

Intradermal and serological testing for mites in healthy beagle dogs

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Background – Intradermal testing (IDT) is widely used in veterinary medicine to select allergens for immunotherapy. The recommended concentration for mites is 250 protein nitrogen units (PNU)/mL. It is not known whether healthy dogs responding to this concentration have asymptomatic sensitization or irritation. Furthermore, interbatch and intersupplier variability of allergens has not been fully addressed.

Hypothesis/Objectives – The incidence of positive IDTs in healthy beagles was recorded and the value of combining these results with serology to differentiate between asymptomatic sensitization and irritancy evaluated. Additionally, the interbatch and intersupplier variability of allergens was assessed.

Animals – Seventeen healthy laboratory beagles with no history or clinical signs of canine atopic dermatitis were used.

Methods – Intradermal tests were performed with four mite allergens from two suppliers (varying batches). An initial IDT at 250 PNU/mL was used to determine whether decreasing or increasing test concentrations were used in the subsequent titration IDTs. Additionally, two IgE ELISA tests from different manufacturers were performed.

Results – Seven of 17 dogs showed IDT reactions at 250 PNU/mL. There were highly significant allergen interbatch and significant intersupplier correlations and agreement. The associations between the IDT reactions and the IgE serologies statistically identified two groups of dogs: one with positive serology and IDT reactions at 250 PNU/mL; and another with negative serology and IDT reactions.

Conclusions and clinical importance – Our results suggest that dogs that have IDT reactions and positive serology are asymptotically sensitized, while dogs that react at higher allergen concentrations, but have negative serology, do so as a result of irritant reactions.

Introduction

Atopic dermatitis is a common skin disease affecting dogs, humans and probably other animal species. Canine atopic dermatitis (cAD) is currently defined as a genetically predisposed inflammatory and pruritic skin disease with characteristic clinical features associated with IgE antibodies most commonly directed against environmental allergens.^{1,2} To determine the allergens responsible for triggering the disease, allergen-specific IgE serological or intradermal tests (IDTs) can be used.^{3,4} Both tests have been shown to give positive results in apparently normal dogs. The reason for these positive results could be the existence of a subclinical sensitization to that particular allergen or, in IDTs, the use of irritant allergen concentrations. An irritant reaction has been defined as a reaction that resembles an allergen-specific reaction with erythema and wheal formation, but that is not caused by an IgE-mediated immunological reaction.⁴ No study has been performed to confirm or support the non-IgE-mediated cause of such a reaction.

In the absence of a universally accepted and easily applicable gold standard for the diagnosis of cAD-related sensitization to a specific allergen, it is not possible to evaluate the sensitivity and specificity of IDTs in dogs accurately. In other words, when an atopic dog has a positive reaction to an allergen, it can correspond to the following three different scenarios: (i) a clinically relevant sensitization; (ii) a clinically irrelevant sensitization; or (iii) an irritant reaction. In the same way, an absence of reaction in the same dog may be due to a true absence of sensitization or to an insufficient stimulation due, for example, to too low a concentration of the allergen.

Currently, the appropriate concentration is determined by the term 'threshold concentration', which is defined as the highest concentration of the extract that does not cause an irritant reaction.⁴ This threshold is usually determined through testing serial allergen dilutions on healthy dogs. The appropriate testing concentration is considered to be the one that does not induce reaction in more than 10% of the healthy dogs. Using this approach, Hensel *et al.*⁵ and Bauer *et al.*⁶ determined that the thresholds for house dust and forage mites range from 75 to 250 protein nitrogen units (PNU), depending on the mite. The studies were, however, carried out with only

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decreasing concentrations, with only one allergen provider and one batch. Additionally, the variability in the dogs used, their different environment, management and diet was not addressed.

Thus, the goals of the present study were as follows:

(i) to test the hypothesis that some healthy beagles in a colony of laboratory beagles, all kept in the same constant environment with the same feeding management and no history or clinical signs of cAD, can present with positive reactions to allergen extracts at concentrations commonly used in IDTs; and (ii) to evaluate the variability between the skin test reaction of allergen concentrations with the same PNU/mL of different suppliers and from different batches from the same supplier. In addition, we evaluated the value of combined serology and IDT results in determining whether a positive IDT reaction may be due to asymptomatic sensitization or irritancy.

