

Diagnosis and treatment of canine allergies

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Summary

Our studies evaluate various diagnostic methods for allergies in the dog, their specificity and sensitivity and ways to improve diagnostic accuracy. Other studies focus on new treatments such as Vitamin D, intralymphatic immunotherapy and topical ceramides. We also try to find ways to decrease the dose of potent medications with possible adverse effects to minimise treatment complications. Finally, we began studying non-specific immunomodulation with bacterial antigens to improve clinical signs of allergic dogs.

Research Objectives

We work at optimising the diagnosis and treatment of food allergies in dogs and cats. To achieve that, we evaluated serum testing and skin testing for allergen-specific IgE, correlated the results of the two different tests and evaluated blocking clinically inactive IgE against complex carbohydrate determinants to improve the correlation between results of the two test types. We also evaluated patch testing for dogs with food allergy as there is no valid and reliable test for the diagnosis of food allergy in the dog. For treatment we studied various types of allergen immunotherapy in randomised controlled trials, established rush immunotherapy in veterinary medicine, evaluated intralymphatic immunotherapy in a larger case series and now compare intralymphatic immunotherapy with conventional subcutaneous immunotherapy in dogs allergic against environmental allergens in a double-blinded, randomised study. We studied the effect of fatty acids on the immune system of allergic dogs and the influence of such fatty acids topically and orally on the needed dose of immunosuppressive agents such as cyclosporine in a randomised, double-blinded trial. The influence of vitamin D on the immune system is increasingly in the focus of research. We evaluated treatment with vitamin D in atopic dogs in a cross-over trial. And finally, we studied the influence of bacterial oligodeoxynucleotides initially on peripheral blood mononuclear cells and their cytokine production in vitro and subsequently more recently their influence in vivo in a pilot study as subcutaneous injections in atopic dogs. A placebo-controlled double-blinded study with subcutaneous injections of bacterial oligodeoxynucleotides is now approved and will be begun in the near future.

Key Findings

We could show in our studies that blocking anti-CCD antibodies in serum prior to testing for allergen-specific IgE vastly improved the correlation between skin test and serum test results. We could also demonstrate a high specificity of patch testing with food allergens, although the low sensitivity renders this test unsuitable for routine clinical use. In contrast, testing of allergen-specific IgA and IgM in saliva was not able to differentiate food allergic from healthy dogs.

We could establish rush immunotherapy as an effective and practical way of allergen immunotherapy in veterinary medicine and currently characterize the response to intralymphatic allergen immunotherapy. Non-specific immunomodulation with bacterial deoxynucleotides is possible, comparable to allergen-specific immunotherapy based on an in-vitro and a pilot study and currently investigated in a blinded fashion. Essential fatty acids decrease the dose of cyclosporine needed to control clinical signs in canine atopic dermatitis. Vitamin D was shown to also be an effective therapy for canine atopic dermatitis. In contrast, topical ceramides did not show effect in a placebo-controlled, double-blinded trial.

Selected recent publications

1. Saridomichelakis MN, Favrot C, Jackson HA, Bensignor E, Prost C, Mueller RS. "A proposed medication score for long-term trials of treatment of canine atopic dermatitis sensu lato". *Veterinary Record* 2021;188:e19. doi: 10.1002/vetr.19.
2. Rostaher A, Mueller RS, Meile L, Favrot C, Fischer NM. "Venom immunotherapy for Hymenoptera allergy in a dog". *Veterinary Dermatology*. doi: 10.1111/vde.12931.
3. Mueller RS, Nuttall T, Prost C, Schulz B, Bizikova P. "Treatment of the feline atopic syndrome - a systematic review." *Veterinary Dermatology* 2021; 32: 43-e8. doi: 10.1111/vde.12933.
4. Pali-Schöll I, DeBoer DJ, Alessandri C, Seida AA, Mueller RS, Jensen-Jarolim E. "Formulations for Allergen Immunotherapy in Human and Veterinary Patients: New Candidates on the Horizon". *Frontiers in Immunology* 2020; 11: 1697.
5. Olivry T, Mueller RS. "Critically Appraised Topic on Adverse Food Reactions of Companion Animals (8): Storage Mites in Commercial Pet foods." *BMC Veterinary Research* 2019 Oct 31;15(1):385. doi: 10.1186/s12917-019-2102-7.
6. Gedon NKY, Boehm TMSA, Klinger CJ, Udraitė L, Mueller RS. „Agreement of serum allergen test results with unblocked and blocked IgE against cross-reactive carbohydrate determinants (CCD) and intradermal test results in atopic dogs". *Veterinary Dermatology* 2019; 30: 195-e61.
7. Pali-Schöll I, Blank S, Verhoeckx K, Mueller RS, Janda J, Marti E, Seida AA, Rhyner C, DeBoer DJ, Jensen-Jarolim E. "EAACI position paper: Comparing insect hypersensitivity induced by bite, sting, inhalation or ingestion in human beings and animals". *Allergy* 2019; 74(5): 874-887.
8. Udraitė Vovk L, Watson A, Dodds WJ, Klinger CJ, Classen J, Mueller RS. "Testing for food-specific antibodies in saliva and blood of food allergic and healthy dogs". *Veterinary Journal* 2019; 245:1-6.
9. Klinger CJ, Hobi S, Johansen C, Koch HJ, Weber K, Mueller RS. „Vitamin D shows in vivo efficacy in a placebo-controlled, double-blinded, randomised clinical trial on canine atopic dermatitis." *Veterinary Record* 2018; 182(14): 406.
10. Timm K, Mueller RS, Nett-Mettler CS. Long-term effects of intralymphatic immunotherapy (ILIT) on canine atopic dermatitis. *Veterinary Dermatology* 2018; 29(2): 123-e49.

Funding

Funder	Project title	Start date	End date
DGVD	Influence of isoxazolines on cutaneous Demodex populations in dogs	2019	2021
Pharmaceutical Company	Evaluation of hypochlorous acid as an ear flush in dogs with chronic otitis externa - a randomised controlled study	2019	2019
Pharmaceutical Company	PCR evaluation and quantification of proteins in commercial dog food	2019	2019
Gesellschaft für kynologische Forschung	Intralymphatic immunotherapy – a double-blinded, placebo-controlled, multi-centred study		
DGVD	Intra- and interassay variability of serum allergen-specific IgE	2017	2017
Pharmaceutical Company	Evaluation of a new diet to alleviate clinical signs of canine atopic dermatitis	2016	2018
Pharmaceutical Company	Adrisin for canine atopic dermatitis	2016	2016