



Seroprevalence of cat- and dog-specific IgEs in atopic dermatitis without history of pet parenting

Dear Editor,

Allergic reaction to pets may exacerbate atopic dermatitis (AD).¹ Cats and dogs are commonly kept as pets, and their derived antigens, such as Fel d1 and Can f1, are airborne and disperse easily.^{2,3} These airborne antigens sometimes sensitize individuals without pets.⁴ Pet allergies in patients without pets are frequently observed in daily clinical practice, but the actual etiology of this condition is unclear.

To investigate the mechanism of pet allergies in individuals without pets, we collected clinical data from 66 adult patients with AD that were seen in the outpatient clinic of Osaka University Hospital (age [mean \pm SD]: 35.8 \pm 1.6; male/female = 42/24). We evaluated measurements of serum total IgE and allergen-specific IgEs obtained by chemiluminescence enzyme immunoassay with multiple antigen simultaneous test (MAST). This study was approved by the Institutional Review Board of Osaka University Hospital (ID: 14109).

The median values of total IgE (4785 U/mL), TARC (2847 pg/mL), and eosinophils (701/ μ L) were markedly increased above normal levels. Only three of 66 patients had a past history of dog parenting, and no patients had a past history of cat parenting (Table 1). We excluded the three patients with a past history of dog parenting from our analysis.

Cat-specific and dog-specific IgEs were above class 3 (lumicount 13.5-58.0) in 32 (51%) and 17 (27%) of the 63 patients, respectively. Because pet and pollen antigens are both airborne, we evaluated the relationship between pollen-antigen and pet-antigen susceptibility (Table 2). Of interest was that the frequency of patients with high susceptibility to certain pollen antigens was equal to that of patients with high susceptibility to cat antigens with statistical significance ($P < 0.05$; Table 2). In contrast, the frequency of patients with high susceptibility to dog antigens was different than that of patients with high susceptibility to pollen antigens (Table 2).

In this study, we observed increased serum pet-antigen-specific IgEs in many patients with AD and no history of pet parenting. Furthermore, individuals with high susceptibility to cat antigens tended to also have a high susceptibility to pollen antigens. Interestingly, the prevalence of cat IgEs correlated with that of spring and autumn seasonally associated pollen IgEs, which may suggest an influence of

TABLE 1 Demographic and clinical data of study subjects

Atopic dermatitis (n = 66)	
Age (mean \pm SD)	35.8 \pm 1.6
Male/female	42/24
Total IgE, median (range), U/mL	4785(839-20 000)
TARC, median (range), pg/mL	2847(1366-6673)
Number of eosinophil, median (range), / μ L	701(406-1211)
History of pet parenting (cat/dog), No.	(0/3)

SD, standard deviation; TARC, thymus- and activation-regulated chemokine.

cat mating seasons that occur during those same times.⁵ The remaining question was that the proportion of individuals who were positive for cedar pollen IgE or Japanese cypress IgE was comparatively higher than the proportion of individuals who were positive for other pollen IgEs. One possible reason for that could be the influence of the pollen dispersal period. The pollen dispersal period of both cedar and Japanese cypress is comparatively shorter than that of other plants, which may lead to allergies specific to those pollens.

Previous reports have identified a correlation between pet allergens and AD. For example, Ownby et al⁶ reported that early cat exposure can prevent the effects of AD later in life. In contrast, two other studies concluded that cat parenting might increase the prevalence of, and even exacerbate, the symptoms of AD.^{7,8} On the other hand, it has been reported that dog parenting sometimes prevents the onset of AD.^{9,10} Thus, the precise influence of pet parenting on the incidence and severity of AD remains unclear.

We should note that patients with AD might have pet allergies, even if they do not have a history of pet parenting. Further studies are needed to elucidate the relationship between the seroprevalence of cat-specific IgEs and that of pollen-specific IgEs.

ACKNOWLEDGEMENT

This study was supported by the Ministry of Health, Labor, and Welfare of Japan (201322007B).

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TABLE 2 Relationship between the prevalence of cat- or dog-specific and pollen-specific IgE

	Cat IgE					Dog IgE				
	Low		High		P value	Low		High		P value
	n	%	n	%		n	%	n	%	
Timothy grass										
High	15	24.6	6	9.8	0.031*	6	9.8	15	24.6	1
Low	16	26.2	24	39.3		10	16.4	30	49.2	
Sweet vernal grass										
High	19	30.6	8	12.9	0.012*	7	11.3	20	32.3	1
Low	13	21.0	22	35.5		9	14.5	26	41.9	
Orchard grass										
High	13	23.2	5	8.9	0.021*	4	7.1	14	25	1
Low	14	25.0	24	42.9		10	17.9	28	50	
White birch										
High	11	19.6	2	3.6	0.004**	3	5.4	10	17.9	1
Low	16	28.6	27	48.2		11	19.6	32	57.1	
Ragweed mixture										
High	5	8.1	0	0	0.053	1	1.6	4	6.5	1
Low	27	43.5	30	48.4		15	24.2	42	67.7	
Mugwort										
High	14	22.6	4	6.5	0.012*	6	9.7	12	19.4	0.523
Low	18	29.0	26	41.9		10	16.1	34	54.8	
Ceder										
High	29	46.8	20	32.3	0.029*	12	19.4	37	59.7	0.725
Low	3	4.8	10	16.1		4	6.5	9	14.5	
Japanese cypress										
High	17	29.8	11	19.3	0.114	6	10.5	22	38.6	0.55
Low	11	19.3	18	31.6		9	15.8	20	35.1	
Japanese alder										
High	5	8.6	1	1.7	0.194	3	5.2	3	5.2	0.323
Low	24	41.4	28	48.3		12	20.7	40	69.0	

High, high susceptibility; low, low susceptibility.

Measurement results of IgE can be classified into six classes with lumicount (class 0: 0-1.39, class 1: 1.40-2.77, class 2: 2.78-13.4, class 3: 13.5-58.0, class 4: 58.1-119, class 5: 120-159, class 6: 160-200). The study subjects were divided into two groups: above class 3 (high susceptibility) or below class 2 (low susceptibility). Pearson's chi-squared test was used to measure the association between titers of two distinct different categories of antigen-specific IgE. Data were considered significant or strongly significant if $P < 0.05$ or $P < 0.01$, respectively.

* $P < 0.05$ and ** $P < 0.01$.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

AUTHOR CONTRIBUTION

IK and HM designed the study. HM wrote the manuscript. HM and YY performed data collection, statistical analysis, and interpretation of the results. All authors read and approved the final manuscript.

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