

Journal of Feline Medicine and Surgery

<http://jfm.sagepub.com/>

Feline Non-Flea Induced Hypersensitivity Dermatitis: Clinical features, diagnosis and treatment

Claude Favrot

Journal of Feline Medicine and Surgery 2013 15: 778

DOI: 10.1177/1098612X13500427

The online version of this article can be found at:

<http://jfm.sagepub.com/content/15/9/778>

Disclaimer

The Journal of Feline Medicine and Surgery is an international journal and authors may discuss products and formulations that are not available or licensed in the individual reader's own country. Furthermore, drugs may be mentioned that are licensed for human use, and not for veterinary use. Readers need to bear this in mind and be aware of the prescribing laws pertaining to their own country. Likewise, in relation to advertising material, it is the responsibility of the reader to check that the product is authorised for use in their own country. The authors, editors, owners and publishers do not accept any responsibility for any loss or damage arising from actions or decisions based on information contained in this publication; ultimate responsibility for the treatment of animals and interpretation of published materials lies with the veterinary practitioner. The opinions expressed are those of the authors and the inclusion in this publication of material relating to a particular product, method or technique does not amount to an endorsement of its value or quality, or the claims made by its manufacturer.

Published by:

International Society of Feline Medicine



American Association of Feline Practitioners



and

<http://www.sagepublications.com>

Additional services and information for *Journal of Feline Medicine and Surgery* can be found at:

Email Alerts: <http://jfm.sagepub.com/cgi/alerts>

Subscriptions: <http://jfm.sagepub.com/subscriptions>

Reprints: <http://www.sagepub.com/journalsReprints.nav>

Permissions: <http://www.sagepub.com/journalsPermissions.nav>

>> [Version of Record](#) - Aug 21, 2013

[What is This?](#)



FELINE NON-FLEA INDUCED HYPERSENSITIVITY DERMATITIS

Clinical features, diagnosis and treatment

Claude Favrot

Practical relevance: Hypersensitivity dermatitis (HD) is often suspected in cats and is mostly caused by insect bites, food or environmental allergens. Cats with non-flea induced HD are reported to present frequently with one or more of the following cutaneous reaction

patterns: miliary dermatitis, eosinophilic dermatitis, self-induced symmetrical alopecia or head and neck excoriations/pruritus.

Clinical challenges: None of the above patterns are, however, pathognomonic for non-flea induced HD and the diagnosis of this condition is based on exclusion of diseases presenting similarly and an adequate response to treatment. Therapeutic approaches to affected cats include use of immunomodulatory drugs (ciclosporin, glucocorticoids, antihistamines), hypoallergenic diets and allergen-specific immunotherapy.

Evidence base: This review provides an update on the clinical signs, diagnosis and treatment of feline non-flea induced HD. It draws on the findings of a recent large-scale study that described the clinical signs of numerous cats with non-flea HD and has proposed criteria to facilitate the diagnosis of the condition.

Broad scope of hypersensitivity dermatitis

Hypersensitivity dermatitis (HD) is often suspected in companion animals and includes flea (and other insect) bite hypersensitivity dermatitis, cutaneous adverse food reactions, urticaria, angioedema and atopic dermatitis.¹ In feline medicine, the term 'atopic dermatitis' is considered inappropriate because the importance of IgE in the pathogenesis of the condition has not been conclusively demonstrated.^{2,3} Therefore, for the purpose of this discussion, and more generally, the more generic term of 'non-flea HD' (ie, non-flea bite associated HD) is used in place of feline atopic dermatitis.

The diagnosis of feline non-flea HD is usually based on exclusion of other pruritic conditions such as ectoparasitic disease and bacterial infections.⁴⁻⁷ Additionally, and depending on the clinical pattern, other conditions may need to be ruled out (eg, psychogenic alopecia for symmetrical self-induced alopecia, viral diseases for head and neck excoriations, mast cell hyperplasia or tumours for eosinophilic dermatitis). As non-flea HD may be caused by various allergens, cats should undergo an elimination dietary trial and allergy tests may be beneficial in some cases, especially when allergen-specific immunotherapy is planned.

