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**CAUSES OF CAT ALLERGY**

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Worldwide, at least one allergic disease occurs in 8-10 % of people. It is important to understand what causes allergies in order to find ways to completely cure it. Eight cat allergens are currently recognised by the World Health Organization/International Union of Immunological Societies (Table 1).

However, Fel d 1 is the only major antigen, and is by far the most important and potent allergen. Fel d 1 shares no significant cross-reactivity with other mammalian proteins although it is also produced by other members of the Felidae family. Around 90-96 % of cat-allergic individuals are sensitised to Fel d 1 and it is responsible for 60-90 % of the total allergic reactivity seen in affected individuals. The prevalence of

reactivity to the other seven antigens in cat-allergic individuals is variable and typically 10-40 % often with lower levels of IgE. Sequence homology between lipocalins of different species means that cross-reactivity is seen, for example between Fel d 4 and Can f 6, and Fel d 7 and Can f 1, which can result in cross-sensitivity in allergic individuals. Similarly, Fel d 2 is a minor cat allergen, but cross-reactivity with pork albumin ('pork-cat syndrome') means occasional individuals sensitised to Fel d 2 react to eating pork meat.



The major sources of Fel d 1 are the saliva and sebaceous glands, and some is also present in lacrimal and anal gland secretions and in urine. Skin production of Fel d 1 varies according to anatomical site, with the facial region reported to produce higher amounts than the chest. Salivary Fel d 1 is distributed during grooming, with papillae on the cat's tongue efficiently wicking and depositing saliva and Fel d 1 through the haircoat. Grooming presumably also assists in distribution of Fel d 1 from sebaceous glands.

Entire male cats (at least partially under the influence of testosterone) produce greater amounts of Fel d 1 than neutered males or females (irrespective of neuter status). Production is not affected by coat colour or hair length. Production of Fel d 1 varies considerably between cats and also within individual cats over time, but some cats tend to remain higher (or lower) producers compared with others. Production may decline in older cats.

The structure of Fel d 1 indicates a potential carrier function. While its biological function remains to be determined, a role in the transport of steroids, hormones or perhaps pheromones seems likely.

Fel d 1 in the haircoat and on the skin is the main reservoir for environmental Fel d 1, being shed in substantial amounts on dander (dried saliva, cutaneous flakes and debris). It was found that 49 % of cat dander particles were  $>9 \mu\text{m}$  and 23 %  $<4.5 \mu\text{m}$  in size. The small particle size means that, as well as being present in settled dust, Fel d 1 can remain airborne for prolonged periods (several days) with minimal air disturbance. Particles readily reach smaller airways, explaining the rapid onset of clinical symptoms seen in some cat-allergic individuals following exposure. Moreover, the sticky nature of dander and Fel d 1 means that spread to environments outside of the home readily occurs on clothes or even human hair; thus Fel d 1 is a ubiquitous allergen.

Beyond houses with cats, immunologically significant levels of Fel d 1 are

frequently detected in homes without cats, schools and day care centres, cars, hospitals, churches, cinemas, hotels and other public buildings, and on public transport including trains, buses and aeroplanes. In regions where pet cat ownership is common, detection rates in homes, schools and other public buildings are often in the order of 75-100 %. Generally, environmental concentrations of Fel d 1 are much higher in houses where cats are kept as pets, and in other places the amount is influenced primarily by the number of cat-owning people who use the space. Fel d 1 presence is also affected by the physical environment, as concentrations are higher in dust from soft furnishings such as upholstered chairs, carpets and mattresses. The very widespread distribution of Fel d 1 beyond cat-owning homes is regarded as an important source of allergen for both sensitisation and allergic symptoms.

Difficulty of breathing due to airway edema can be caused by an immune reaction to the allergen Fel d 1, which is found in dandruff and dried saliva of the animal, which enters the body with the air under the breath

Conclusion: studies have shown that the allergen Fel d 1 is responsible for 90-96 % of allergic reactions caused by the products of cats (dandruff, saliva). Further research should be conducted in this area, as they may reveal effective methods of complete or partial treatment of people with allergies not only to cats, but also to household dust and food.