Materials and methods

Study design

All phases of the detailed experimental design of the study were approved beforehand by the cantonal authority, Service Vétérinaire, Granges-Paccot, Switzerland.

Dogs

The dogs used in this study were the property of Novartis Animal Health and were kept in their research facility. The dogs' kennels are hosed down repeatedly throughout the day and cleaned regularly with a high-temperature pressure wash. The dogs are kept on a concrete floor with plastic covers and bowls, but no blankets. Only dogs that showed no abnormalities on general physical and dermatological examination, haemograms and serum chemistry profiles were included. The dogs had been without any medication that could influence the IgE serology or intradermal skin testing for at least 6 weeks, including topical (ear or eye drops) and systemic treatments. Additionally, these dogs had never presented with clinical signs of cAD and had never had an IDT. A preselection blood sample for IgE serology (Imovet bg[®] ELISA test, Berne, Switzerland) took place 4–6 weeks before the IDTs to select 10 dogs with negative IgE serology and 10 dogs with positive IgE serology to at least one of four different mites [*Dermatophagoides farinae* (D.f.), *Dermatophagoides pteronyssinus* (D.p.), *Acarus siro* (A.s.) and *Tyrophagus putrescentiae* (T.p.)].

Allergen-specific IgE serum testing

Serum samples (1.0–1.5 mL) were obtained and submitted to Labor Laupenack (Bern, Switzerland) for the allergen-specific ELISA tests with monoclonal anti-IgE antibodies (Imovet bg[®]).⁷ This test was performed 4–6 weeks before the IDTs, and then repeated simultaneously with the IDTs and another allergen-specific IgE ELISA test (Heska Allercept[®], Fribourg, Switzerland) using a recombinant α -chain of the high-affinity IgE receptor (Fc ϵ R1 α).^{8,9} The latter test was performed blinded to the intradermal and Imovet test results.

The results of the Imovet ELISA test give the amount of measured allergen-specific IgE in kilo units (kU/L). The assessment of the results was as follows: <0.5 kU/L, negative; 0.5–2.0 kU/L, weakly positive; >2.0–20 kU/L, definitely positive; and >20 kU/L, strongly positive. Heska test results were expressed in ELISA antibody (EA) units based on optical density values, with results at or above 150 EA units considered positive.

Allergens for intradermal testing

Four aqueous mite allergens (D.f., D.p., A.s. and T.p.), commercially available from Greer Laboratories Inc. (Lenoir, NC, USA) and Alk-Abelló (Round Rock, TX, USA), were used in this study. From one

supplier (Greer) two different batches of allergens (batch A and batch B) were used, while only one batch was used from the second supplier (Alk-Abelló; named batch C throughout this study). In total, 12 mite allergens were tested.

Intradermal testing

The investigators were blinded to the results of the serological IgE (Imovet) test results at the time of the IDTs. The dogs were sedated with medetomidine (Domitor[®]; Pfizer AG, Zurich, Switzerland) at 20–40 μ g/kg. The sites for intradermal testing were prepared as described elsewhere and the injections sites marked with a permanent marker pen.⁵

An initial IDT was performed with all 12 mite allergens. Each dog was injected with 0.05 mL of the allergen solutions at the currently recommended concentration of 250 PNU/mL.^{4,5,10,11} Additionally, 0.05 mL of a positive control of histamine at 1:10,000 dilution (0.1 mg/mL) and a negative control from each supplier (0.9% phosphate buffered saline, Greer and 0.9% phenol buffered saline, Alk-Abelló) was injected. The solutions were prepared the day before and stored at 4°C overnight. The IDTs were performed by two investigators (S.K. and C.N.-M.) and the reactions evaluated after 15 min. An objective measurement of the diameter of each injection site was performed using digital callipers by one of the investigators (S.K. or C.N.-M.). In addition, the appearance of erythema and/or induration as well as a subjective overall score were recorded (0, 1, 2, 3 and 4). A positive reaction was defined as any erythematous and indurated wheal exhibiting a diameter equal to or greater than the mean diameter between the negative control and the positive histamine control. If there were differing results in the subjective evaluation between the two investigators, a third investigator (S.M.) made the final decision.