It is usually accepted that cats with non-flea HD will exhibit pruritus and at least one of the following patterns: head and neck excoriations/pruritus, self-induced symmetrical alopecia, eosinophilic diseases (eosinophilic plaques or granulomas, indolent ulcers) or miliary dermatitis.⁴⁻⁷ None of these signs or patterns are considered pathognomonic for non-flea HD in cats. For this reason, criteria have been developed to facilitate the diagnosis in the context of a thorough work-up,⁵ and these are a key focus of this article.

Treatments for non-flea HD include diets, antigen-specific immunotherapy, glucocorticoids, antihistamines and ciclosporin.^{6,8}

Clinical features of feline non-flea HD

Epidemiology

Feline non-flea HD (including food hypersensitivity with cutaneous manifestations) is recognised as a frequent condition even though the incidence and prevalence have never been studied. A familial predisposition has been observed by some authors and a breed predisposition (Abyssinian) has been suggested.^{6,7,9} These data collectively

Claude Favrot
DVM PhD DipECVD
Dermatology Department,
Clinic for Small Animal Internal Medicine,
Vetsuisse Faculty, University of Zurich,
Winterthurerstrasse 260,
8057 Zurich, Switzerland
Email: cfavrot@vetclinics.uzh.ch



Clinical presentation

Most cats with non-flea HD present with one or more of the following reaction patterns: miliary dermatitis, head and neck excoriations/pruritus, self-induced (symmetrical) alopecia and eosinophilic dermatitis. In one recently published multi-centre study, 46% of cats with non-flea HD presented with at least two of these reaction patterns.⁷ It is worth noting, however, that atypical forms such as pododermatitis, seborrhoeic reactions, exfoliative dermatitis (mural folliculitis), facial erythema, pruritus sine material (without any obvious skin changes) and ceruminous otitis have been described by some authors,^{1,2,4,11–14} and accounted for 6% of non-flea HD cats in the aforementioned study.⁷

Cutaneous reaction patterns

❖ **Miliary dermatitis** refers to a papulocrustous dermatitis that usually develops on the face and trunk (Figure 1). The lesions are typically very small and may be difficult to see. This pattern is often associated with other facial lesions and/or alopecia.

❖ **Head and neck excoriations/pruritus** describes papular and erythematous changes occurring on the face (Figure 2) and neck (Figure 3) of cats, often in association with self-induced lesions, alopecia, crusts, miliary dermatitis and/or seborrhoeic changes. The pruritus may be extremely severe and self-induced lesions may be impressive.



Figure 1 Miliary dermatitis

❖ **Self-induced alopecia** is characterised usually by symmetrical changes occurring mostly on the flanks, abdomen (Figure 4) and dorsum, and caused by excessive licking (overgrooming). This behaviour is easily recognised because hair tips in and around the lesions are broken. Some owners do not associate these changes with excessive licking and present the cat for investigation of suspected spontaneous alopecia.



Figure 2 Head excoriations



Figure 3 Neck excoriations



Figure 4 Self-induced alopecia of the abdomen

Continued on page 780

Continued from page 779

✚ Eosinophilic dermatitis

consists of eosinophilic plaques or granulomas and/or indolent ulcerations.

– **Indolent ulcer** is a unilateral or bilateral erosive to ulcerative lesion of the upper lips (Figure 5).

Although the lesions may appear very severe they do not cause major discomfort.

– **Eosinophilic plaques** are raised, erythematous, exudative and intensely pruritic lesions developing on the abdomen (Figure 6), inguinal, medial and caudal aspects of the thigh area and less frequently on the neck and face.¹⁵

– **Eosinophilic granulomas** may present as linear (Figure 7), diffuse to nodular swollen and usually firm lesions occurring mostly in the oral cavity, interdigital areas (Figure 8), chin ('fat chin', Figure 9) and limbs (linear granulomas).

Pruritus

Cats with non-flea HD usually present with intense pruritus. In one study, owners evaluated this itching as 5 or above on a scale of



Figure 5 Ulcerative lesion of the upper lips

0–10 in 88% of patients.⁷ Pruritus is, however, not always recognised by owners (especially in cats with self-induced alopecia) and trichoscopy (demonstrating broken hair tips) is useful to confirm overgrooming.

