

# Flea Bite Hypersensitivity (flea allergic dermatitis)

## ETIOLOGY AND PATHOGENESIS

Flea bite hypersensitivity or flea allergic dermatitis develops following introduction of flea salivary proteins into the skin. An allergy develops to these proteins and initiates immediate, late phase and chronic inflammatory reactions. Flea bites may be irritating, but clinical signs in affected animals are thought to be associated with allergy rather than the actual flea bites. In dogs, early and regular flea exposure may prevent or delay development of the allergic reaction. Intermittent exposure seems to be the most potent inducer of clinical sensitivity. Fleas are vectors for *Bartonella* (cat scratch fever), *Rickettsia felis* (cat-flea typhus-like illness), *Haemoplasma* (feline infectious anaemia) and *Dipylidium caninum* (tape worms).

The vast majority of infestations are associated with the cat flea (*Ctenocephalides felis*). A variety of other fleas have been found on dogs and cats..



## CLINICAL FEATURES

**Dogs** exhibit more predictable clinical signs than cats. There is no breed incidence, except that allergic dogs may be predisposed. Dogs of any age may be affected. Itching is usually present, although variable. Lesions are mostly over the caudal back, flanks, tail and perineum. They are less commonly found on the limbs, and head. Clinical signs include symmetrical to irregular hair loss, redness to the skin, red bumps on the skin, crusts, excoriation, and a darkening and or thickening of the skin. The severity of the lesions is related to the degree and duration of the infestation. Acute pyotraumatic dermatitis ('hot spots') and superficial bacterial infection are common secondary complications.



**Cats** may not manifest overt itching. Feline flea allergic dermatitis is a common cause of a number of clinical presentations including symmetrical self-induced hair loss, a syndrome of very small bumps or crusts over the trunk and lesions of the eosinophilic granuloma complex.



## DIFFERENTIAL DIAGNOSES

- Lice
- Mange
- Ectopic ear mite infestation
- Chigger infestation
- *Lynxacarus radovsky* infestation

- Superficial staphylococcal pyoderma (usually a secondary problem)
- Ringworm
- Allergic dermatitis
- Food allergies
- Drug allergy
- Psychogenic alopecia

## DIAGNOSTIC TESTS

A definitive diagnosis of flea bite allergy requires compatible clinical signs, the presence of fleas or flea feces on the animal. However, it can also be difficult or impossible to demonstrate fleas or flea feces in some animals (especially cats) and in severely pruritic over-grooming animals. It may be easier to detect fleas and/or feces on clinically normal in-contact animals. The presence of tapeworms is highly suggestive of fleas. Fleas may bite people especially if the animals have been out of the environment for a period of time. Flea bites in people appear as small red bumps, typically on the lower limbs. Sensitized humans may develop severe reactions.



## MANAGEMENT

Adult fleas are obligate ectoparasites that lay eggs in the coat. Under ideal conditions an adult female flea can produce 40-50 eggs per day. (To bad our chickens are not this good at laying eggs) These, however, readily fall into the immediate local environment, where all the immature stages from egg through to pupa develop. Although buildings are the preferred breeding environment, fleas may breed outside in warm climates. .

The principal problem in trying to control domestic flea populations is the resistant pupa. Pupae can lie dormant for several months, and yield viable adults after all other eggs, larvae, and adults are killed. Repeated environmental treatments may therefore be necessary. It is important to treat all potential environments (including sheds, cars, outdoor sleeping areas etc.) and in-contact animals. This may require tactful conversations about flea control with neighbors, family and friends.

### Environmental treatment

Vacuum cleaning will help remove adult fleas from the flooring, reduces the numbers of eggs and larvae within the carpet, elevates the carpet pile, enhancing penetration of the insecticide, and stimulates emergence of pupated adults.

Environmental products are usually aerosol sprays consisting of a permethrin/pyrethroid combined with a insect growth regulator (IGR) such as methoprene, pyriproxifen and cyromazine. The insecticide provides a rapid kill of larvae and adults that can be effective for up to 2-3 months. The IGRs prevent normal development of the eggs, larvae and pupae, with residual activity for up to 12 months. Foggers, available for some products, are easier to apply but often miss protected sites under furniture and do not penetrate carpets and rugs well. Great care must be taken when using environmental treatments in homes with small rodents, birds and fish as the products may be toxic to these species. Fleas are susceptible to sunlight, but shaded outdoor areas can be treated with insecticides.

### On-animal adulticides

Shampoos and washes sold in pet stores are not particularly effective since they are rinsed off and have little residual activity. Flea collars are convenient, particularly in cats, but used alone often fail to provide adequate flea control, may trigger contact reactions, are toxic if ingested and may cause strangulation if fitted incorrectly.

Topical permethrin/pyrethroid spot-on solutions, foams and pump sprays are highly effective, but can require more frequent administration than other topical insecticides. The rapid 'knock-down' effect can be useful to minimize flea contact and biting behavior in very sensitive animals. Cats are, however, particularly susceptible to permethrin toxicity; these products must be used with care and cats should never be exposed to products designed for use in dogs. Micro-encapsulated products are safer but have less rapid knock-down. However, they do have longer residual activity.

The newer spot-on insecticides fipronil (also available as a pump spray), selamectin, imidacloprid, metaflumizone, dinotefuran, and pyriprole are highly effective against fleas, although the killing activity is delayed compared to permethrins. They are safe products, even in young animals and nursing mothers. They have prolonged residual activity, usually 4-8 weeks, and up to 12 weeks for fipronil spray on dogs. Used regularly, these products have also been shown to eliminate environmental infestations. Fipronil and pyriprole, which bind to sebum, and selamectin, which is systemically absorbed are particularly resistant to bathing and wetting.

Nitenpyram is given orally and is an effective adulticide within 15-20 minutes. It has poor residual activity, however, and is usually used in with an IGR. Spinosad is a new oral medication for dogs, which with a single dose has a 100 % kill rate after four hours and residual action for 30 days.

D-limonene, Tea-tree, Pennyroyal and other essential oils are repellent and insecticidal, although clinical efficacy remains to be proven. Some essential oils are toxic to cats and should be used with care.

### On-animal insect growth regulators

Topical IGRs including methoprene, pyriproxifen and lufenuron (oral or injectable) can be administered as sole agents, as combination products or with a separate adulticide. They are effective at blocking the life-cycle and therefore environmental accumulation of fleas, but the lack of adulticidal activity means that the effect on the overall flea population takes time. Simultaneous use of an adulticide is therefore recommended at least initially for prompt reduction of the adult population.

### Other treatments

Although flea control is mandatory, it may not be sufficient to result in complete control of the dermatosis and anti-inflammatory treatments (such as antihistamines, steroids or essential fatty acids) may be necessary.

### KEY POINTS

- Flea allergic dermatitis is common.
- Flea allergic dermatitis may be occurring even when fleas or feces are not found on the animal.
- If flea allergic dermatitis is suspected, evaluate the response to a thorough, 6-8 week flea control trial.
- Always use an adulticide on all animals and an environmental adulticide/IGR in the home.