blood draw.
- But how accurate is it?
- Based on comparative studies, sensitivity of ASIST is 25-30% lower than that of skin testing.
- **In reality, the ultimate diagnosis in human medicine is provided by an oral food challenge.**

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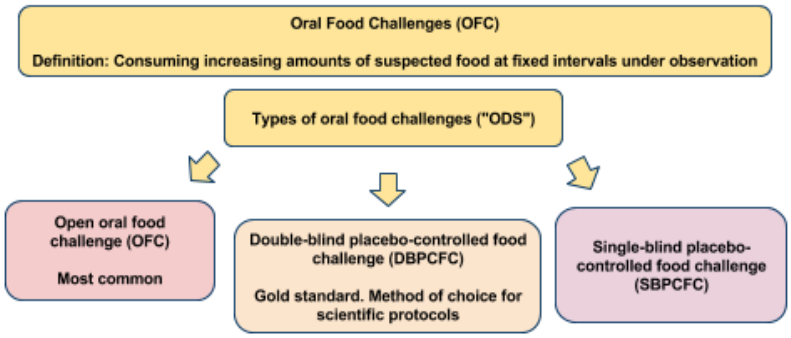
3 types of oral food challenges in human medicine



Both the physician and the patient are aware that the patient is eating the suspected food. The challenge food is not disguised in any way.
Most practical test in clinical practice.

Neither the physician nor the patient know what the patient is being fed. The suspected food is disguised in another food.
Most reliable test because it eliminates both patient and physician bias. If the patient reacts consistently to the allergen (but not the placebo), results are reliable. Not often performed in non-academic settings.

The physician is aware of what the patient is being fed, but the patient is not. The suspected food is disguised so the patient is unaware of the contents.

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3 steps in diagnosing food allergies in humans

- Step 1 - Elimination diet

The patient must avoid the suspected food for at least 2 weeks.

- Step 2 - Challenge

The procedure is labor intensive.
The suspected food is hidden in opaque capsules to eliminate taste and smell.
Increasing amounts of either a challenge or a placebo food are administered to a symptom-free fasted patient every 10-30 minutes until an age-appropriate serving size is administered.
Clinical reactivity is ruled out once 10 grams of dry food is ingested.
Patients are monitored for at least 2 hours post-challenge and instructed to contact the allergy clinic if there are any delayed reactions.

- Step 3 - Sequential provocation

Challenge with different foods on different days.

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Duration of food trial

- Critically Appraised Topics on Adverse Food Reactions #1 (2015)

Olivry et al. BMC Veterinary Research (2015) 11:225
DOI 10.1186/s12917-015-0541-3

BMC Veterinary Research

RESEARCH ARTICLE Open Access

Critically appraised topic on adverse food reactions of companion animals (1): duration of elimination diets

Thierry Olivry[1*], Ralf S. Mueller[2] and Pascal Prélaud[3]

Duration of food trial

- There are variable recommendations in the veterinary literature regarding the length of time before seeing clinical improvement once a patient is placed on the elimination diet, with some authors recommending a 12-week trial.
- To diagnose CAFR in at least 80 % of dogs and cats, an elimination diet trial should last a minimum of 5 weeks in dogs and 6 weeks in cats.
- Increasing the duration of the trial to 8 weeks will increase the sensitivity of diagnosis to more than 90 % of cases in both species.
- If pruritus is decreased by at least 50% during this period of time, a diagnosis of adverse food reaction can be presumed.

Duration of food trial

- Whenever no clinical improvement is observed during the food trial, an adverse food reaction is ruled out and other diseases such as atopic dermatitis or non-allergic pruritic disorders may be suspected.
- The ultimate goal of an elimination diet is to enable the positive confirmation of a CAFR with a provocation with suspected food items.
- Requiring owners and patients to struggle on for 12 weeks without seeing improvement in clinical signs can cause many owners to lose faith with the entire process, leading them to abandon the food trial and possibly seek out a different opinion.

THE CAVD RECOMMENDS TO PERFORM FOOD TRIALS FOR 8 WEEKS.

