

# Clinical reports

A CLINICAL RESEARCH  
FOR THE VETERINARIAN  
FROM AFFINITY PETCARE

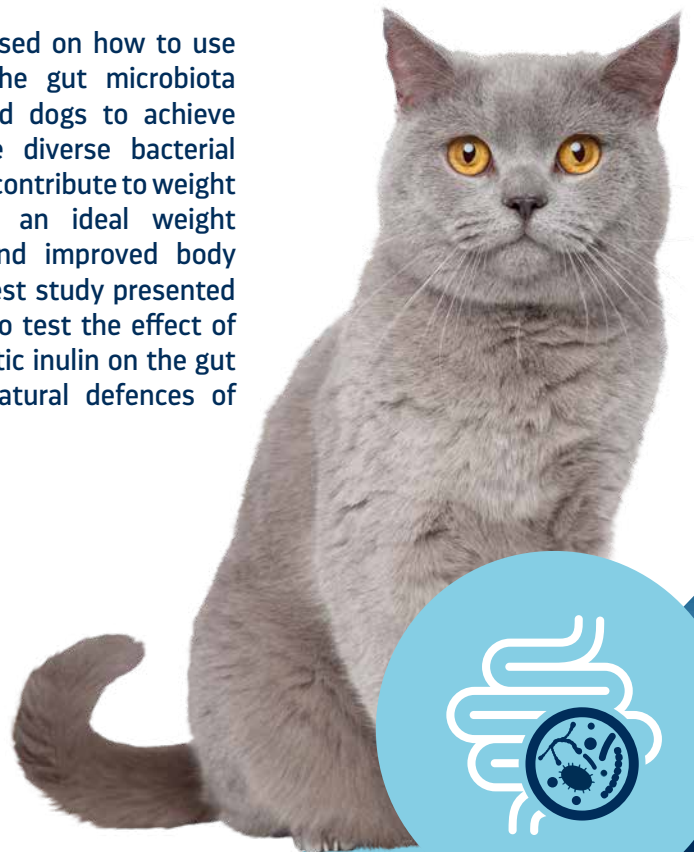
## DIET, MICROBIOTA AND NATURAL DEFENSES

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Gut microorganisms play an essential role in vital physiological functions, such as nutrition, digestion, the immune system, and even mood in cats and dogs.

Diet is one of the key factors to affect the composition of the gut microbiota. This is why Advance has been studying the effects of nutrition on the microbiota of cats and dogs and its contribution to their health for more than 10 years now.

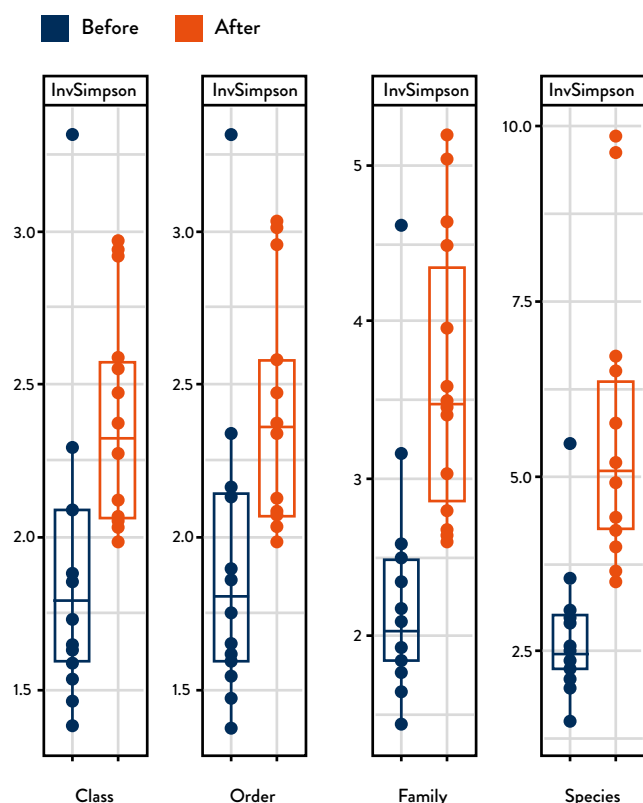
Early studies focused on how to use diet to modify the gut microbiota of obese cats and dogs to achieve a healthier, more diverse bacterial profile that would contribute to weight loss, maintaining an ideal weight once achieved, and improved body condition. The latest study presented here is designed to test the effect of the natural prebiotic inulin on the gut microbiota and natural defences of healthy cats.



## ADVANCE STUDIES ON GUT MICROBIOTA

Previous studies carried out by Affinity evaluated the changes in gut microbiota and body composition in dogs and cats<sup>1,2</sup>. Affinity researchers demonstrated that feeding a low-fat and high fiber diet during 5 weeks successfully modifies gut microbiota in cats<sup>3</sup>. These cats presented an increase in bacterial richness, which is generally associated with a more healthy microbiota<sup>1,3</sup> (Figure 1). In addition, our internal studies have shown that obese cats showed a major representation of bacterial genera with a high energy extraction capacity from complex carbohydrates<sup>1,3,4</sup>. This predominant presence of a specific type of bacteria is what is known as an altered microbiota pattern or intestinal dysbiosis<sup>5</sup>. Similar results have been obtained in overweight and lean dogs<sup>2</sup>.