The titration IDTs consisted of two sets of allergen solutions: one set with five increasing concentrations (500, 1000, 2000, 3500 and 5000 PNU/mL) and one set with five decreasing concentrations (200, 150, 100, 50 and 10 PNU/mL). If a dog had a negative skin test reaction to one particular allergen at 250 PNU/mL, the set with the increasing concentrations was chosen; if the dog had a positive reaction at 250 PNU/mL, the decreasing concentration set was used. In total, 60 allergen injections (five titrations of all 12 mite allergens) were performed with a positive and a negative control for each supplier, as described above. The titration IDTs were performed as soon as the results of the initial IDT test were recorded. The evaluations took place in the same way as described for the initial IDT and were recorded in the same way.

Data and statistical analyses

Kappa tests were used to evaluate the agreement between the tests. Spearman's rank correlation test for nonparametric data was used to compare EA (serology tests) and the lowest concentration eliciting a positive response on the IDTs. Additionally, Fisher's exact tests were used to test associations between two observations, for example, the association between higher optical density and positive reaction with lower PNU concentration or the association between positive serology and positive IDT reaction at the concentration currently used in IDTs. All analyses were carried out using GraphPad[®] software (GraphPad Inc., San Diego, CA, USA).

Results

Animals

Forty-eight laboratory beagles were initially tested with the Imovet ELISA test. Of these, 38 (79%) were negative on serology testing for all tested mite allergens and 10 (21%) dogs were positive for at least one mite allergen. Ten serologically positive and 10 negative dogs were chosen, although three dogs had to be withdrawn, leaving 17 dogs for the IDTs (eight positive and nine negative dogs). These comprised four male and 13 female dogs, with a mean weight of 13.4 kg (range, 8.5–19.2 kg). The

median age of the dogs was 4.1 years (range, 1.7–4.3 years).

Allergen-specific IgE serology

Nine dogs showed negative results to all selected mite allergens when assessed by the Imovet ELISA. The individual results for each dog and each mite are shown in Table 1. Eight dogs had positive results to at least one mite allergen. Of these, one dog was positive to all selected mite allergens, three dogs were positive to three mite allergens and four dogs were positive to only one mite allergen.

Three of 17 dogs were negative for all four mite allergens on the Heska test. Of the 14 positive dogs, five were positive for all four mite allergens, four were positive for three allergens, two were positive for two allergens and three were positive for one allergen. However, 13 of 39 positive reactions were only weak positives (i.e. <200 EA units).

Intradermal testing

The 17 dogs were tested at the concentration of 250 PNU/mL. Seven dogs reacted to this concentration to at least one mite allergen. When all mite allergens from both suppliers and of all batches were combined (12 mite allergens per dog; in total 204 IDTs at 250 PNU/mL), 21 positive test results were recorded (10.3%).

Interobserver variability

Interobserver variability in the subjective evaluation of all IDTs was 5.9%, although most differences involved differences in grading (e.g. 3+ instead of 4+); the interobserver variability between positive or negative results was 0.4%.

Intra- and intersupplier variability

To evaluate the variability in the skin test reactions with allergen concentrations of equal PNUs/mL from different suppliers and of different batches from the same supplier, we performed Spearman's nonparametric correlation. The results showed a correlation between the two Greer allergen batches of 74% ($P < 0.0001$) for all mite allergens (D.f., D.p., A.s. and T.p.) at 250 PNU/mL. Between the allergens of two different suppliers, there were correlations of 57% (batch A Greer versus batch C Alk-Abelló; $P < 0.0001$) and of 78% (batch B Greer versus batch C Alk-Abelló; $P < 0.0001$) for all mites (Table 2).

Asymptomatic sensitization versus irritant reaction

Table 1 shows the results of all the IgE serology and IDT results. The results of the IDTs were the lowest concentration of allergen that elicited a positive reaction.

