

Risk factors for sensitization to furred pets

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The risk factors for sensitization to pets was investigated in 169 male pupils. A recent or former contact with cats, dogs, and guinea pigs in own home was reported in 52 (30.8%), 42 (24.9%), and 20 (11.8%) study subjects, respectively. Clinically manifested allergy was found in two probands to cats and in two others to guinea pigs, three of them had formerly had pets and one proband with allergic rhinitis to cats had never had any pet. Sensitization to animals and aeroallergens was investigated with Phadezym-RAST. Only owners of cats had a higher incidence of cat sensitization than probands without direct contact (26.9% versus 10.3%, $P < 0.01$). No statistically significant difference in sensitization to dogs and guinea pigs was found in groups with and without these pets. A strong correlation existed between sensitization to pets and other aeroallergens (house dust mite: $P < 0.025$, birch pollen: $P < 0.0001$, mugwort: $P < 0.0001$, and grass pollen: $P < 0.0001$). No association was found between sensitization to pets and smoking history, bronchial hyperreactivity to methacholine or radiological findings of the paranasal sinus.

Key words: furred pets; aeroallergens; sensitization; bronchial hyperreactivity; risk factors.

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CLINICAL ASPECTS

Frequent contact with furred pets is the cause of sensitization and allergic reactions to animals. Cat epithelium appears to be a strong allergen. Sensitization to cats, dogs, and guinea pigs can also occur without direct contact with these animals. Subjects sensitized to aeroallergens have a 3.4-fold increased risk for sensitization to furred pets and should avoid their contact. Fewer furred pets in urban homes could reduce sensitization and allergic reactions.

Cats, dogs and guinea pigs are the most popular pets in civilized countries, especially in families with children (9, 15, 22, 25). The susceptibility of young people to develop allergies to various species of animals is of some importance, because of frequent sensitization (8-10, 17, 20). Various allergens from furred animals are of particular relevance (2, 3, 12, 14, 16-19, 27). Several studies report the importance of skin test, allergen-specific IgE to cats, dogs or other pets, and provocation tests (5, 7, 13, 21, 29, 30, 32). From these reports cats appear to cause more frequent and more severe allergic

reactions than any other species. It is recommended that asthmatic children keep away from furred pets. This advice seems founded more on clinical experience than profound scientific investigations. Only few reports from studies of asthmatic or atopic children have given scientific reasons for this advice (9, 15, 28).

We attempted to establish whether any associations exist between sensitization to common pets and contact with them or other sensitizations, anamnestic findings, bronchial hyperreactivity, and radiological findings in the paranasal sinus.

Table 1

Contact with pets and sensitization to these animals

	Cats		Dogs		Guinea pigs	
	+	-	+	-	+	-
	n = 52	n = 117	n = 42	n = 127	n = 20	n = 149
Sensitization	14	12	5	17	2	9
No sensitization	38	105	37	110	18	140
	P < 0.01		NS		NS	

Subjects with cats more frequently developed sensitization to cats ($P < 0.01$), whereas subjects with dogs or guinea pigs did not sensitize more frequently to these animals.

MATERIAL AND METHODS

We studied 169 volunteer male pupils with an average age of 16 years (range 15 to 17). The study population was recruited from 183 male pupils just starting at a technical college in Vienna. Ten pupils could not be examined because they were absent due to illness on the day of investigation and four refused to participate. By means of a standardized questionnaire the subjects were asked about smoking history, recent or former contact with pets, allergic disorders in the family, signs of conjunctivitis or disorders of the respiratory tract. Clinical investigation was performed and X-rays of the chest and paranasal sinus taken. Blood samples were obtained for allergological tests. Total IgE was measured using the Phadezym-PRIST method. Sensitization to the following antigens was investigated with Phadezym-RAST: cat dander (e1), dog dander (e5), guinea pig epithelium (e6), *Dermatophagoides pteronyssinus* (d1), birch pollen (t3), mugwort pollen (w6), orchard grass pollen (g3), and rye grass pollen (g12) (5). The commercial RAST score system was used with 0 as negative and 1, 2, 3, and 4 as increasingly positive. Spirometric data, lung volume and airway resistance were performed in a whole-body plethysmograph (Jaeger). The bronchial provocation test was carried out using an inspiratory triggered Bronchoscreen nebulizer (Jaeger). Five μ l aliquots of methacholine were administered in increasing concentrations (0.1%, 1%, and 5%) until a total dose of 140 μ g, 1540 μ g, and 8540 μ g was achieved. Whole-body plethysmography and spirometry were

performed 1 min after the end of each concentration. The methacholine provocation test was stopped earlier when a 200% increase of specific airway resistance or a 40% decrease of forced expiratory volume in 1 s (FEV_1) was found. The dose of nebulized methacholine (PD_{100}) provoking a 100% increase of specific airway resistance (i.e. total airway resistance $\times$ intrathoracic gas volume) was calculated in a log-linear model. A PD_{100} below 5000 μ g was considered bronchial hyperreactive.

Statistical analysis

The chi-square test was used to investigate the association between sensitization to animals and the other clinical, radiological, and allergological findings (23). Differences in total IgE levels were investigated with the Kolmogoroff-Smirnoff test. A P value < 0.05 was considered statistically significant.

