

Canine atopic dermatitis

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Canine atopic dermatitis is a chronic or relapsing inflammatory skin disease characterised by pruritus. Affected individuals have a hereditary tendency to develop IgE-mediated allergic reactions to certain environmental allergens. There is some variation in 'at risk' breed lists between countries. The Labrador Retriever, Golden Retriever, and Terrier breeds feature strongly in most atopic populations. The offspring of atopic-atopic dog matings do not always develop atopic dermatitis, suggesting that an interplay of environmental and genetic factors is required to produce disease. Studies on human twins and families have shown atopy to be highly heritable in people.

SKIN BARRIER FUNCTION

Healthy skin offers an effective and responsive barrier to most bacteria, viruses, parasites and allergens. House dust mites, storage mites, tree pollens, weed pollens, grass pollens and mould spores have been identified as significant allergens to some atopic individuals. It is thought that allergens are mostly gaining entry to the body through the inefficient skin barrier of atopic animals.

The **filament aggregating protein** filaggrin is an important part of the complex and interdependent process of creating an intact and robust epidermis. Filaggrin is the 'glue' that holds keratin filaments together while they bond firmly to each other and form the structural macrofilaments of the cells of the outer stratum corneum. Mutations in the gene encoding for filaggrin have been shown to be very strong predisposing factors for atopic dermatitis in people (Palmer *et al.*, (2006) *Nature Genetics* 38, 441-446).

The cells of the outer layer of the epidermis, the stratum corneum, are surrounded by epidermal lipids to form a flexible 'bricks and mortar' functional skin barrier. Both human and canine patients with atopic dermatitis have been shown to have abnormalities and deficiencies in the intercellular lipid barrier. Both the composition of intercellular lipids, and the way in which they are arranged, are different in atopic compared to non-atopic individuals.

Allergens that penetrate atopic skin are picked up by the phagocytic Langerhans' cells, processed, and presented to other components of the immune

system. Atopic animals have a Th2 cell-dominated allergic response leading to the production of high levels of allergen specific IgE. This IgE titre can be measured in serological assays.

DIAGNOSING ATOPIC DERMATITIS

Atopic dermatitis is an incurable disease requiring long-term management for a high proportion of the dog's life and a considerable investment of energy and finance by the owner. An accurate diagnosis is very important and allows the, often limited, energy, time and funds available to be invested in the most beneficial way.

Clinical signs usually manifest initially between six months and four years of age. They may have a seasonal or perennial pattern, or may start seasonal and become increasingly perennial over time. The severity of clinical signs varies from mild to severe. Secondary bacterial and/or yeast infections are common and exacerbate the underlying pruritus. Otitis externa is a common presenting sign.

A set of diagnostic criteria was produced by Willemse in 1986 (Table 1), and modified by Prélaud *et al.*, in 1998 (Table 2). Atopic patients should have at least three major and three minor signs under the

TABLE 1: Diagnostic criteria for canine atopic dermatitis (Willemse, 1986)

Major features

- Pruritus
- Facial and/or digital involvement
- Lichenification of the flexor surface of the tarsus or the extensor surface of the carpus
- Chronic or chronically relapsing dermatitis
- An individual or family history of atopy
- A breed predisposition

Minor features

- Onset of signs before three years of age
- Facial erythema or lip inflammation
- Bilateral conjunctivitis
- Superficial staphylococcal pyoderma
- Hyperhidrosis i.e. sweating more than maintenance of body temperature requires
- Immediate skin test reactivity to allergens
- Elevated allergen specific IgG
- Elevated allergen specific IgE

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TABLE 2: Diagnostic criteria for canine atopic dermatitis (Prélaud et al., 1998)

- Corticosteroid-responsive pruritus
- Pinnal erythema (Fig. 1)
- Bilateral erythematous pododermatitis (Fig. 2)
- Inflammation of the lips
- Appearance of first signs between six months and three years of age



Fig. 1: Pinnal erythema, lichenification and excoriation in an atopic WHWT. (Photograph © Jane Coatesworth.)

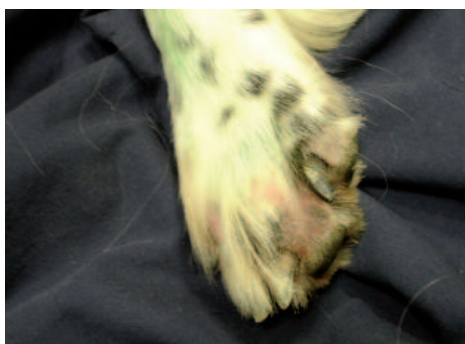


Fig. 2: Pedal erythema and alopecia in a young atopic English Setter. (Photograph © Jane Coatesworth.)

Willemse criteria, or at least three of the five signs under the Prélaud criteria.