Duration of food trial - Dogs

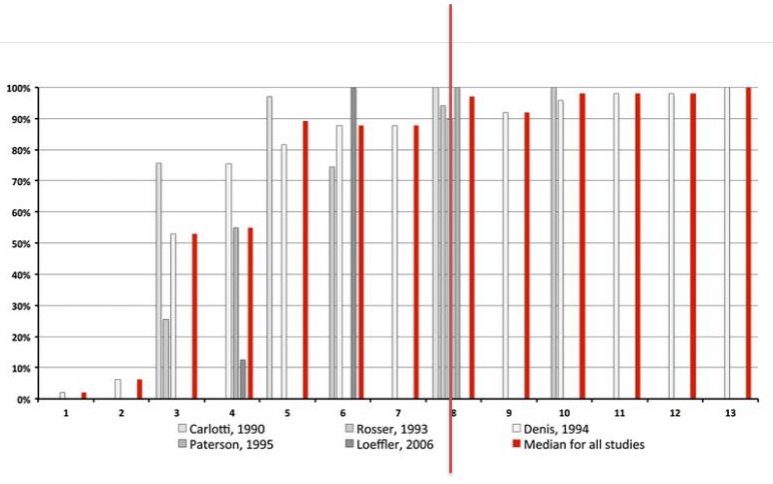

Fig. 1
Cumulative percentages of clinical remission in 209 dogs with CAFRs over time (in weeks)

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Duration of food trial - Cats

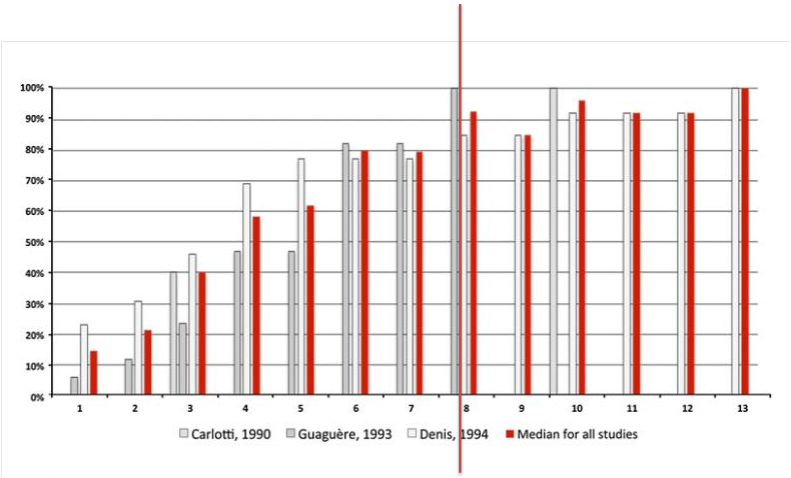

Fig. 2
Cumulative percentages of clinical remission in 40 cats with CAFRs over time (in weeks)

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General considerations

- Definitively diagnosing a cutaneous adverse food reaction in dogs and cats remains a challenge.
- Results can be ambiguous !
- Unfortunately, the only currently reliable method to identify patients with cutaneous adverse food reactions is to perform an elimination diet trial for a sufficient time while controlling concurrent allergies and secondary infections. This is easier said than done !
- The term "elimination diet" is preferred to "hypoallergenic diet" because any reduction in allergenicity or clinical reactivity at which point a diet could be considered hypoallergenic is arbitrary.

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3 steps in diagnosing food allergies in dogs and cats

- Step 1 - Elimination diet

  - Guidelines
  - Client communication
  - Diet selection

- Step 2 - Challenge

- Step 3 - Sequential provocation

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Step 1 - Elimination diet

- Slowly introduce the elimination diet !

1 meal of new food followed by 1 meal of old food
Both types of food at the same time

- Requires strict owner compliance: the diet is to be fed exclusively !

No treats (unless compatible), rawhides, edible toys and bones
No flavored medications, preventatives, supplements and toothpaste

- Clinical signs of gastro-intestinal disease usually resolve within 2 weeks, while cutaneous clinical signs will usually take longer.
- It may take several weeks for the *maximum* improvement to be seen.
- Seeing an improvement during the process provides encouragement to pet owners to continue with the trial.