RESULTS

Of 169 probands, 52 (30.8%) had had recent or previous contact with cats, 42 (24.9%) with dogs, and 20 (11.8%) guinea pigs in their homes. Two subjects had definite allergic reactions to cats (1 asthma and 1 rhinitis) and two others to guinea pigs (rhinoconjunctivitis). Three of them had formerly had pets and one subject with allergic rhinitis to cats had never had any pet. Sensitization to cats was statistically significantly more frequent among owners of cats than among people with no cats (14 of 52

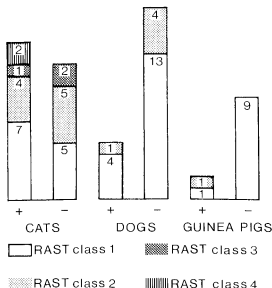


Fig. 1. RAST classes of sensitized probands dependent on contact with furred pets. There is no statistically significant difference in RAST classes between owners (+) and subjects without direct contact (-) to cats, dogs, and guinea pigs.

versus 12 of 117, i.e. 26.9% versus 10.3%; $P < 0.01$). The risk for sensitization to cat dander increased 2.6-fold among cat owners.

Owners of dogs or guinea pigs were not more frequently sensitized to animals than probands without the corresponding pet (Table 1). A considerable incidence of sensitization to pets was revealed in probands without direct contact

Table 2
Sensitization to animals and aeroallergens

Sensitization to aeroallergens		Sensitization to pets		<i>P</i>
		+	-	
House dust mite:	+	15	19	< 0.025
	-	31	104	
Birch pollen:	+	13	7	< 0.0001
	-	33	116	
Mugwort pollen:	+	14	9	< 0.0001
	-	32	114	
Grass pollen:	+	26	25	< 0.0001
	-	20	98	

The risk for sensitization to pets increases with sensitization to aeroallergens.

Table 3
Allergic symptoms to pets and aeroallergens

	Allergic symptoms to pets			<i>P</i>
	+	-		
Allergic symptoms to aeroallergens	+	2	28	< 0.1
	-	2	137	

Subjects with allergies to aeroallergens more frequently have allergic reactions to pets.

with these animals, but no statistically significant difference was found in sensitization to cats, dogs or guinea pigs among these groups. Analysing the RAST classes in probands with and without pets, we found no difference in the titer of specific IgE to these animals (Fig. 1). There was a strong association between sensitization to cats, dogs or guinea pigs and sensitization to other aeroallergens (Table 2). The presence of allergen-specific IgE to house dust mite, birch, mugwort, grass pollens or any aeroallergen increased the risk for sensitization to animals 1.9; 3.0; 2.8; 3.0; or 3.4 fold, respectively. There was no statistically significant difference in total IgE levels of subjects with and without animal sensitization (median 147.8 kU/l ranging from 14 to 2333 kU/l versus 107.6 kU/l ranging from 3 to 1772 kU/l; NS). Despite fewer allergic symptoms, only weak correlation was found between symptomatic groups. Subjects with allergies to aeroallergens were more often allergic to pets: of 30 with allergy to aeroallergens two had allergic reactions to pets (Table 3).

In our investigated group the 46 smokers and 123 non-smokers showed no difference in sensitization to pets (24.7% versus 28.6%; NS).

Table 4
Bronchial hyperreactivity to methacholine and sensitization to pets

Bronchial hyperreactivity	Sensitization to pets	
	+	-
+	22	54
-	24	69

No statistically significant difference.

Bronchial hyperreactivity with PD_{50} below 5000 μ g and a decrease in FEV_1 of more than 20% from baseline was revealed in 76 probands (45%). No association was found between sensitization to animals and bronchial hyperreactivity to methacholine (Table 4). Mucosal swelling of a paranasal sinus or complete opacification was detected in 11 probands with animal sensitization and in 36 not sensitized probands (23.9% versus 29.3%; NS).

DISCUSSION

Contact with pets, especially cats, dogs and guinea pigs is very common in urban homes of the western world (20, 21, 24, 25). Even in a home without pets there appears to be relatively frequent animal sensitization, possibly because of the frequent contamination of urban house dust with animal danders (8, 31). Sensitization to animals is increased 2.6 fold among cat owners, but was not statistically significantly different from that in owners of dogs or guinea pigs. These results about the allergenicity of cat epithelium confirm current opinion (1, 12, 15). It seems unlikely that different degrees of exposure to cats causes higher incidences of sensitization to this animal. Contact with dogs and guinea pigs showed no difference in sensitization. The detection of dog-specific IgE is influenced by breed-specific allergy to dogs and different sensitivity of dog RAST (c2 and c5) and must be taken into consideration (13, 14, 29). Sensitization to cats, dogs, and guinea pigs depended on the presence of other allergen-specific IgE, but not on the total IgE levels. Specific IgE to house dust mite, mugwort, birch, and grass pollens increased the risk of sensitization to animals. The risk factor of sensitization to furred pets is increased 3.4 fold in subjects with specific IgE to aeroallergens.

There is no doubt about the significance of radiological findings in the paranasal sinus, or of the bronchial hyperreactivity to methacholine in clinically manifested allergies and bronchial asthma (4, 6, 26). The frequent bronchial hyperreactivity to methacholine appears related to the age of our subjects and the total dose, but the mechanism of a primarily subclinical sensi-

tization to animals is obviously independent of the existence of a bronchial hyperreactivity (11). Clinically silent disorders of the paranasal sinus also do not influence the sensitization to animals. As active smoking did not appear to influence sensitization to pets it seems doubtful that passive smoking should play a role either. The reason for the discrepancies between statements about allergic disorders and sensitization to pets, and aeroallergens or bronchial hyperreactivity, may be the lack of disturbing symptoms in young people.

In conclusion we believe that subjects with sensitization to aeroallergens should avoid contact with furred pets because of an increased risk of sensitization. Subjects should be warned about the high allergenicity of cats. Nevertheless, sensitization and allergic reactions may occur in subjects independent of long-term exposure to pets. Despite the favourable psychological aspects of children having pets, fewer furred pets in urban homes could reduce sensitization to animals and prevent severe allergic reactions.

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