
Effects of supplemental fructooligosaccharides plus mannanoligosaccharides on immune function and ileal and fecal microbial populations in adult dogs.
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Abstract

The goal of this study was to examine whether supplemental fructooligosaccharides (FOS) plus mannanoligosaccharides (MOS) influenced immune function and ileal and fecal microbial populations of adult dogs. Eight adult dogs surgically fitted with ileal cannulas were used in a crossover design. Dogs were fed 200 g of a dry, extruded, kibble diet twice daily. At each feeding, dogs were dosed with either 1 g sucrose (placebo) or 2 g FOS plus 1 g MOS orally via gelatin capsule. Fecal, ileal, and blood samples were collected at the end of each 14-d period to measure microbial populations and immune characteristics. Treatment least squares means were compared using the GLM procedure of SAS. Supplementation of FOS plus MOS increased fecal bifidobacteria and fecal and ileal lactobacilli concentrations. Dogs fed FOS plus MOS also tended to have lower blood neutrophils and greater blood lymphocytes vs placebo. Serum, fecal, and ileal immunoglobulin concentrations were unchanged by treatment. Supplementation of FOS plus MOS beneficially altered indices of gut health by improving ileal and fecal microbial ecology. Supplementation of FOS plus MOS also altered immune function by causing a shift in blood immune cells.

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Supplemental fructooligosaccharides and mannanoligosaccharides influence immune function, ileal and total tract nutrient digestibilities, microbial populations and concentrations of protein catabolites in the large bowel of dogs. Swanson KS, Grieshop CM, Flickinger EA, Bauer LL, Healy HP, Dawson KA, Merchen NR, Fahey GC Jr.
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Abstract

The goal of this study was to examine whether supplemental fructooligosaccharides (FOS) and (or) mannanoligosaccharides (MOS) influenced indices of gut health of dogs. Adult female dogs (n = 4) surgically fitted with ileal cannulas were fed a dry, extruded, kibble diet twice daily. At each feeding, the following treatments were administered: 1) Control (no FOS or MOS); 2) 1 g FOS; 3) 1 g MOS; or 4) 1 g FOS + 1 g MOS. Fecal, ileal and blood samples were collected during the last 4 d of each 14-d period to measure protein catabolite concentrations, microbial populations, immune characteristics and nutrient digestibilities. Treatment means were compared using preplanned orthogonal contrasts. Dogs supplemented with MOS had lower (P = 0.05) fecal total aerobes and tended to have greater (P = 0.13) Lactobacillus populations. Ileal immunoglobulin (Ig) A concentrations were greater (P = 0.05) in dogs supplemented with FOS + MOS vs. control. Lymphocytes (% of total white blood cells) were greater (P < 0.05) in dogs supplemented with MOS. Serum IgA concentrations also tended (P = 0.13) to be greater in dogs supplemented with MOS. Dogs supplemented with FOS and FOS + MOS had lower (P < 0.05) fecal total indole and phenol concentrations. Dogs supplemented with MOS tended to have lower ileal DM (P = 0.149) and OM (P = 0.146) digestibilities vs. control. Results of this study suggest that dietary supplementation of FOS and MOS may have beneficial effects on colonic health and immune status of dogs.

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Fructooligosaccharides and Lactobacillus acidophilus modify gut microbial populations, total tract nutrient digestibilities and fecal protein catabolite concentrations in healthy adult dogs.


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Abstract

The objective of this research was to determine whether fructooligosaccharides (FOS) and (or) Lactobacillus acidophilus (LAC) affected concentrations of gut microbial populations, fermentative end products and nutrient digestibilities in healthy adult dogs. Two experiments were performed using 40 adult dogs (20 dogs/experiment). Dogs in each experiment were randomly assigned to one of 4 treatments. Twice daily, treatments were given orally via gelatin capsules: 1) 2 g sucrose + 80 mg cellulose; 2) 2 g FOS + 80 mg cellulose; 3) 2 g sucrose + 1 x 10(9) colony forming units (cfu) LAC; or 4) 2 g FOS + 1 x 10(9) cfu LAC. Data were analyzed by the General Linear Models procedure of SAS. In Experiment 1, FOS resulted in lower (P = 0.08) Clostridium perfringens and greater fecal butyrate (P = 0.06) and lactate (P < 0.05) concentrations. In Experiment 2, FOS supplementation increased (P < 0.05) bifidobacteria, increased lactobacilli (P = 0.08), increased fecal lactate (P = 0.06) and butyrate (P < 0.05), and decreased (P < 0.05) fecal ammonia, isobutyrate, isovalerate and total branched-chain fatty acid concentrations. Dogs fed LAC had the highest fecal concentrations of hydrogen sulfide and methanethiol in Experiment 1 and dimethyl sulfide in Experiment 2, whereas dogs fed FOS had the lowest concentrations of these compounds. Overall, FOS appeared to enhance indices of gut health by positively altering gut microbial ecology and fecal protein catabolites, whereas LAC was more effective when fed in combination with FOS rather than fed alone.
Supplementation of diets with bovine colostrum influences immune function in dogs.