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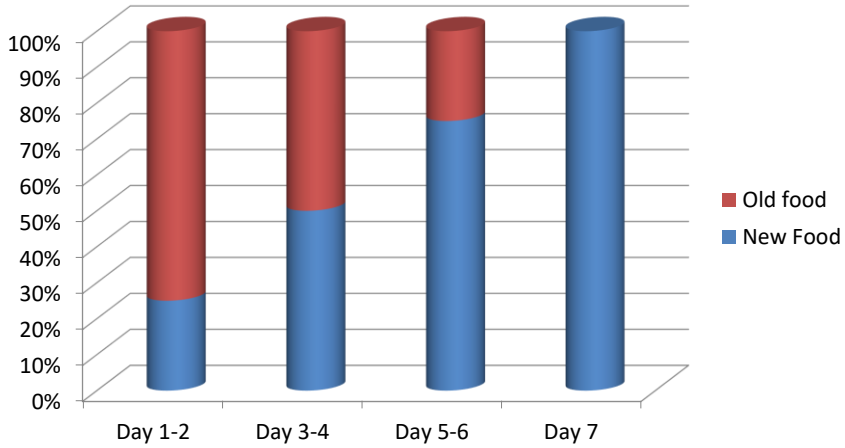
How to slowly introduce an elimination diet

7 day transition in dogs



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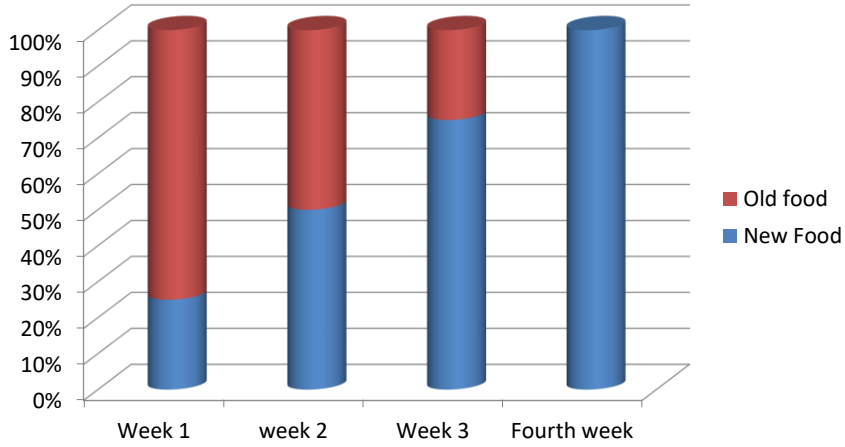
How to slowly introduce an elimination diet

Up to a 3 week transition in cats



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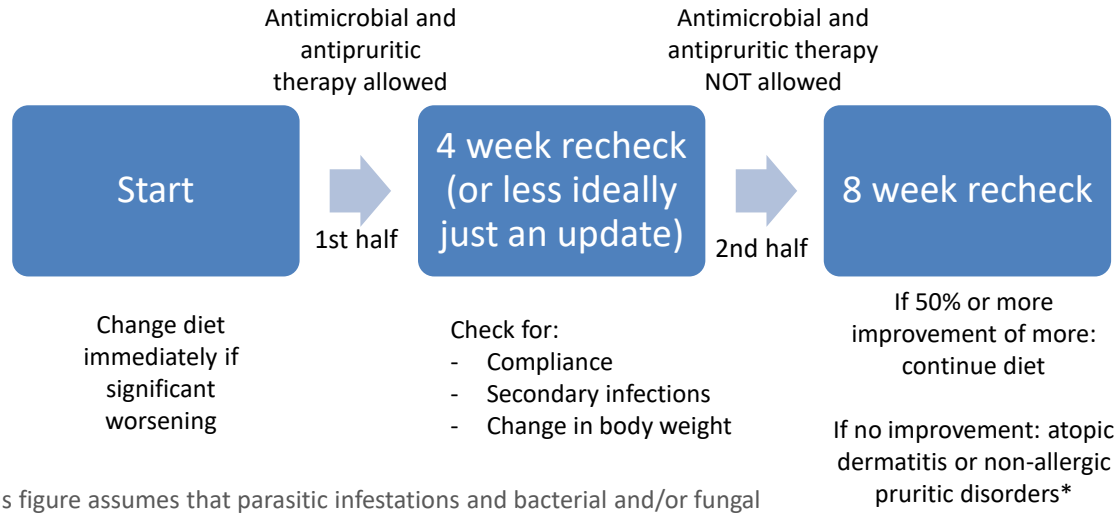
Step 1 - Elimination diet