Twelve positive reactions of the 204 performed injections (17 dogs $\times$ four mites $\times$ three batches = 204) were seen at the standard test concentration of 250 PNU/mL or lower with each Greer batch (A and B = 24 positives; 11.8%), and two tests were positive at 500 PNU/mL with each batch (four positives; 2.0%). The IDTs with the Alk-Abelló allergens showed five positive reactions (2.5%) with test concentrations of 250 PNU/mL or lower, and four positive reactions at 500 PNU/mL (2.0%). There were 35 positive reactions >500 PNU/mL for all allergens

(17.2%); these usually only occurred with very high concentrations. The majority of reactions remained negative at a concentration of 5000 PNU/mL (132 of 204; 65%).

By combining the two serological tests and the IDT threshold concentrations of all allergen batches for each individual mite and dog (four mites tested in 17 dogs = 68 test results), we found three groups. The largest group consisted of 48 of 68 negative results in at least one serology test in combination with negative results in at least two of the three IDTs at concentrations ≤ 500 PNU/mL. In a second group, there were 12 of 68 results that were positive in at least one serological test and simultaneously positive in at least two of the three IDTs at concentrations ≤ 250 PNU/mL. Finally, there was a group where eight of 68 results were positive in at least one of the two serology tests and negative in at least two of the three IDTs at 250 PNU/mL. Notably, the IDTs in this group became positive at concentrations >500 PNU/mL. These results were highly significant ($P < 0.0001$; Fischer's exact test, two sided).

Discussion

In common with previous studies of allergen testing in healthy dogs,^{4–6,12–14} we found a considerable number of positive serology and IDT results in our group of healthy laboratory beagles. This was remarkable, because all dogs had been kept in a constant, homogeneous environment, which is unlikely to support high mite numbers.^{15,16} We therefore consider results of "allergy testing" in healthy, privately owned dogs difficult to interpret because these dogs are kept in a highly heterogeneous environment, where mites are known to proliferate.¹⁷

To the authors' knowledge, variability between different veterinary allergen suppliers has only been investigated in one small study. Only minor differences between the suppliers were noted, but most dogs did not react to any of the allergens.¹⁸ The variability between batches from any one supplier has not been previously evaluated. Our results showed highly significant correlation and agreement between the results of the two batches from one supplier (Greer batch A and B), as well as a significant correlation and agreement when batches from different suppliers were compared (Greer batch A versus Alk-Abelló batch C and Greer batch B versus Alk-Abelló batch C). This suggests that changes in allergen batch from the same supplier will lead to negligible variability. Allergens from another supplier may give differing results, but the clinical significance of this is unclear.

Our results show that dogs with positive IDT reactions to standard concentrations (i.e. 250 PNU/mL) also tended to have positive ELISAs to the same allergens. A similar association was seen in dogs with negative reactions at 250 PNU/mL, but not with positive reactions to 500 PNU/mL. This suggests that IDT reactions to concentrations of <500 PNU/mL are associated with the presence of IgE and that these dogs have developed asymptomatic sensitization. Testing mite allergens at 500 PNU/mL could improve the sensitivity of IDTs with house dust and storage mites. In contrast, dogs that only had positive reactions at concentrations >500 PNU/mL