Non-dermatological signs

Cats with HD may also present with non-dermatological signs. In the recent multi-centre study dis-

cussed above, 6% of cats presented with sneezing and/or coughing, 14% with digestive signs (soft stools, diarrhoea, vomiting), 7% with conjunctivitis and 16% with otitis externa and/or media.⁷ These results should be compared with those provided by Carlotti and Prost, who suggested that up to 50% of allergic cats may exhibit some sneezing.¹⁶ Eosinophilia on haematology has also been suggested to be a non-specific but helpful diagnostic criterion.¹⁷ Eosinophilia was present in the majority of tested cats in the multi-centre study, but was also detected in flea-allergic cats and numerous pruritic cats with non-hypersensitivity reactions.⁷



Figure 6 Eosinophilic plaques on the abdomen

Cats with non-flea HD usually present with intense pruritus and may also have non-dermatological signs.



Figure 8 Interdigital eosinophilic granulomas



Figure 7 Linear eosinophilic granulomas on the caudal thigh

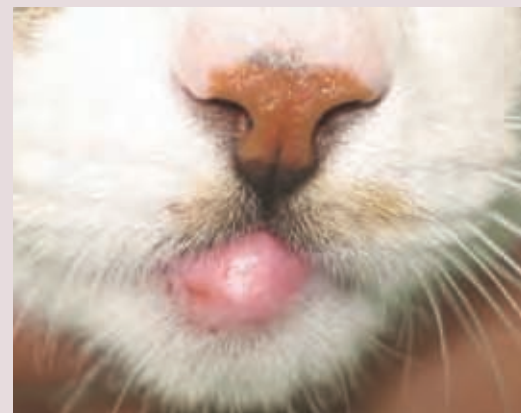


Figure 9 Eosinophilic granulomas on the chin ('fat chin')

suggest a hereditary background associated with HD, but specific genetic studies have not been carried out in allergic cats. A gender predisposition has not been demonstrated, though females represented 59% of a panel of 161 cats with non-flea HD.⁷ The majority of

cats with HD seem to exhibit the first clinical signs before 3 years of age, although some studies suggest a wider range of age at onset of disease.^{2,6,10} In one recently published study, the mean age at onset was 3.4 years, with cats demonstrating food HD being



Flea combing, scrapings, fungal cultures and cytological examination (if the skin is inflamed) should be regarded as the absolute minimum work-up in patients with a suspicion of non-flea HD.

slightly older (mean 4 years old) than those with non-flea, non-food HD.⁷ In the same study, seasonality was a feature of the disease in fewer than 10% of cats.

Clinical presentation

The typical cutaneous reaction patterns and other signs that may be associated with feline non-flea HD are summarised in the boxes on pages 779 and 780.

Food and non-food induced HD

It has been reported that cats with food HD present more frequently with head and neck excoriations than cats with other types of hypersensitivity. This was not confirmed by a recently published study, in which no statistically significant differences in terms of distribution patterns were found.⁷ One of the main conclusions of this study was that food and non-food HD are virtually indistinguishable based on clinical criteria alone. This mirrors what is known in dogs.

Differential diagnoses

Given that none of the clinical signs or reaction patterns described for non-flea HD (see pages 779 and 780) are pathognomonic, ruling out of resembling diseases is a compulsory step in the case work-up. Ectoparasites such as fleas, lice, *Otodectes*, *Notoedres*, *Demodex* and *Neotrombicula* species, as well as bacterial and fungal diseases, will need to be ruled out in virtually all cats.^{2,6,7,10,15,17} Additionally, and depending on the clinical presentation, some other differential diagnoses should be considered and confirmatory tests carried out (Table 1).