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Abstract

While the need for colostrum in neonates is well established, the systemic effect of feeding bovine colostrum (BC) to adult humans is gaining increasing attention. However, no systematic studies evaluating the immunomodulatory effect of BC in dogs have been reported. The aim of the present study was to evaluate the immunomodulatory effect of dietary supplementation of BC in dogs. The study was conducted in two phases: pre-test (8 weeks) and test (40 weeks), with twenty-four dogs (mean age 2.5 years) randomised into two groups. In the 'pre-test' phase, both groups were fed a nutritionally complete diet. At the end of the 'pre-test' phase, all dogs received a canine distemper virus (CDV) vaccine, and dogs in the 'test group' were switched to a diet supplemented with 0.1% spray-dried BC. Response to the CDV vaccine was evaluated by measuring vaccine-specific plasma IgG levels. Gut-associated lymphoid tissue response was assessed by measuring faecal IgA levels. Gut microbiota were evaluated by the temporal temperature gel electrophoresis methodology. Dogs fed the BC-supplemented diet demonstrated a significantly higher vaccine response and higher levels of faecal IgA when compared with the control group. Supplementing diets with BC also resulted in significantly increased gut microbiota diversity and stability in the test group. In conclusion, diets supplemented with BC significantly influence immune response in dogs.
Eighteen Beagle dogs were used to evaluate the effects of bovine lactoferrin (bLF) on immune function and faecal microbial populations. The study comprised three feeding periods, each lasting four weeks. After an initial control Period 1, six dogs per group were supplemented with 0, 120 and 1800 mg bLF/kg dry diet, respectively (Period 2). In Period 3 dogs received again control diets. Peripheral blood mononuclear cell subsets, lymphocyte proliferative response to concanavalin A, phytohaemagglutinin and pokeweed mitogen and plasma IgA and IgG concentrations were analysed. The faecal concentrations of aerobic and anaerobic bacteria, Escherichia coli, Clostridium perfringens, Lactobacillus spp. and Bifidobacterium spp. were determined by cultural methods. Supplementation of bLF increased the number of monocytes, T cells and cytotoxic T cells in the blood and the proliferative response of peripheral blood mononuclear cells. The leukocyte counts were not affected, except monocytes that increased after the supplementation with bLF. Plasma immunoglobulin concentrations were unchanged by treatment. Dogs supplemented with bLF tended to have lower faecal concentrations of E. coli and Clostridium perfringens. In conclusion, bLF seems to alter indices of the cellular immune response and faecal microbial populations of healthy adult dogs.
Early exposure to probiotics in a canine model of atopic dermatitis has long-term clinical and immunological effects.

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Abstract

Probiotics modulate the immune response and may have protective effects against atopic dermatitis (AD). Clinical trials using dogs with spontaneous disease are limited by confounding factors such as different diets, environments and sensitizations while a more controlled evaluation is possible using experimental models. A validated model of canine AD showed that early exposure to Lactobacillus rhamnosus GG (LGG) significantly decreases allergen-specific IgE and partially prevents AD in the first 6 months of life. This study is a follow-up three years after discontinuation of LGG. Clinical signs were evaluated after allergen challenge with ragweed, timothy, Dermatophagoides farinae. Allergen-specific IgE, IL-10 and TGF-β were measured on the 1st day of challenge, before allergen exposure. Normal dogs were included as controls. Analyses included seven dogs in the non-probiotic and nine in the probiotic litter. For clinical scores, a 2-Group × 9-Time Analysis of Variance showed significant effects of group (p=0.0003, probiotic<controls), time (p<0.0001) and group × time interaction (p<0.0001). IL-10 for all allergens was significantly higher in the control group than probiotics-exposed dogs. Allergen-specific IgE and TGF-β did not differ between litters. Early exposure to probiotics has long-term clinical and immunological effects in this model and larger studies using dogs with spontaneous disease are needed.