- Minimize other causes of pruritus, as they interfere with the ability of the owner and veterinarian to determine the success or failure of the food trial.
- Monitor for, and treat secondary infections (bacterial pyoderma and *Malassezia* dermatitis).
- Oral/topical antipruritic therapy may be required during the first half of the food trial.
- Further counseling is needed to ensure medications are not administered in a noncompatible treat.
- A food trial may be best performed during the winter months (when the patients are only exposed to house dust and storage mites) if there is a warm weather seasonal exacerbation in the history of the patient.

Elimination diet trial algorithm



* This figure assumes that parasitic infestations and bacterial and/or fungal infections have already been ruled out.

Elimination Diet Trial Resources

www.cavd.ca

Pet Owner Resources:

CAVD Illustrated Diet Trial Handout for Dogs

Document illustré sur la diète d'éviction canine de la CAVD

CAVD Illustrated Diet Trial Handout for Cats

Document illustré sur la diète d'éviction féline de la CAVD

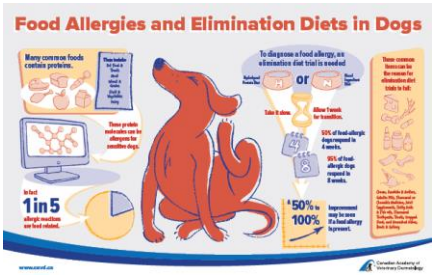
Elimination Diet Trial Handout for Dogs - Original

Elimination Diet Trial Handout for Cats - Original

Clinic Resources:

Veterinary Elimination Diets Available in Canada - Dogs

Veterinary Elimination Diets Available in Canada - Cats



Canadian Academy of Veterinary Dermatology

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Selection of elimination diet

Several types of diets that can be used

- Commercial diet

  Novel/limited/selected protein diet
  - Veterinary therapeutic ("prescription") diets
  - "Over-the-counter" diets

  Hydrolyzed protein diet (chicken, soy, poultry feather)
  Raw food diet
  Cooked diet (local suppliers)

- Home-cooked diet

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The truth about the "silver bullet" in veterinary medicine

- There is no foolproof "works every time" or "one size fits all" diet.
- Choosing the best diet to feed a patient with a suspected food allergy requires careful and detailed questioning of owners about previous and current diets, treats and flavored products.
- A Diet History Form (endorsed by the American College of Veterinary Nutrition - ACVN) can assist practitioners in collecting a thorough dietary history from pet owners.
- Available online: http://www.acvn.org/nutrition-resources
- Use an internet search engine for each diet and treats in order to find out the nature of the animal proteins and grains that are included.

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Things to consider

- Once this information is known, you must choose a diet that :

1) Consists of proteins/grains to which the patient has not had (or very little) exposure in the past (which means it should not contain the more commonly used ingredients).
2) Has minimal chance of cross reactivity with previously fed proteins.
3) Will be eaten by the patient.
4) Will be readily fed by the owner (cost ?).

- You should also be confident that the pet food manufacturer has truly kept the food limited to what is stated on the label, and has not allowed contamination with other feeds or proteins (co-packing).