Table 1 Hypersensitivity dermatitis: differential diagnoses and confirmatory tests

Reaction pattern	Main differential diagnoses	Test
Miliary dermatitis	Fleas	Combing, therapeutic trial
	Other ectoparasites	Scrapings, therapeutic trial
	Dermatophytes	Culture, trichoscopy, Wood's lamp examination
	Bacterial folliculitis	Cytological examination
Head and neck excoriations/pruritus	Ectoparasites	Combing, scrapings, therapeutic trial
	Fungal diseases (dermatophytes, <i>Malassezia</i> dermatitis)	Cytological examination, Wood's lamp examination, trichoscopy, culture
	Bacterial diseases	Cytological examination, culture
	Viral diseases (herpesvirus, papillomavirus, calicivirus, poxvirus, feline leukaemia virus)	Histological examination, polymerase chain reaction (PCR)
	Skin tumours (cutaneous lymphoma, squamous cell carcinoma, mast cell tumour)	Histopathological examination
Self-induced alopecia	Internal diseases	Trichoscopy (hair tips not broken)
	Bacterial folliculitis	Cytological examination
	Dermatophytes	Trichoscopy, fungal culture, Wood's lamp examination
	Psychogenic alopecia	History, diagnosis of exclusion, therapeutic trial
Eosinophilic dermatitis	Ectoparasites (<i>Demodex</i> species)	Scrapings
	Gingivitis	Histopathology
	Ectoparasites	Scrapings
	Dermatophytes	Scrapings
	Skin tumours (mast cell tumour, cutaneous lymphoma, metastases)	Histopathology
	Bacterial diseases (staphylococcosis, mycobacteriosis, nocardiosis)	Cytological examination, histological examination, culture, PCR
	Viral diseases	PCR

Diagnostic work-up

In ruling out diseases that may look clinically like non-flea HD, ectoparasites (ie, fleas, *Otodectes*, *Notoedres*, *Demodex*, *Trombicula*, etc) and dermatophytosis should be a particular focus of attention. Consequently, flea combing, scrapings, fungal cultures and cytological examination (if the skin is inflamed) should be regarded as the absolute minimum work-up in patients with a suspicion of non-flea HD. Note that Wood's lamp examination, trichoscopy and culture on dermatophyte test medium can be associated with false-negative results.

Malassezia dermatitis and superficial pyoderma can complicate feline HD in some instances and should be treated appropriately. Exclusion of fleas and other parasites often requires treatment of the affected cat, other animals living in the household and the house, even if parasites are not found on the animal. Special attention should also be paid to *Demodex gato* infestations if this mite is present in the area in which the cat lives, or if the cat has a history of travel.

If the presentation pattern suggests the possibility of other conditions, such as viral or neoplastic diseases, then skin biopsies and polymerase chain reaction (PCR) may additionally be indicated to rule out these disorders. However, the histology associated with non-flea HD is not substantially different from any other pruritic skin disorder and not generally very helpful in determining the aetiology of the pruritus.

Rarely, symmetrical alopecia can be associated with psychogenic causes and a specific work-up should be carried out, especially in patients with self-induced alopecia.¹⁸

Diagnostic criteria

The Dermatology Department at the University of Zurich has recently developed criteria for the diagnosis of non-flea HD (see box below).⁵ It is extremely important that these criteria are not considered a replacement for a proper work-up but, rather, tools to evaluate the probability of non-flea HD before this work-up or to confirm a suspicion thereafter. The importance of this work-up is best illustrated by comparing the specificity and sensitivity of the criteria before (sensitivity: 75%, specificity: 76% when five out of the eight criteria are met) and after (sensitivity: 90%, specificity: 83% when six of the 10 criteria are met) ruling out fleas. The fact that the sensitiv-

ity and specificity are markedly higher when fleas are ruled out supports flea control as the first mandatory step in the work-up of pruritic cats.

Elimination diet

As food induced HD and non-flea, non-food HD are virtually indistinguishable, even after conducting a proper clinical examination and using the criteria discussed above, it is mandatory to carry out an elimination dietary trial in all cats with non-flea HD.

An elimination diet consists of feeding a cat for 6–8 weeks with a source of protein and a carbohydrate source that have never previously been provided. Hydrolysed foods, in

These diagnostic criteria are not a replacement for a proper work-up, but tools to evaluate the probability of non-flea HD before the work-up or to confirm a suspicion thereafter.



