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THE DOG AS AN ANIMAL MODEL TO STUDY FOOD ALLERGY: SUBLINGUAL IMMUNOTHERAPY INDUCES PEANUT-SPECIFIC IgG, IgA AND IgE RESPONSES

Aim of the study

To assess the potential of 4-month peanut sublingual immunotherapy in inducing peanut-specific immune responses in non-allergic dogs.

Background

Sublingual immunotherapy is a treatment for allergic diseases in which a drop of allergen extract is applied directly under the tongue on a daily basis. This allergen-specific immunotherapy is currently being used in humans to treat allergic rhinitis¹ and food allergies². However, the underlying immunological mechanism is not completely understood. In this study we suggest the use of dogs as a model to study the kinetics of the immune response during sublingual immunotherapy.

Methods

During a period of 4 months, a placebo (n=8) and peanut extract (n=8) was administered daily to non-allergic dogs. Every two to three weeks, blood was sampled. Using ELISA, induction of peanut-specific IgG, IgA and IgE in the dogs' serum was assessed. ELISPOT was performed to detect circulating peanut-specific IgG- and IgE-secreting cells. The dogs were clinically assessed to evaluate whether sublingual immunization induced symptoms of allergy in the non-allergic dogs.



Dispenser for sublingual immunotherapy and administration of allergen extract to a dog.

References

¹Wilson, D. R., Torres Lima, M., & Durham, S. R. (2005). Sublingual immunotherapy for allergic rhinitis: systematic review and meta-analysis. *Allergy*, 60(1), 4-12.

²Fleischer, D. M., Burks, A. W., Vickery, B. P., Scurlock, A. M., Wood, R. A., Jones, S. M., ... & Mayer, L. (2013). Sublingual immunotherapy for peanut allergy: a randomized, double-blind, placebo-controlled multicenter trial. *Journal of Allergy and Clinical Immunology*, 131(1), 119-127.

³Buchanan, B. B., & Frick, O. L. (2002). The dog as a model for food allergy. *Annals of the New York Academy of Sciences*, 964(1), 173-183.