**FIGURE 1.** Alpha bacterial diversity (Inv Simpson) for class, order, family and species before (blue) and after (orange) after feeding a low-fat and high fiber diet during 5 weeks.



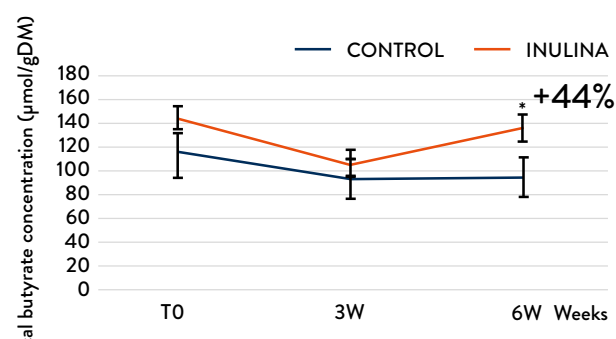
One new study was carried out to confirm the effectiveness of a source of fructan fibers, specifically inulin, in the fecal microbiota and immune response in cats<sup>5</sup>.

In the first part of the study, twenty-six adult neutered male and female cats were fed a complete and balanced diet formulated for adult cats (Control) for one month (T0) before they were randomly allocated to one of two groups. The first group remained with the control

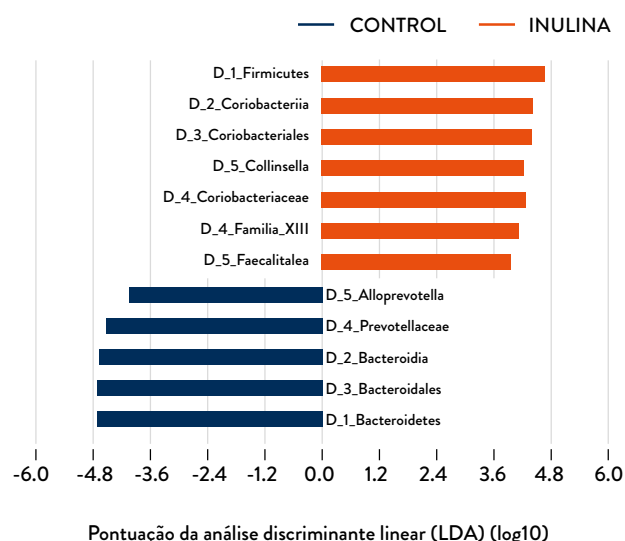
diet and the second group received the same diet supplemented with 0.7% inulin for 6 weeks.

Compared to the control group, the inulin group had higher fecal butyrate concentration after 6 weeks of supplementation ( $137 \pm 51$  vs.  $95 \pm 32$   $\mu\text{mol/g}$  dry matter,  $p = 0.02$ , Figure 2). In addition, the microbiota taxonomy analysis (Figure 3) of the fecal samples showed higher *Firmicutes* phylum (+14%), one of the main butyrate producers, and lower *Bacteroidetes* phylum (-56%), *Prevotellaceae* family (gram-negative bacteria) (-51%) after 6 weeks of inulin supplementation compared to the control group.

**FIGURE 2** Fecal butyrate concentration ( $\mu\text{mol/gDM}$ )



**FIGURE 3** Histogram of microbiota taxonomic groups for differentially abundance distribution ( $\alpha = 0.05$ , LDA score  $> 2$ ) after 6 weeks supplementation.

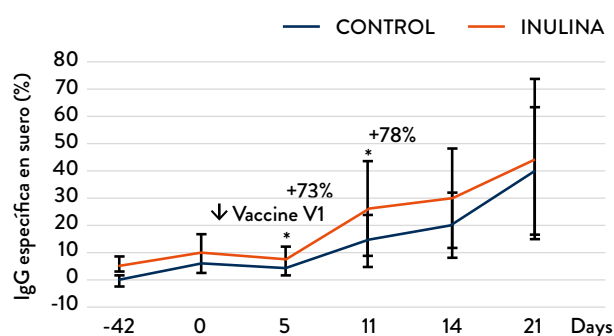


In the second part of the study, after a 6-month washout period with the control diet, the cats were again divided into 2 dietary groups (control vs. 0.7% inulin) (day -42). Six weeks after the change of diet, the cats were primo-vaccinated against the feline leukaemia virus (day 0), with a vaccine booster 21 days after the first dose. Serum specific IgG immune response (anti p45 FeLV antibodies measured by

ELISA) was followed before vaccination (day -42, 0), after first vaccine (day 5, 11, 14, 21) and after booster (day 25, 28, 34, 42, 56).

Compared to the control group, the inulin group tended to have a higher specific serum IgG response after the first vaccination only ( $P=0.09$ ), with significant differences at day 5 ( $6.9 \pm 5.7$  vs  $4.0 \pm 3.2\%$ ,  $P = 0.04$ ) and day 11 ( $25.7 \pm 18.1$  vs  $14.4 \pm 9.6\%$ ,  $P = 0.05$ ) post-vaccination (**Figure 4**). Taken together, these results suggest that a six-week dietary supplementation with a low dose of inulin in cats is able to modify the fecal microbiota and its functional metabolites (butyrate), leading to an earlier immune response after vaccination. Further studies would be useful to better understand the biological significance of these results.

**FIGURE 4** Specific IgG response following vaccination



**Affinity researchers demonstrated that feeding a low-fat and high fiber diet during 5 weeks successfully modifies gut microbiota in cats**

## LITERATURE REVIEW

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