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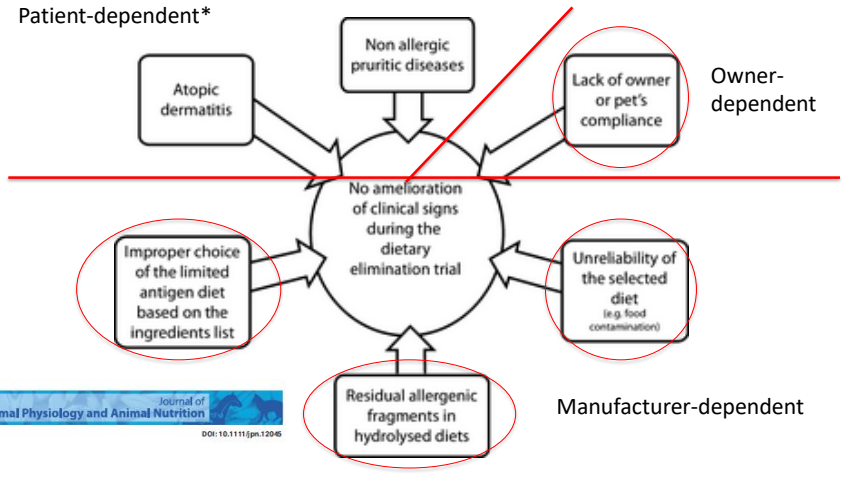
Elimination diet trial failure factors



Journal of Animal Physiology and Animal Nutrition
DOI: 10.1111/jpn.12045
SUPPLEMENT ARTICLE

Identification of undeclared sources of animal origin in canine dry foods used in dietary elimination trials

R. Ricci[1], A. Granato[2], M. Vascellari[2], M. Boscarato[2], C. Palagiano[1], I. Andrighetto[1,2], M. Diez[3] and F. Mutinelli[2]

* This figure assumes that parasitic infestations and bacterial and/or fungal infections have already been ruled out.

Step 2 – Challenge

- Once patients are symptom-free, reintroduce the previous food (that was thought to cause the symptoms).
- If clinical signs return within 14 days, an adverse food reaction is confirmed.
- This does not differentiate between mechanisms of adverse food reaction (immunologic vs. non-immunologic) but establishes a relationship between certain ingredients and observable clinical signs.
- May be unacceptable to some owners.
- May happen by "mistake" (owners run out of food).

Step 3 – Sequential provocation

- This is the only way to identify the exact offending allergen(s).
- Feed elimination diet until pruritus resolves.
- Add 1 suspected offending ingredient at a time for up to 14 days, in order to provoke the reaction again.
- Clinical reactivity is ruled out if there has not been a reaction within 2 weeks.
- Examples: chicken, beef, lamb, fish, soy, corn, wheat.
- Repeat sequence.
- Very time consuming.
- May be unacceptable to some owners (optional?).

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Hydrolyzed diets in veterinary medicine

- In a systematic review published in 2010, a small number of studies pointed to reduced, but not eliminated, immunological and clinical allergenicity of the hydrolysate-based commercial diets available at the time.

Veterinary Dermatology

DOI: 10.1111/j.1365-3164.2009.00761.x

A systematic review of the evidence of reduced allergenicity and clinical benefit of food hydrolysates in dogs with cutaneous adverse food reactions

Thierry Olivry*† and Petra Bizikova*

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Hydrolyzed diets in veterinary medicine

- The review showed that a variable proportion of dogs with CAFR exhibit a worsening of clinical signs when fed partial hydrolysates.
- The authors concluded that hydrolysate-containing diets are of best benefit in patients suspected not to be sensitized to their ingredients in their nonhydrolyzed form (native protein).
- Nowadays, a distinction is made between:
  1. Partially hydrolysed poultry meat protein
  2. Partially hydrolysed soy protein
  3. Extensively hydrolysed poultry feather protein

Extensively hydrolysed poultry feather protein

- In a recently published study, an extensively hydrolysed poultry feather protein diet was compared to a partially hydrolysed chicken protein diet.
- The hydrolysed poultry feather diet did not induce an increase in pruritus in chicken-allergic dogs, in contrast to the hydrolysed chicken liver diet that led to pruritus flares in 40% of the dogs.