Criteria for the diagnosis of non-flea HD

Criteria for use in pruritic cats

- ✦ At least two body sites affected
- ✦ At least one of the following four reaction patterns:
 - Symmetrical alopecia
 - Miliary dermatitis
 - Eosinophilic dermatitis
 - Head and neck excoriations/pruritus
- ✦ Presence of symmetrical alopecia
- ✦ Presence of any lesions on the lips
- ✦ Presence of excoriations or ulcerations on the chin or neck
- ✦ Absence of lesions on the rump
- ✦ Absence of non-symmetrical alopecia on the rump and tail
- ✦ Absence of tumours or nodules

Sensitivity = 75%, Specificity = 76% when 5/8 criteria are met

Criteria for use after ruling out fleas

- ✦ At least two body sites affected
- ✦ Pruritus at onset
- ✦ Miliary dermatitis as a dominant pattern
- ✦ Eosinophilic dermatitis or symmetrical alopecia or excoriation/ulcerations of the head, face, lips, ears or neck
- ✦ Presence of non-symmetrical alopecia on the rump, tail or hind limbs
- ✦ Presence of symmetrical alopecia on the abdomen
- ✦ Absence of erosions/ulcerations on the front limbs
- ✦ Absence of lesions on the sternum or in the axillae
- ✦ Absence of nodules or tumours
- ✦ At least one of the following four reaction patterns:
 - Symmetrical alopecia
 - Miliary dermatitis
 - Eosinophilic dermatitis
 - Head and neck excoriations/pruritus

Sensitivity = 90%, Specificity = 83% when 6/10 criteria are met

An elimination dietary trial is mandatory in all cats with non-flea HD.
Owners of cats with outdoor access should be instructed to keep them indoors for the duration of the trial.



which the proteins have been broken down into small pieces, making them less allergenic, have not been proven superior to date.^{19,20} In addition, some reports of allergy reactions to preservative suggest that a home-cooked diet may be the best option, though studies have not been carried out in cats.²¹ As none of the possible diets can be regarded as 100% anallergenic, if a food allergy is strongly suspected, a further dietary trial with another protein source should be considered in patients not responding to an elimination diet.⁴ It is worth noting that owners of cats with outdoor access should be instructed to keep their pet indoors during the whole trial.

Some cases of late improvement have been seen as long as 12 weeks after the start of a trial. Consequently, extending the duration of the trial should be considered in a patient with a high index of suspicion that fails to respond within 8 weeks.

Last, but not least, any improvement during the trial should be confirmed by a challenge with the original diet; in the case of food induced HD, recurrence of the clinical signs is usually seen within 7–10 days.

Allergy tests

Allergy testing is not appropriate for establishing or confirming a diagnosis of non-flea HD because of the high number of false-positive and false-negative results associated with these tests. Allergy testing should, however, be carried out when antigen immunotherapy is planned. In the experience of most dermatologists, allergens implicated in intradermal and serological tests are mainly from dust mites, which does not rule out any role of pollen allergens.^{2,6} Interpretation of these tests in cats is often regarded as more difficult than in other animals, and intravenous injection of fluorescein with subsequent interpretation with Wood's lamp has been advocated.²²

Treatment of non-flea HD

Allergen-specific immunotherapy

Desensitisation has been evaluated in several open studies, with success rates reported in 50–75% of the cases.²³ When successful, this intervention can be regarded as supportive of the diagnosis of HD. It appears to be a safe long-term treatment.

Glucocorticoids

Glucocorticoids are efficacious in the treatment of feline non-flea HD. When possible, oral treatment is preferred and an initial dosage of 1–2 mg/kg q24h prednisolone is usually effective. Prednisone is not efficiently metabolised to prednisolone in the cat and should not be used. Recently, treatment with methylprednisolone and triamcinolone was shown to be very effective and safe. Initial remission was obtained within 1–2 weeks with a mean dosage of 1.4 mg/kg q24h methylprednisolone or 0.18 mg/kg q24h triamcinolone.²⁴ Afterwards, cats were maintained on q48h treatment with 0.5 mg/kg methylprednisolone or 0.08 mg/kg triamcinolone. This study confirms the recommendations of previous authors that the dosage of glucocorticoids should be tapered as soon as possible to the lowest alternate-day dose that controls pruritus.