Table 1. Summary of results for intradermal and serological tests

Dog number	Dermatophagoides farinae, individual results										Dermatophagoides pteronyssinus, individual results										Acarus siro, individual results										Tyrophagus putrescentiae, individual results														
	Batch A					Batch B					Batch C					Batch A					Batch B					Batch C					Batch A					Batch B					Batch C				
	Imovet (kU/l)	Heska EA units	Batch A (Greer)	Batch B (Greer)	Batch C (Alk-Abelló)	Imovet (kU/l)	Heska EA units	Batch A (Greer)	Batch B (Greer)	Batch C (Alk-Abelló)	Imovet (kU/l)	Heska EA units	Batch A (Greer)	Batch B (Greer)	Batch C (Alk-Abelló)	Imovet (kU/l)	Heska EA units	Batch A (Greer)	Batch B (Greer)	Batch C (Alk-Abelló)	Imovet (kU/l)	Heska EA units	Batch A (Greer)	Batch B (Greer)	Batch C (Alk-Abelló)	Imovet (kU/l)	Heska EA units	Batch A (Greer)	Batch B (Greer)	Batch C (Alk-Abelló)	Imovet (kU/l)	Heska EA units	Batch A (Greer)	Batch B (Greer)	Batch C (Alk-Abelló)										
1	<0.15	225	250	250	1000	0.83	179	250	250	500	0.25	44	Negative	Negative	Negative	0.17	92	Negative	Negative	Negative	0.17	92	Negative	Negative	Negative	0.17	92	Negative	Negative	Negative	0.17	92	Negative	Negative	Negative										
2	<.015	109	Negative	Negative	Negative	0.46	154	Negative	Negative	Negative	0.23	4	Negative	Negative	Negative	0.23	69	Negative	Negative	Negative	0.23	69	Negative	Negative	Negative	0.23	69	Negative	Negative	Negative	0.23	69	Negative	Negative	Negative										
3	2.4	752	250	250	Negative	0.26	84	Negative	Negative	Negative	0.29	188	Negative	Negative	Negative	0.5	370	Negative	Negative	Negative	0.5	370	Negative	Negative	Negative	0.5	370	Negative	Negative	Negative	0.5	370	Negative	Negative	Negative										
4	<0.15	103	Negative	Negative	Negative	<0.15	155	Negative	Negative	Negative	<0.15	35	Negative	Negative	Negative	<0.15	154	Negative	Negative	Negative	<0.15	154	Negative	Negative	Negative	<0.15	154	Negative	Negative	Negative	<0.15	154	Negative	Negative	Negative										
5	<0.15	123	Negative	Negative	Negative	<0.15	160	Negative	Negative	Negative	<0.15	64	Negative	Negative	Negative	<0.15	70	Negative	Negative	Negative	<0.15	70	Negative	Negative	Negative	<0.15	70	Negative	Negative	Negative	<0.15	70	Negative	Negative	Negative										
6	4.9	1750	250	250	1000	0.21	99	Negative	2000	5000	0.67	489	Negative	2000	500	0.67	1262	Negative	500	500	500	0.67	1262	Negative	500	500	500	500	500	500	0.67	1262	Negative	500	250										
7	0.31	203	Negative	Negative	Negative	<0.15	146	Negative	Negative	Negative	0.2	234	Negative	Negative	Negative	0.39	217	Negative	Negative	Negative	0.39	217	Negative	Negative	Negative	0.39	217	Negative	Negative	Negative	0.39	217	Negative	Negative	Negative										
8	3.8	51	Negative	Negative	Negative	<0.15	66	Negative	Negative	Negative	0.29	115	Negative	Negative	Negative	0.48	83	Negative	Negative	Negative	0.48	83	Negative	Negative	Negative	0.48	83	Negative	Negative	Negative	0.48	83	Negative	Negative	Negative										
9	0.16	930	500	250	50	0.22	171	Negative	2000	2000	0.16	237	Negative	2000	2000	0.19	609	Negative	1000	2000	2000	0.19	609	Negative	250	250	250	250	250	250	0.19	609	Negative	250	500										
10	6.6	1916	Negative	5000	3500	<0.15	76	Negative	Negative	Negative	0.39	311	Negative	Negative	Negative	0.45	753	Negative	5000	5000	5000	0.45	753	Negative	5000	5000	5000	5000	5000	5000	0.45	753	Negative	5000	Negative										
11	2.3	1294	150	150	100	<0.15	182	5000	5000	Negative	0.52	484	5000	5000	Negative	0.64	1049	250	200	1000	1000	0.64	1049	250	250	250	250	250	250	0.64	1049	250	250	150											
12	<0.15	109	Negative	Negative	Negative	<0.15	90	Negative	Negative	Negative	0.19	0	Negative	Negative	Negative	0.16	66	Negative	5000	1000	1000	0.16	66	Negative	3500	3500	3500	3500	3500	3500	0.16	66	Negative	3500	Negative										
13	<0.15	255	5000	Negative	Negative	<0.15	189	Negative	Negative	2000	<0.15	253	Negative	Negative	2000	<0.15	215	Negative	Negative	2000	2000	<0.15	215	Negative	Negative	Negative	Negative	Negative	Negative	<0.15	215	Negative	Negative	3500											
14	2.8	539	250	150	250	0.69	168	250	150	500	1.3	269	250	150	500	1.1	289	Negative	3500	Negative	Negative	1.1	289	Negative	3500	1000	1000	1000	1000	1000	1.1	289	Negative	3500	1000										
15	<0.15	40	Negative	Negative	Negative	<0.15	47	Negative	Negative	Negative	0.18	0	Negative	Negative	Negative	<0.15	60	Negative	Negative	Negative	Negative	<0.15	60	Negative	Negative	Negative	Negative	Negative	Negative	<0.15	60	Negative	Negative	Negative											
16	0.37	150	Negative	Negative	Negative	0.37	76	Negative	Negative	Negative	0.23	46	Negative	Negative	Negative	0.26	95	Negative	Negative	Negative	Negative	0.26	95	5000	5000	5000	5000	5000	5000	0.26	95	Negative	5000	Negative											
17	3.9	675	250	250	2000	0.32	177	Negative	Negative	Negative	0.94	207	Negative	Negative	Negative	1.4	222	3500	2000	5000	5000	1.4	222	3500	3500	3500	3500	3500	3500	1.4	222	3500	3500	Negative											