While most atopic dogs fulfil these criteria, non-atopic dogs may also show these clinical signs and have other causes for their pruritus. Atopy can only be diagnosed by ruling out all of the other possible causes of pruritic skin disease. It is a diagnosis of exclusion. Exclusion requires a patient, methodical and rigorous approach to every individual case. Common differential diagnoses for pruritic skin disease include flea bite hypersensitivity, food intolerance, bacterial superficial pyoderma, *Malassezia* dermatitis (Fig. 3) and *Sarcoptes* infestation. Atopic dermatitis may also co-exist with any of these conditions.

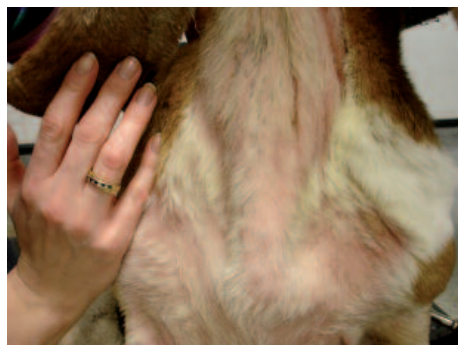


Fig. 3: *Malassezia* dermatitis on the ventral neck of an atopic Basset Hound. (Photograph © Jane Coatesworth.)

HOW ITCHY IS THE DOG?

Owners vary widely in their observation, interpretation and tolerance of pruritic behaviour. Scratching with a hindleg is commonly perceived as itch, while licking of the paws and perineum may be attributed to keeping clean, scooting on the perineum to worms or anal sacs, and dragging the ventrum along the carpet as a party trick. It is helpful to ask a range of specific questions to pick up pruritic behaviour, or include them in a questionnaire. How much does your dog rub its face? Shake its head? Rub against fixed objects? etc. Pets can be encouraged to show pruritic behaviour in the consulting room by allowing them to wander about undisturbed while you are talking to the owner (Fig. 4). Some dogs, and many cats, show pruritus only when the owner is absent. Examination of plucked hairs can be helpful in these cases, revealing hair shafts fractured by the trauma of gnawing, rubbing or scratching (Fig. 5).



Fig. 4: Pruritic behaviour in the consulting room. (Photograph © Jane Coatesworth.)



Fig. 5: Hair shafts fractured by trauma. (Photograph © Jane Coatesworth.)

Giving owners a visual scale (Fig. 6) on which to assess the itch level of their dog can save time, and enhance accuracy and consistency between consultations.

Example of a visual analog scale.

Owners are asked to mark the place on the line that is analogous to the severity of the dog's behaviour.

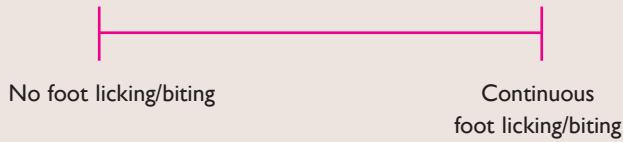


Fig. 6: Example of a visual analog scale.

Atopic dermatitis is a clinical diagnosis made by exclusion. What then is the role of the intradermal skin test or IgE serology? These tests, due to a high incidence of false positives, do not answer the question: 'Is this dog atopic?' They help to answer the question: 'To what specific allergens is this atopic dog reacting?' A number of normal, non-atopic dogs will return positive reactions on both serology and intradermal skin testing. It is, therefore, important not to use these tools as diagnostic tests for atopy. Results must be carefully correlated with the history of the patient, e.g. a patient with positive reactions to only tree pollens but a non-seasonal pattern of pruritus clearly needs further investigation.

In summary atopic individuals are thought to suffer from both poor skin barrier function and a genetic predisposition to develop allergy. Atopic dermatitis is a clinical syndrome recognised by characteristic clinical signs, an early age of onset, and a chronic or relapsing pattern. It is the remaining diagnosis when other pruritic dermatoses have been excluded. Each case requires a rigorous, patient and logical approach, and good client communication.

We will look at treatment options for atopic dermatitis in a forthcoming article

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These multiple choice questions are based on the above text. Answers appear on page 59.

1. What role have IgE serology and intradermal skin testing in our approach to the pruritic patient:

- They tell us which animals are atopic and which are not.
- They are helpful once we have made a clinical diagnosis of atopy.
- They allow us to prepare allergen specific immunotherapy.
- All Westies are atopic anyway.
- All of the above.

2. How do we diagnose atopic dermatitis:

- By excluding all other causes of pruritus
- By recognising that patients fulfil the clinical signs criteria
- By assessing the type, timing and degree of pruritus
- All of the above

3. Atopic dermatitis is:

- Incurable
- Usually presents between six months and four years of age
- A common cause of otitis externa
- Predisposes animals to secondary bacterial and yeast infections of the skin
- All of the above

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