The long-term risks of glucocorticoid treatment include weight gain, diabetes mellitus and secondary infections. Cats on prolonged treatment with glucocorticoids should be examined regularly and quarterly urinalysis and blood chemistry should be performed.



Ciclosporin

The first pilot studies on the use of ciclosporin for the treatment of HD in cats suggested that the drug was an adequate alternative to glucocorticoids.^{8,25} The initial dosage was 5 mg/kg q24h, but some cats required higher dosages. A larger study published recently confirmed these preliminary data and demonstrated that the optimum dosage is 7 mg/kg.²⁶ Seventy per cent of the treated cats showed an improvement of greater than 50% after 8 weeks of treatment with 7 mg/kg ciclosporin. Initial improvement is expected during the second week of treatment.

Treatment is usually well tolerated, although vomiting and/or diarrhoea can occur when treatment is initiated. Rarely, toxoplasmosis has been reported.²⁷ As *Toxoplasma*-seropositive cats seem to be protected against ciclosporin-associated toxoplasmosis, it might be wise to exclude seronegative outdoor cats from such treatment.

Antihistamines

Antihistamines are usually considered to be more effective in cats than in dogs for the treatment of hypersensitivity dermatoses. Most of the studies, however, were carried out a number of years ago and lacked adequate controls. Results of these various studies, as well as information on side effects and dosages, have been reviewed by Scott and Miller.²⁸ Chlorpheniramine (2–4 mg/kg q12h) is usually considered the most effective antihistamine in the cat.

KEY POINTS

- ❖ Feline non-flea induced hypersensitivity dermatitis (HD) is frequently encountered in daily practice but very little is known about the precise causes. The associated clinical changes are not pathognomonic and a thorough work-up is mandatory.
- ❖ Clinical criteria have been proposed to facilitate diagnosis in conjunction with case work-up.
- ❖ Once a diagnosis of non-flea HD is made, treatment involves antigen-specific immunotherapy, dietary changes or the use of immunomodulatory drugs.



Funding

The author received no specific grant from any funding agency in the public, commercial or not-for-profit sectors for the preparation of this article.

Conflict of interest

The author does not have any potential conflicts of interest to declare.