Intradermal test results for batches A–C are presented as either the last concentration to which a reaction was shown (if decreasing concentrations were used = initial test positive) or the first concentration to which a reaction was shown (if increasing reactions were used = initial test negative). Negative is defined as no reaction at the highest concentration of 5000 PNU/mL. Batches A, B and C are allergens provided by Greer (two different batches; A and B) and by Alk Abelló (one batch; C).

Table 2. Results of the statistical tests for comparing mite allergen batches

Tests compared	Kappa test for agreement	Spearman's correlation test; Correlation %; P-value
Greer A–Greer B	0.9; $P < 0.0001$	74%; $P < 0.0001$
Greer A–ALK	0.62; $P < 0.0001$	57%; $P < 0.0001$
Greer B–ALK	0.66; $P < 0.0001$	78%; $P < 0.0001$

Greer A and Greer B are allergens supplied by Greer as two different batches (A and B); and ALK are allergens supplied by Alk Abelló (batch C).

were more likely to have negative serology, suggesting that these reactions are most likely to be due to irritation.

In conclusion, our results indicate that positive reactions in IDTs performed at the standard concentration of 250 PNU/mL in healthy dogs are not irritant reactions but are rather the result of nonclinical sensitization. It is possible that using 500 PNU/mL in IDTs will reduce false-negative results without increasing false-positive reactions. This study, however, used healthy laboratory beagle dogs, and IDTs would rarely be performed in these dogs. We used this population to minimize variation in environment, management and feeding, but the results with privately owned healthy dogs of various breeds, which live in 'real-life' conditions, may differ. Further studies are therefore warranted.

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Résumé

Contexte – Les tests intradermiques (IDT) sont largement utilisés en médecine vétérinaire pour sélectionner les allergènes d'une immunothérapie. La concentration recommandée pour les acariens est de 250 PNU/mL. On ne sait pas si les chiens sains répondant à cette concentration ont une sensibilisation asymptomatique ou une irritation. En outre, les variabilités entre les lots et entre les fournisseurs des allergènes n'ont pas été pleinement prises en compte.

Hypothèses/Objectifs – L'incidence d'IDT positifs chez des beagles sains a été enregistrée et les valeurs combinées de ces résultats avec ceux de sérologies ont été évaluées pour distinguer la sensibilisation asymptomatique de l'irritation. De plus, les variabilités entre les lots et entre les fournisseurs ont été estimées.

Animaux – Dix sept beagles sains de laboratoire sans antécédents ou signes cliniques de dermatite atopique canine ont été inclus.

Méthodes – Les IDT ont été réalisés avec quatre allergènes d'acariens de deux fournisseurs (divers lots). Un premier IDT à 250 PNU/mL a été utilisé pour déterminer si une diminution ou une augmentation des

concentrations tests étaient nécessaire dans les titrages d'IDT suivants. De plus, deux tests ELISA-IgE de différents fabricants ont été effectués.