Veterinary Dermatology

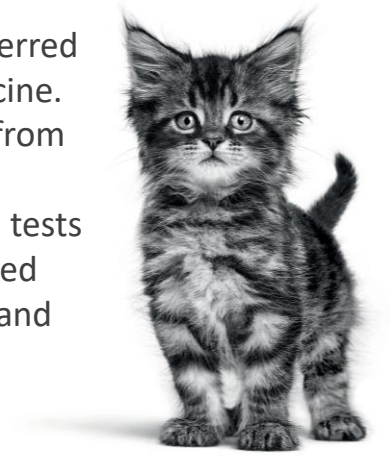
Vet Dermatol 2016; **27**: 289–e70 DOI: 10.1111/vde.12302

A randomized, double-blinded crossover trial testing the benefit of two hydrolysed poultry-based commercial diets for dogs with spontaneous pruritic chicken allergy

Petra Bizikova*† and Thierry Olivry*†

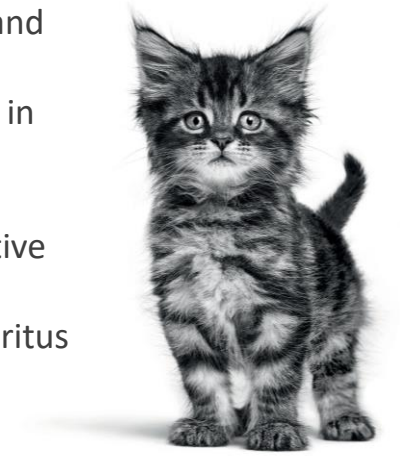
Implications for practice

- The term "cutaneous adverse food reaction" is preferred when referring to this condition in veterinary medicine.
- It is impossible to clinically distinguish this disease from atopic dermatitis.
- At this point in time, intradermal/serum/hair/saliva tests and dermatohistopathology cannot be recommended for the diagnosis of adverse food reactions in dogs and cats.



Implications for practice

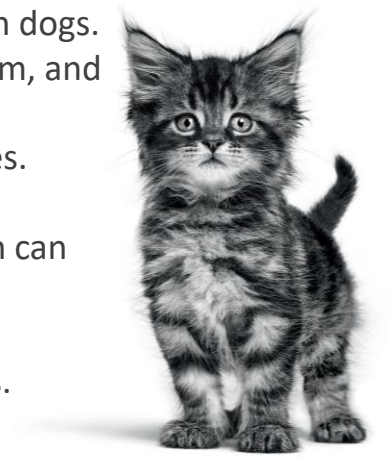
- CAFRs affect dogs and cats of any age, any breed, and both genders.
- Onset of clinical signs likely occur later in cats than in dogs.
- There is no reliable breed predisposition data.
- Most patients are pruritic, making pruritus a sensitive (albeit nonspecific) sign.
- Dogs with CAFR more often have a generalized pruritus than cats.



Dr. Vincent Defalque
Diplomate of the American College of Veterinary Dermatology
North West Veterinary Dermatology Services

Implications for practice

- Cats have more pruritic faces, heads and necks than dogs.
- Other commonly pruritic areas are the ears, ventrum, and feet.
- The perineum is not usually pruritic in either species.
- Canine CAFRs most often manifest as bacterial skin infections, otitis externa or atopic dermatitis, which can all coexist in the same patient.
- In cats, CAFRs manifest as the expected syndromes associated with feline hypersensitivity dermatitides.



Implications for practice

- Among dogs and cats with nonseasonal pruritus, the prevalence of CAFR is high enough to justify this syndrome to be ruled-out.
- One of the initial interventions should include a strict elimination diet trial, especially if chronic vomiting and diarrhea are noted.
- Other non-cutaneous signs occur less commonly because of AFRs.
- For diagnosing CAFRs in more than 90 % of dogs and cats, elimination diet trials should last at least 8 weeks.

Implications for practice

- In a dog living in Australia, Europe or North America, the allergens most likely contributing to CAFRs are beef, dairy products, chicken, wheat and lamb.
- In cats, the most common allergens causing CAFRs are beef, fish and chicken.
- The prevalence of each offending food allergens is likely underestimated.

Implications for practice

- Two elements play a pivotal role in making an elimination diet trial effective: the owner's compliance and the adequacy of the selected diet.
- It is important to recognize the limitations of our current understanding of adverse food reactions, and the way we currently investigate them.
- Definitively diagnosing a cutaneous adverse food reaction in dogs and cats remains a challenge.
- Results can be ambiguous !
- Be patient ! And encourage your clients to be patient too !