References

- Scott DW, Miller WH and Griffin CE. **Skin immune system and allergic skin diseases.** In: Scott DW, Miller WH and Griffin CE (eds). *Muller and Kirk's small animal dermatology*. 6th ed. Philadelphia: WB Saunders, 2001, pp 543–666.
- Foster AP and Roosje PJ. **Update on feline immunoglobulin E (IgE) and diagnostic recommendations for atopy.** In: August JR (ed). *Consultations in feline internal medicine*. 4th ed. Philadelphia: WB Saunders, 2004, pp 229–238.
- Reinero CR. **Feline immunoglobulin E: historical perspective, diagnostics and clinical relevance.** *Vet Immunol Immunopathol* 2009; 132: 13–20.
- Bryan J and Frank L. **Food allergy in the cat: a diagnosis of elimination.** *J Feline Med Surg* 2010; 12: 861–866.
- Favrot C, Steffan J, Seewald W, Hobi S, Linek M, Marignac G, et al. **Establishment of diagnostic criteria for feline non-flea-induced hypersensitivity dermatitis.** *Vet Dermatol* 2012; 23: 45–50.
- Foster AP. **Diagnosing and treating feline atopy.** *Vet Med* 2002; 226–240.
- Hobi S, Linek M, Marignac G, Olivry T, Beco L, Nett C, et al. **Clinical characteristics and causes of pruritus in cats: a multicentre study on feline hypersensitivity-associated dermatoses.** *Vet Dermatol* 2011; 22: 406–413.
- Wisselink MA and Willemse T. **The efficacy of cyclosporine A in cats with presumed atopic dermatitis: a double blind, randomised prednisolone-controlled study.** *Vet J* 2009; 180: 55–59.
- Moriello KA. **Feline atopy in three littermates.** *Vet Dermatol* 2001; 12: 177–181.
- Roosje PJ, Thepen T, Rutten VPMG and Willemse T. **Feline atopic dermatitis.** In: Thoday KL, Foil CS and Bond R (eds). *Advances in veterinary dermatology*. Volume 4. Oxford: Blackwell Sciences, 2002, pp 178–187.
- Prélaud P, Guaguère E, Freiche V, Drouard C and Laforge H. **The allergic cat.** *Prat Med Chir Anim Cie* 1999; 34: 437–447.
- Prost C. **Les dermatoses allergiques du chat.** *Prat Med Chir Anim Cie* 1993; 28: 151–164.
- Declercq J. **A case of diet-related lymphocytic mural folliculitis in a cat.** *Vet Dermatol* 2000; 11: 75–80.
- Saridomichelakis MN and Koutinas AF. **A retrospective study of 10 spontaneous cases of feline atopic dermatitis.** *Eur J Comp Anim Pract* 2001; 11: 177–183.
- Young KM and Moriello KA. **Eosinophils and eosinophilic diseases.** In: August JR (ed). *Consultations in feline internal medicine*. Philadelphia: WB Saunders, 2004, pp 239–245.
- Carlotti D and Prost C. **L'atopie feline.** *Point Vet* 1989; 20: 777–784.
- O'Dair H, Markwell P and Maskell I. **An open prospective investigation into etiology in a group of cats with suspected allergic skin disease.** *Vet Dermatol* 1996; 7: 193–202.
- Sawyer LS, Moon-Fanelli AA and Dodman NH. **Psychogenic alopecia in cats: 11 cases (1993–1996).** *J Am Vet Med Assoc* 1999; 214: 71–74.
- Cave N. **Hydrolyzed protein diets for dogs and cats.** *Vet Clin North Am Small Anim Pract* 2006; 36: 1251–1268.
- Olivry T, Bergvall KE and Atlee BA. **Prolonged remission after immunosuppressive therapy in six dogs with pemphigus foliaceus.** *Vet Dermatol* 2004; 15: 245–252.
- Verlinden A, Hesta M, Millet S and Janssens GP. **Food allergy in dogs and cats: a review.** *Crit Rev Food Sci Nutr* 2006; 46: 259–273.
- Kadoya-Minegishi M, Park SJ, Sekiguchi M, Nishifuji K, Momoi Y and Iwasaki T. **The use of fluorescein as a contrast medium to enhance intradermal skin tests in cats.** *Aust Vet J* 2002; 80: 702–703.
- Rossje PJ, Thepen T, Rutten VPMG and Willemse T. **Feline atopic dermatitis.** In: Thoday KL, Foil CS and Bond R (eds). *Advances in veterinary dermatology*. Volume 4. Oxford: Blackwell Sciences, 2002, pp 178–187.
- Ganz EC, Griffin CE, Keys DA and Flatgard TA. **Evaluation of methylprednisolone and triamcinolone for the induction and maintenance treatment of pruritus in allergic cats: a double-blinded, randomized, prospective study.** *Vet Dermatol* 2013; 23: 387–e372.
- Noli C and Scarampella F. **Prospective open pilot study on the use of cyclosporine for feline allergic skin disease.** *J Small Anim Pract* 2006; 47: 434–438.
- King S, Favrot C, Messinger L, Nuttall T, Steffan J, Forster S, et al. **A randomized double-blinded placebo-controlled study to evaluate an effective cyclosporin dose for the treatment of feline hypersensitivity dermatitis.** *Vet Dermatol* 2013; 23: 440–e484.
- Last RD, Suzuki Y, Manning T, Lindsay D, Galipeau L and Whitbread TJ. **A case of fatal systemic toxoplasmosis in a cat being treated with cyclosporin A for feline atopy.** *Vet Dermatol* 2004; 15: 194–198.
- Scott DW and Miller WH. **Antihistamines in the management of allergic pruritus in dogs and cats.** *J Small Anim Pract* 1999; 40: 359–364.