Résultats – Sept des 17 chiens ont montré des réactions aux IDT à 250 PNU/mL. Il y avait corrélation et concordance respectivement significatives entre les lots d'allergènes et entre les fournisseurs. Les associations entre les réactions IDT et les sérologies IgE ont permis d'identifier statistiquement deux groupes de chiens: un groupe avec des sérologies positives et des réactions à IDT à 250 PNU/mL; et un autre avec des sérologies et des réactions à IDT négatives.

Conclusions – Nos résultats suggèrent que les chiens ayant des réactions aux IDT et des sérologies positives sont asymptomatiquement sensibilisés alors que les chiens qui réagissent à des concentrations plus élevées d'allergènes mais avec des sérologies négatives correspondent à des réactions d'irritation.

Resumen

Introducción – la prueba intradérmica (IDT) es ampliamente utilizada en veterinaria para seleccionar los alérgenos que se utilizarían para la inmunoterapia. La concentración recomendada para los ácaros es de 250 PNU/mL. No se sabe si los perros sanos que responden a esta concentración tienen sensibilización o irritación asintomática. Además, las diferencias entre lotes y entre distribuidores no han sido totalmente determinadas.

Hipótesis/objetivos – se observó la incidencia de IDTs positivas en perros Beagle sanos y se analizó el valor de combinar estos resultados con serología para distinguir entre la sensibilización y la irritación asintomática. Además, se determinaron la variabilidad entre lotes y distribuidores.

Animales – se utilizaron diecisiete perros Beagle sanos del laboratorio sin historia ni signos clínicos de dermatitis atópica.

Métodos – las IDTs se realizaron con cuatro alérgenos de ácaro a partir de dos distribuidores (y de diferentes lotes). Se utilizó una IDT inicial a 250 PNU/mL para determinar si se utilizarían concentraciones mayores o menores en titulaciones subsecuentes de IDTs. Además, se realizaron dos pruebas de IgE-ELISA de distintos fabricantes.

Resultados – siete de 17 perros demostraron reacciones de IDT a 250 PNU/mL. Hubo una correlación y acuerdo de alérgenos altamente significativos entre lotes y distribuidores. Las asociaciones entre las reacciones de IDT y las pruebas serológicas de IgE identificaron a nivel estadístico dos grupos de perros: uno con serología positiva y reacciones de IDT a 250 PNU/mL; y otros con serología y reacciones de IDT negativas.

Conclusiones – nuestros resultados sugieren que los perros que tienen reacciones de IDT y serología positiva sin signos clínicos están sensibilizados al alérgeno, mientras que los perros que reaccionan a concentraciones más altas del alérgeno, pero tienen serología negativa, lo hacen como resultado de reacciones irritantes.

Zusammenfassung

Hintergrund – Der Interdermaltest (IDT) wird in der Veterinärmedizin weithin verwendet, um die Allergene für eine Immuntherapie auszuwählen. Die empfohlene Konzentration für Milben beträgt 250 PNU/mL. Man weiß nicht, ob es sich bei gesunden Hunden, die auf diese Konzentration reagieren, um eine asymptomatische Sensibilisierung oder eine Irritation handelt. Weiterhin sind Schwankungen zwischen einzelnen Chargen und zwischen den Herstellern bisher nicht ausreichend bedacht worden.

Hypothese/Ziele – Das Vorkommen von positiven IDTs bei gesunden Beagles wurde festgehalten und die Möglichkeit der Verwendung dieser Ergebnisse in Kombination mit Ergebnissen aus der Serologie zur Differenzierung zwischen asymptomatischer Sensibilisierung und Irritation evaluiert. Zusätzlich wurde die Variabilität zwischen den Chargen und zwischen den Herstellern der Allergene beurteilt.

Tiere – Siebzehn gesunde Beagles aus dem Tierversuchslabor ohne eine Anamnese oder klinische Symptome einer caninen atopischen Dermatitis wurden verwendet.

Methoden – IDTs wurden mit vier Milbenallergenen von zwei Herstellern (unterschiedliche Chargen) durchgeführt. Zu Beginn wurde ein IDT mit 250 PNU/mL verwendet, um festzustellen, ob abnehmende oder steigende Testkonzentrationen in den nachfolgenden titrierten IDTs verwendet werden sollten. Zusätzlich wurden zwei IgE-ELISAs von unterschiedlichen Herstellern durchgeführt.

