Immunostimulatory effect of beta-1,3/1,6-glucan supplementation in a dry diet after vaccination in puppies.

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Introduction

Several infectious diseases are still causes of high morbidity and mortality in puppies. It is a common practice to protect puppies thanks to vaccines, but many stress and immunosuppressive conditions may occur and impact the effect of vaccination. Some functional ingredients are used to stimulate the immune system and enhance the efficacy of vaccines.[1,2] Beta-1,3/1,6-glucan is extracted from cell wall of baker yeast (*Saccaromyces cerevisae*).

Its molecular configuration is crucial for its biological activity: recognition of beta-glucan by specific receptors is translated into activation of the innate immune cells, synthesis and release of cytokines, generation of enhanced cell-mediated responses and finally orchestration of the adaptive immune response.[3] The immunostimulatory abilities of beta-glucan have already been demonstrated in young and adult dogs.[4-7]

The aim of this study was to assess the effect of beta-1,3/1,6-glucan included in a dry diet, on serum immunglobulin G concentration following polyvalent vaccination in puppies.

Animals, materials and methods

Twenty Beagle puppies (7 weeks of age at the initiation of the study) were allocated into 2 groups, with similar environment and breeding conditions. From weaning and for 2 months, they were fed either a control diet (Control) or a test diet (Beta-glucan). The Control diet was a commercial dry diet intended for growing dogs (Table 1). The only difference between the 2 diets was beta-glucan added in the Beta-glucan diet (dose: 565 mg/kg DM) and included in the fat coating of the kibbles. The program of vaccination (using a commercial modified live polyvalent vaccine) and blood sampling is represented in Fig. 1. For each blood sample, serum IgG concentrations were measured by radial immune-diffusion technique.

Table 1: Nutritional characteristics of the tested diets (% DM)

Crude protein	35.9
Crude fat	22.8
Crude fibre	2.2
Crude ash	7.6
Calcium	1.4
Phosphorus	1.1

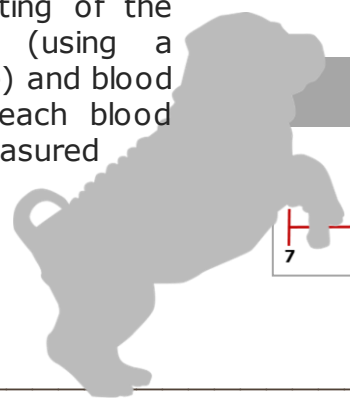
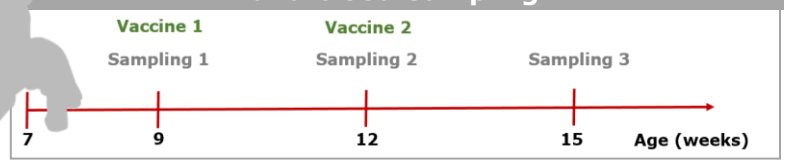


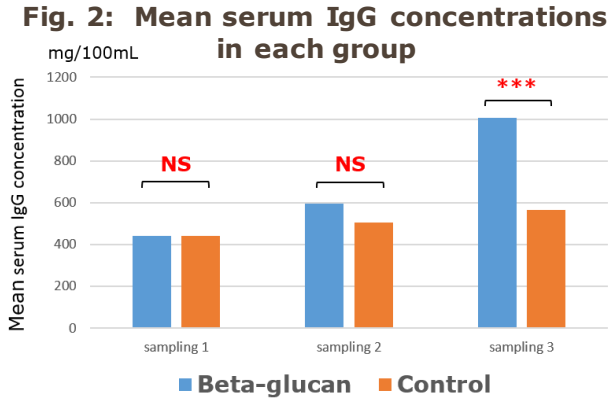
Fig. 1: Program of vaccination and blood sampling



Results

All puppies consumed normally their daily ration and remained healthy throughout the study. There was no difference in baseline serum IgG concentrations (sampling 1) between the groups (Fig. 2). As a reaction to the first vaccination, IgG level was increased in both groups at sampling 2: it was higher with Beta-glucan diet but without significant difference. At the end of the study, 3 weeks after the second vaccine, IgG concentration (sampling 3) was significantly higher in the Beta-glucan group compared to the Control group.

Fig. 2: Mean serum IgG concentrations in each group



***: p<0.005, NS: no significant difference

Conclusion

This study shows that addition of beta-1,3/1,6-glucan (565 mg/kg DM) in a dry food increases efficiently the humoral response after vaccination in puppies, and thus may help to promote a better immune protection for a regular and harmonious growth.

References: 1) Raa J. Petfood Industry 2000 ; 2) Rosenhaug HY. Pet Food 2002 ; 3) Goodridge HS et al. Immunol Rev 2009 ; 4) Stuyven E et al. Clin Vaccine Immunol 2010 ; 5) Altug N et al. Kaflas Univ Vet Fak Derg 2010 ; 6) Haladova E et al. Acta Vet Hung 2011 ; 7) Vetvicka V and Oliveira C. Br J Pharm Res 2014

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