

Organ System and ABVP Core Examination Review Module C : Correlation of Intradermal Allergy Testing and Three Commercially Available Serological Allergy Tests

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Allergic dermatitis is one of the most common dermatological diseases seen in practice, yet its diagnosis remains less than straightforward. In the past several years, several companies have started offering serologic allergy tests for dogs. Serum immunoglobulins rise in allergic dogs making it possible to identify and measure allergen-specific antibody levels.¹ These tests are readily available and can be easily performed in any practice environment with no special equipment or skill needed, making the test very convenient. Intradermal allergy testing has been considered the gold standard for diagnosing canine atopy for many years and remains the primary testing method used by most veterinary dermatologists. Intradermal allergy testing allows us to test the skin itself, which is the target of the allergic response. Most animals tolerate the procedure well and results are immediately available.

Purpose:

Our objective was to evaluate the correlation of results from intradermal allergy testing and three commercially available serologic allergy tests.

Methods and Material:

Six dogs of mixed age and sex with clinical symptoms consistent with atopy were enrolled. When appropriate, each patient was treated with a dietary and scabicide therapeutic trial to rule out food allergy and scabies respectively. Antihistamines and steroid containing treatments were withheld for appropriate durations in preparation for testing. On the day of testing, serum was obtained, divided into 3 aliquots and submitted to 3 labs for testing (Heska, Greer, VARL). The dog was sedated and an intradermal allergy test was performed in the usual manner.

Out of a total of 120 allergens tested, only 11 allergens were the same among the 4 tests and these were used for the final evaluation (cedar, cocklebur, lamb's quarter, English plantain, Bermuda grass, perennial rye, Kentucky bluegrass/June, *Penicillium notatum*, cockroach, *Dermatophagoides farinae*, and flea). To convert the reported results into a comparable format, the interpretation material provided by each laboratory was used to classify the reported results into one of 3 categories (negative, weak positive, or strong positive).

Test	Negative Score	Weak Positive	Strong Positive
IDAT	0	1	2-4
Greer	0	1	2-4
Heska	< 150		> 150
VARL	0	1-2	3-6

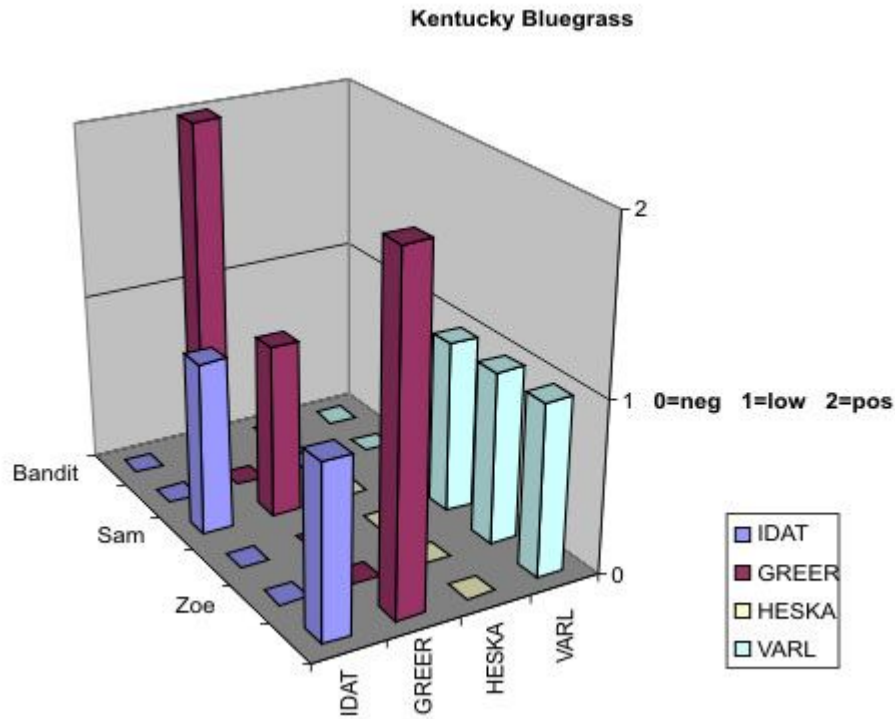
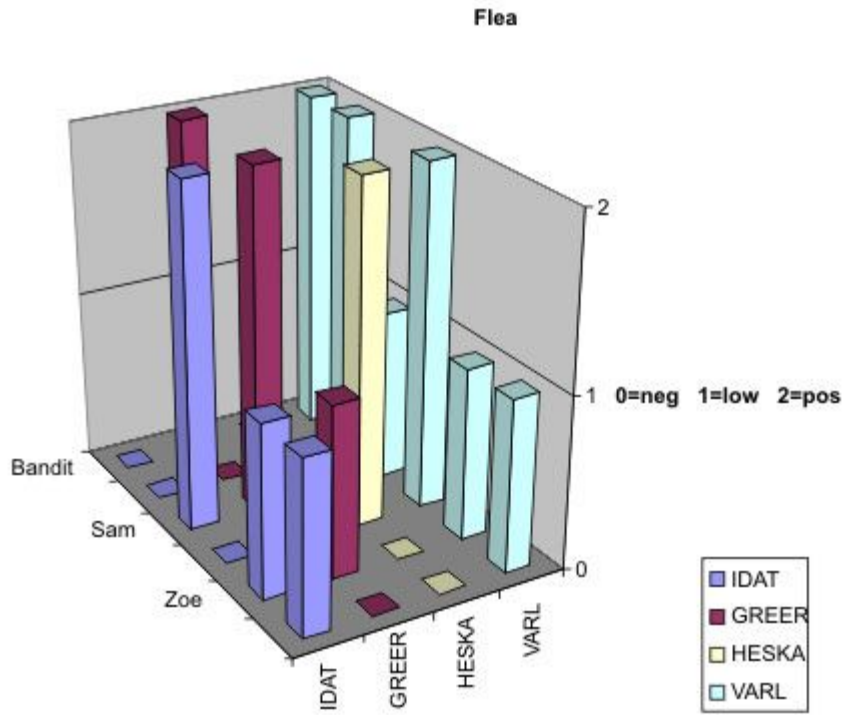
Results