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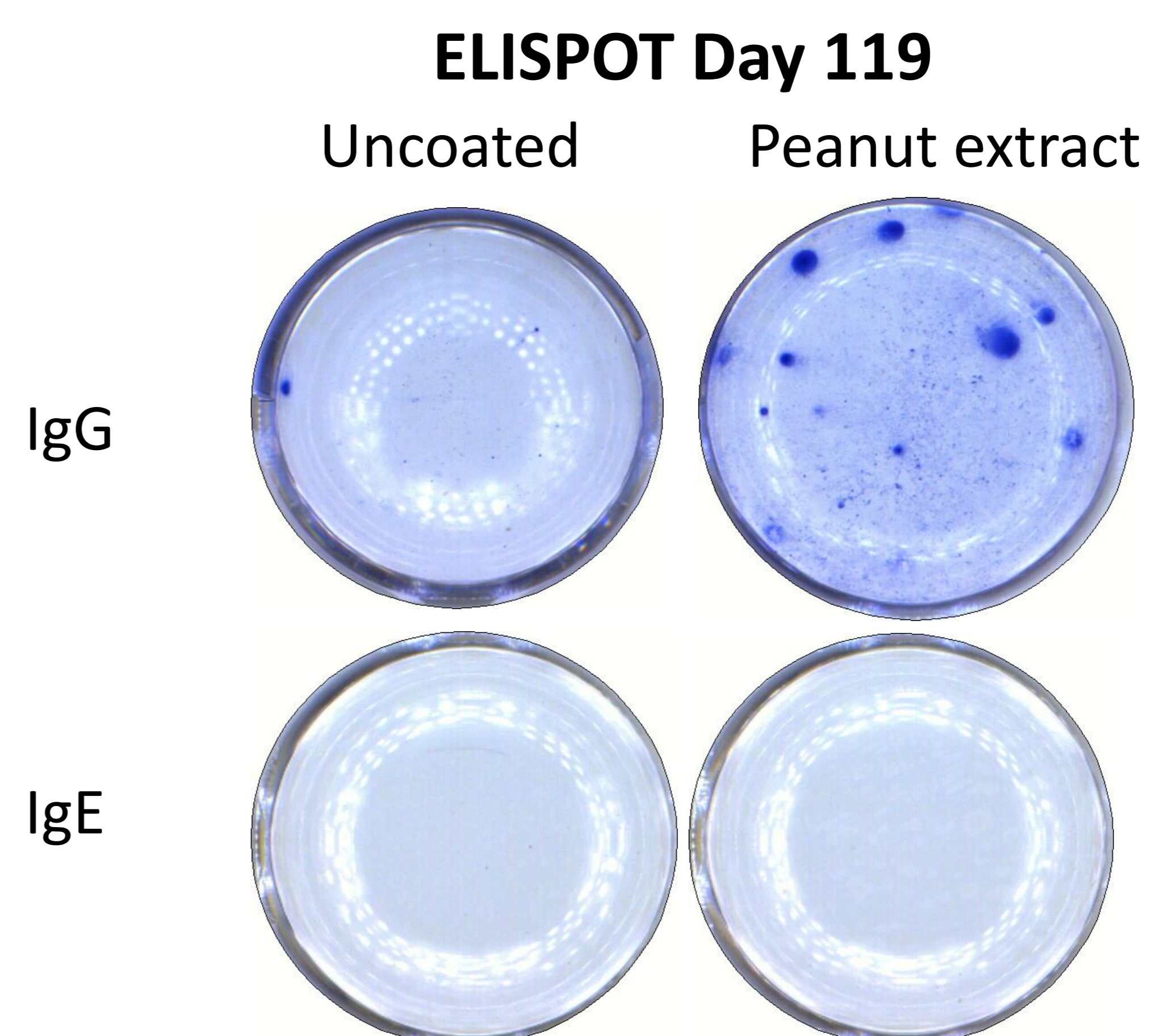
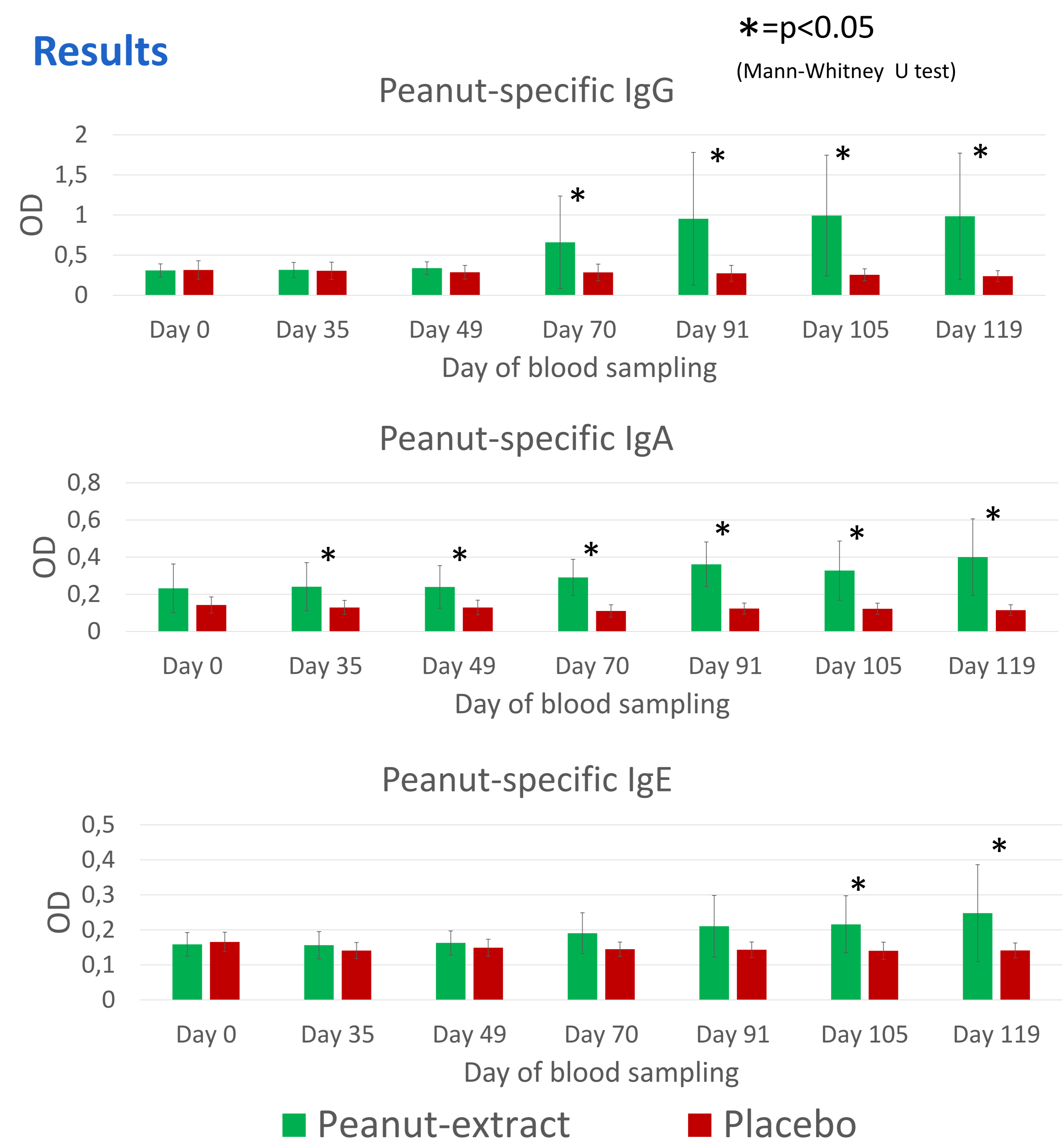


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Results



Conclusion:

Sublingual immunotherapy induces peanut-specific IgG, IgA and IgE responses in non-allergic dogs. Subsequently, allergen-specific immune responses can be induced in tolerant dogs during sublingual immunotherapy with peanut extract. Dogs and humans show similarities regarding physiology and anatomy of the gastro-intestinal tract, diet and their living environment. Additionally, allergies of dogs and humans are mediated by comparable immune responses³. Therefore, the dog is proposed as an animal model to investigate allergen tolerance for food allergens and to elucidate the effects of sublingual immunotherapy on the immune system.