Ergebnisse – Sieben von 17 Hunden zeigten IDT Reaktionen bei 250 PNU/mL. Es bestand eine hochsignifikante Korrelation und Übereinstimmung zwischen den Allergenen der verschiedenen Chargen und eine signifikante Korrelation und Übereinstimmung zwischen den Herstellern. Der Zusammenhang zwischen den IDT Reaktionen und der IgE Serologie zeigte zwei Gruppen von Hunden: eine mit positiver Serologie und IDT Reaktionen bei 250 PNU/mL; und eine andere mit negativer Serologie und IDT Reaktionen.

Schlussfolgerung – Unsere Ergebnisse weisen darauf hin, dass Hunde, die IDT Reaktionen und eine positive Serologie aufweisen, asymptomatisch sensibilisiert sind, während Hunde mit negativer Serologie, die bei höheren Allergenkonzentrationen reagieren, eine Reaktion aufgrund Irritation zeigen.

要約

背景 - 皮内反応試験 (IDT) は獣医学領域で免疫療法のアレルゲンを選択する為に広く行われている。奨励されるダニ抗原の濃度は 250 PNU/mL である。この濃度での健康犬に対する反応が無症候性に感作されるのか、刺激を起こすのかは知られていない。さらに、アレルゲンのバッチ間、供給元間のばらつきは十分に分かっていない。

仮説/目的 - 正常犬で IDT の陽性の発生率を記録し、無症候性の感作および刺激性の区別をするために血清学的な結果を組み合わせ、評価を行った。さらに、バッチ間と供給元間のアレルゲンの変動を評価した。

供与動物 - 臨床的に犬アトピー性皮膚炎の臨床的な症状や病歴のない 17 頭の健康な実験用ビーグルを用いた。

方法 - IDT は 2 つの供給元 (異なるバッチ) から 4 種類のダニ抗原を用いて行った。試験濃度が減少しているのか増加しているのかを決めるために最初の IDT は 250 PNU/mL の濃度で行い、その後 IDT 力価に用いた。さらに、2 つの異なる検査会社に IgE-ELISA 検査を依頼した。

結果 - 17 頭中 7 頭の犬は 250 PNU/mL の濃度で IDT が陽性であった。アレルゲンのバッチ間には強い有意差が、供給元間にも有意差と一致がそれぞれ認められた。IDT 陽性反応と血清学的な IgE の関連性は統計学的に 2 グループ間で認められた：血清学的な陽性反応と 250 PNU/mL 濃度における IDT 反応陽性；もう一つは血清学的な陰性と IDT 反応陽性間であった。

結論 - 著者らの結果から、IDT に反応し血清学的にも陽性の犬は、無症候性に感作されており、より高いアレルゲン濃度で感作した犬が血清学的に陰性であっても、刺激性の反応の結果、そのような現象が見られる可能性を示唆した。

摘要

背景 - 皮内試験 (IDT) 是为了脱敏治疗选择抗原，已经在兽医领域中被广泛使用。

假说/目的 - 记录健康比格犬的 IDTs 阳性率，结合血清学方法结果，鉴别无症状致敏和刺激反应的不同。另外，评估不同批次和不同供应商的抗原差别。

动物 - 选择 17 只健康实验比格犬，这些犬没有异位性皮炎病史和临床症状。

方法 - 使用来自两个供应商 (不同批次) 的四种尘螨抗原，进行 IDTs。先用 250 PNU/mL 进行 IDT，用来确定随后的滴度是升高还是降低。另外，由两个厂商分别进行 IgE-ELISA 实验。

结果 - 17 只犬中的七只在 250 PNU/mL 时表现出 IDT 反应。不同批次和供应商间的抗原分别有着高度显著和显著的相关性和一致性。犬的 IDT 反应和 IgE 血清学的关系被统计学鉴定为两组：一组在 250 PNU/mL 时 IDT 反应伴有血清学阳性；另一组 IDT 反应伴有血清学阴性。

结论 - 我们的研究结果认为，IDT 反应伴有血清学阳性的犬是无症状被致敏，当犬对高浓度抗原反应而血清学阴性时，那么 IDT 反应是刺激的结果。