

Fel d I allergen: skin and or saliva?

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To determine the relative importance of saliva and sebaceous glands as sources of *Fel d I* allergen, we compared *Fel d I* levels at the base and tip of the hair in areas presenting more or less sebaceous glands and areas licked more or less frequently. The amount of *Fel d I* was significantly higher at the base than the tip of the hair. Further, it was strongly correlated with the density of sebaceous glands. This study demonstrated that the most abundant source of *Fel d I* allergen is cat skin.

INTRODUCTION

Fel d I has been detected in fur, saliva, skin, and sebaceous gland specimens.¹⁻⁶ A number of authors claim that saliva is the principal source of this major cat allergen and that the pelt is contaminated as a result of licking during grooming.^{1,6} Conflicting with this view is the finding that sebaceous glands are an important extrasalivary source of *Fel d I* allergen.^{2,3} The purpose of this study was to determine the relative importance of these two sources by comparing *Fel d I* levels at the base and tip of the hair in areas presenting more or less sebaceous glands and areas licked more or less frequently.

MATERIAL AND METHODS

Six healthy adult cats (1.5 kg to 3 kg), were lightly anesthetized (10 mg/kg body weight) with ketamine HCl. Fur was clipped as close to the skin as possible in three areas chosen according to the number of sebaceous glands⁵ and the frequency of licking. Those areas were as follows: the belly where sebaceous glands are sparse but licking is frequent, the axillary area where seba-

ceous glands and licking are infrequent and the base of the tail where sebaceous glands are numerous and licking is infrequent. Strands were cut in two equal parts based on length (base and tip) and then placed in a 5% preparation of BBS pH 8.2. After shaking 24 hours, the samples were centrifuged (2000 g) for 15 minutes. The supernatants were stored at -20 °C pending measurement of *Fel d I* as described previously.²

The Kruskal-Wallis nonparametric test was used to compare mean *Fel d I* levels in the three different locations. The Mann-Whitney U test was used to compare mean levels at the tip and base of the hair.

RESULTS

Fel d I as a function of the frequency of licking. The tip-to-base *Fel d I* ratio (mU/g) was significantly higher (0.8) on the belly, which is frequently licked, than in axillary (0.3) and base upper tail (0.4), which are not frequently licked (Table 1).

Fel d I as a function of the number of sebaceous glands. Mean *Fel d I* levels (mU/g) computed as half the sum of levels measured on base and tip parts were significantly higher ($P < .001$) at the base of the tail (3.5 ± 1.9) where there are many sebaceous glands than in the axillary area (2.1 ± 2.3) or on the belly (1.8 ± 1.3) where sebaceous glands are sparse.

Fel d I at the tip and base of the hair. Mean *Fel d I* levels (mU/g) were 3.4 ± 2.3 at the base part of the hair and 1.5 ± 1.0 at the tip.

This difference was statistically significant ($P < .001$).

DISCUSSION

This experiment shows that the amount of *Fel d I* was significantly higher at the base than the tip of the hair. Further, the amount of *Fel d I* measured was strongly correlated with the density of sebaceous glands. In areas where sebaceous glands are numerous (base of tail), the concentration of *Fel d I* was twice as great on the whole strands than in areas where glands were sparse. This finding suggests that sebaceous glands are a major source of antigen. Indeed densitometric analysis of fur demonstrated that immunoprecipitate concentrations were tenfold higher at the base than at the tip.³ In skin biopsy specimens, *Fel d I* Ag was found in epithelial squamous cells and in sebaceous gland cells.³ The tip-to-base ratio of *Fel d I* was much higher on the belly area where licking is frequent than in axillary area or at the base of the tail where licking is infrequent. This licking, however, did not increase the amount of allergen found on the whole hair strands in this site as compared to the axillary area, which has a similar paucity of sebaceous glands and no licking.

In conclusion, this study demonstrated that the most abundant source of *Fel d I* allergen is cat skin. Since *Fel d I* allergen can be removed easily by merely pouring water over a cat,⁵ it is not tightly bound to the fur or skin but rather appears to be on the surface. The

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Table 1. Mean ($\pm$ SD) *Fel d I* Levels (mU/g hair) in Root and Tip of Fur from Three Different Areas

	Base of Tail (SG = ++, L = +)*			Axillary (SG = +, L = +)			Belly SG = +, L = ++)		
	Base	Tip	T/B	Base	Tip	T/B	Base	Tip	T/B
Mean	4.8	2.1	0.4	3.4	0.9	0.3	2.1	1.6	0.8
$\pm$ SD	1.8	0.8		2.7	0.5		1.4	1.2	

*SG = sebaceous gland and L = licking.

allergen will then deposit along the hair from its base. Licking could provide some additional *Fel d I* deposition.

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NEARLY 50 YEARS AGO MODIFICATION OF EFFECTS OF INHALATION CHALLENGE IN ASTHMA

The authors studied modification of the reduction in vital capacity that followed inhalation of aerosolized birch extract, histamine, and methacholine in three asthmatic subjects. Pretreatment with intravenous aminophylline, 480 mg, was more effective than epinephrine, 0.3 to 0.5 mg, administered by subcutaneous injection, in preventing bronchoconstriction induced by allergen inhalation. Neither intravenous atropine, 0.6 and 1.2 mg, nor intravenous tripeleennamine, 25 mg, afforded any protection.

Aminophylline was also more effective than subcutaneous epinephrine in relieving airway obstruction that followed inhalation of aerosolized pollen extracts. Administration of five deep inhalations of nebulized isoproterenol was more effective than epinephrine, but less effective than aminophylline. Atropine inhibited the bronchoconstrictive effect of methacholine, but tripeleennamine did not. Tripeleennamine prevented and reversed the bronchoconstrictive effect of histamine.

Years later the importance of dose response studies became apparent, but these early observations anticipated techniques and results of many subsequent bronchoprovocation studies.

—RMS

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