



Comment and Controversy

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Atopic dermatitis in the domestic dog



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Abstract Dogs may develop a syndrome of spontaneous, inflammatory, pruritic dermatitis that shares many features with human atopic dermatitis, including a young age of onset, characteristic lesion distribution, immunoglobulin E sensitization to common environmental allergen sources, and evidence of epidermal barrier dysfunction. There are also several important differences between canine and human atopic dermatitis. Although dogs may suffer from multiple-organ hypersensitivity syndromes, there is no evidence that this species experiences the progressive evolution from cutaneous to respiratory allergy characteristic of the human atopic march. Despite the presence of epidermal barrier derangement, there is no significant association between canine atopic dermatitis and mutations in filaggrin. Finally, treatment of canine disease relies much less heavily on topical therapy than does its human counterpart, while allergy testing and allergen-specific immunotherapy provide an often essential component of effective clinical management of affected dogs.

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Introduction

The domestic dog is one of the few nonhuman species to develop spontaneous allergic skin disease. In 1941, Frederick William Wittich (1885–1965), an allergist from Minneapolis, described a dog that developed seasonal “atopic” rhinitis and pruritic dermatitis.¹ The condition was associated with cutaneous hyperreactivity to intradermal injections of ragweed and other pollen extracts, and this hyperreactivity could be passively transferred by the injection of serum to other dogs and to humans. Subsequent work by Wittich and other investigators further characterized the syndrome, eventually resulting in the determination that the relevant serum factor was, in fact, the canine equivalent

of immunoglobulin E (IgE).^{2–4} This condition was then termed canine atopic dermatitis (AD).

Is canine AD the same as human AD?

Canine AD shares a number of features with human AD. Humans and dogs are often hypersensitive to the same allergen sources, if not always to identical specific allergens.⁵ In both species, the condition usually begins early in life, although the canine variant typically starts at the equivalent of adolescence or early adulthood, in contrast to humans, who are typically first affected in infancy.^{6,7} The two conditions are phenotypically similar, with both species demonstrating a predilection for lesional distribution on the face, flexural skin, and distal extremities (See [Figures 1 and 2](#)).^{6,8}

Although there are many similarities between canine and human AD, there are also significant differences between the

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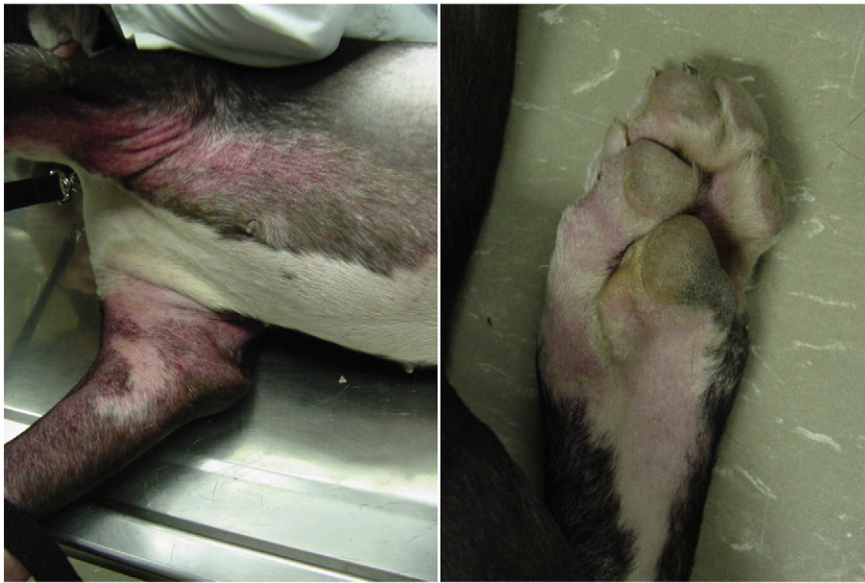


Fig. 1 Canine atopic dermatitis, acute lesions. This dog demonstrates erythema, excoriation and partial alopecia on the skin of the distal extremities and in the axillary and antecubital fold regions.

two disorders, which suggests that they may not be completely analogous:

1. Total serum IgE levels appear to have no clinical relevance in the dog, although allergen specific IgE does often correlate with clinical disease.
2. Although multiple-organ hypersensitivity syndromes can occur in dogs with AD, as they do in humans, there is no evidence of an “atopic march”-like pattern of progressive, sequential acquisition of systemic hypersensitivity disorders in the dog.
3. Although dogs with AD do appear to suffer from epidermal barrier derangement, there is no significant association with mutations in filaggrin.
4. Finally, treatment of canine AD differs from that of the human condition in the lesser emphasis on topical therapy and the inclusion of allergen specific immunotherapy (ASIT) as a major element in long-term disease control.

The role of IgE in canine AD

In humans with AD, total (and often allergen-specific) IgE levels are elevated in the most common variant of the disease (“extrinsic AD”).^{9,10} Total IgE levels are considerably higher even in normal dogs than in humans (1-41 $\mu\text{g}/\text{mL}$ and <130 U/mL [~ 317.2 ng/mL], respectively).^{11,12} The reason for this difference is uncertain; the levels do not differ significantly between dogs with and without detectable parasitism¹³; furthermore, there is considerable evidence that total IgE levels do not correspond with the atopic status or severity in dogs but may correlate better with breed and neutering status.¹³⁻¹⁵

In contrast, allergen-specific IgE levels are more strongly associated with the presence of canine allergic skin disease. Specific IgE levels increase after allergen challenge in dogs, and serum IgE and intradermal test reactivities are commonly used as a diagnostic tool to help identify relevant



Fig. 2 Canine atopic dermatitis, chronic lesions. This dog demonstrates erythema, lichenification and alopecia primarily affecting the skin of the face, distal extremities and flexural areas.

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