There was little consistency and correlation among the 4 tests. Negative results correlated best with 5 animals and 12 allergen having negative results for all 4 tests. Only 2 dogs and 1 allergen demonstrated positive results for all 4 tests. One dog and 2 allergens had positive skin test results with negative results for all 3 serologic tests. Two dogs and 3 allergens had positive results for all 3 serologic tests with negative skin test results.

Correlation	Animal	Allergen
All tests negative	Gabe	Bermuda
		KY Blue/June
		P. Rye
		Lambs Quarter
		English Plantain
	Sam	P. Rye
		Cocklebur
		Pen. Notatum
	Jordi	English Plantain
	Zoe	Bermuda
		P. Rye
	Bailey	Lambs Quarter
All tests positive	Bandit	D. Farinae
	Sam	D. Farinae
Positive IDAT with all serology negative	Zoe	Cocklebur
		Cedar
Negative IDAT with all serology positive	Jordi	Pen. Notatum
	Bailey	P. Rye
		Cedar

Interpreted Test Results

Animal	Test	Bermuda	KYBlue/ June	P. Rye	Cocklebur	Lamb Quater	English Plantain	Cedar	Pen. Notatum	D. Farinae	Flea	Cockroach
Bandit												
	IDAT	neg	neg	neg	neg	neg	neg	neg	neg	strong	neg	strong
	Greer	weak	strong	strong	strong	strong	weak	weak	neg	strong	strong	strong
	Heska	neg	neg	neg	neg	neg	neg	neg	neg	strong	neg	neg
	VARL	neg	neg	neg	weak	neg	strong	neg	weak	weak	strong	strong
Gabe												
	IDAT	neg	neg	neg	neg	neg	neg	neg	neg	strong	neg	neg
	Greer	neg	neg	neg	neg	neg	neg	neg	neg	strong	neg	strong
	Heska	neg	neg	neg	neg	neg	neg	strong	neg	neg	neg	neg
	VARL	neg	neg	neg	weak	neg	neg	neg	weak	weak	strong	strong
Sam												
	IDAT	neg	weak	neg	neg	neg	neg	neg	neg	strong	strong	neg
	Greer	weak	weak	neg	neg	neg	weak	neg	neg	strong	strong	strong
	Heska	neg	neg	neg	neg	strong	neg	strong	neg	strong	neg	neg
	VARL	neg	neg	neg	neg	neg	neg	neg	neg	weak	weak	neg
Jordi												
	IDAT	neg	neg	neg	weak	weak	neg	weak	neg	strong	neg	strong
	Greer	neg	neg	neg	neg	neg	neg	neg	strong	neg	neg	neg
	Heska	neg	neg	neg	neg	neg	neg	strong	strong	neg	strong	neg
	VARL	weak	weak	weak	weak	weak	neg	neg	weak	weak	strong	strong
Zoe												
	IDAT	neg	neg	neg	strong	neg	neg	strong	neg	strong	weak	neg
	Greer	neg	neg	neg	neg	neg	neg	neg	neg	strong	weak	neg
	Heska	neg	neg	neg	neg	neg	neg	neg	neg	neg	neg	neg
	VARL	neg	weak	neg	neg	weak	neg	neg	weak	weak	weak	strong
Bailey												
	IDAT	neg	weak	neg	weak	neg	weak	neg	neg	neg	weak	weak
	Greer	strong	strong	strong	strong	neg	strong	strong	weak	neg	neg	x
	Heska	strong	neg	strong	neg	neg	neg	strong	neg	neg	neg	neg
	VARL	neg	weak	weak	strong	neg	weak	weak	neg	weak	weak	neg



Discussion

The intradermal testing methodology relies on allergen-specific IgE bound to reactive mast cells, which then degranulate after binding antigen.¹ Serologic tests measure transient allergen-specific IgE before the molecules migrate into the tissue.¹ The concentrations of IgE in the blood and tissue vary with antigen exposure (season) and may not follow the same timeline. These fundamental differences could explain the divergent results when comparing serology to intradermal testing. The results of this study are consistent with previous reports demonstrating limited correlation between intradermal allergy testing and serologic tests.¹

The results of the 3 serologic tests demonstrated little consistency despite purportedly measuring the same allergen-specific IgE. Reported sensitivities and specificities for serologic allergy assays range from 0-100%.¹⁻⁴ The methods used by each laboratory differ, which likely explains some of the variation. However, the large discrepancy between labs was surprising. Previous unpublished work identified only 57% and 91% reproducibility between paired samples sent blindly to each of the 2 labs tested (VARL and Greer respectively).⁵ The inconsistent reproducibility and lack of correlation between tests presents the clinician with a difficult task of selecting a test and interpreting the results.

In human medicine, attempts have been made to standardize serologic testing accuracy by using centralized controls to evaluate any particular assay. This approach would provide much needed dependability to the available veterinary assays.⁶⁻⁸

Conclusion

The lack of correlation among the allergy test results and a true gold standard makes any conclusions impossible; however, the failure of the 3 serologic assays to provide similar results is cause for concern.

Greer Laboratories, Inc
Veterinary Allergy Reference Laboratory
Heska Veterinary Diagnostic Laboratory

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