

Probiotic use in dogs and cats – issues and studies into benefits

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present research findings on the efficacy of probiotics, especially in the gastrointestinal system, focusing on conditions where there is evidence of health benefit

PROBIOTICS are defined as “live organisms that when administered in adequate amounts confer a health benefit on the host”.

Many commonly administered veterinary products are often referred to as probiotics, but are technically symbiotic as they contain a combination of both probiotics and prebiotics (in the form of oligosaccharides, which are fermented in the intestine to provide intestinal epithelial cell nutrients). These aid in the correction of abnormalities in normal flora (dysbiosis).

It is widely accepted symbiotics rarely result in any adverse effects (Kelly et al, 2010), although care is required if recommending their use in the immunosuppressed patient (either due to a concurrent morbidity or medication being administered).

The majority of clinical trials assessing the efficacy of probiotics in veterinary patients relate to the gastrointestinal (GI) system. Their use in the UK is particularly common in animals suffering from diarrhoea; a publication showed they were prescribed in up to 26 per cent of cases of acute canine

diarrhoea that presented to vets in general practice (German et al, 2010).

Probiotics have also been evaluated in diseases of the urinary tract, pancreas, kidneys and skin of animals.

In the UK, nutraceuticals are not subject to the same licensing laws as drugs, so there may be significant variation in the efficacy of different products. Use of a veterinary-specific formulation is recommended and careful evaluation of the product literature is essential.

The only probiotic licensed in the European Union for use in canine and feline species is *Enterococcus faecium* NCIMB 10415/SF68.

Canine studies

Gastrointestinal system

A variety of veterinary products are available for treating canine GI disease. These products normally contain both a probiotic bacteria and prebiotic oligosaccharide, alongside other products that may result in resolution of diarrhoea (most notably absorbents such as clay). Thus, attributing a clinical response to the symbiotic alone is difficult, but from a clinical point of view and, more importantly, an owner's perspective, this is probably of little consequence.

Canine acute gastroenteritis

Canine acute gastroenteritis is a very common problem in clinical practice (prevalence of 15 per cent) with around one-quarter of these patients receiving symbiotic therapy (German et al, 2010).

The clinical studies evaluating the use of probiotics in this setting are surprisingly low, with only two placebo-controlled prospective studies identified in the veterinary literature.

One examined the use of a single bacteria (*Bifidobacterium animalis* strain AHC7) in dogs with acute diarrhoea and found a statistically significant reduction in time to resolution of the diarrhoea and the number of patients that received subsequent antibiotic therapy (3.9 +/- 2.3 days versus 6.6 +/- 2.7 days; Kelly et al, 2010).

The other study (Herstad et al, 2010) evaluated a combination thermo-stabilised *Lactobacillus acidophilus* and live strains of *Pediococcus acidilactici*, *Bacillus subtilis*, *Bacillus licheniformis* and *Lactobacillus farciminis* against a placebo in dogs with acute self-limiting gastroenteritis (vomiting and diarrhoea) and again found a statistically significant reduction in time to production of a normal stool (mean 1.3 days and 2.2 days respectively), but no difference in time to resolution of vomiting.

While these studies both have relatively small numbers, and one could argue about the clinical

significance of the results, it appears probiotic therapy is useful in acute canine diarrhoea.

Intestinal parasites

Canine intestinal parasites can represent a source of zoonotic infections for owners. While these conditions are normally treated quickly and effectively with an antiparasiticide, there has been research into the efficacy of probiotics in both the treatment and prevention of infection.

Gonçalves Coelho et al (2013) studied dogs naturally infected with hookworm (*Ancylostoma*) and the efficacy of treatment with various *Lactobacillus* species. The results showed promise – dogs treated with the probiotic showed significant reduction in the eggs per gram of faeces count and significant increase in circulating leukocyte count following 28 days of therapy.

While certainly not replacing treatment with standard therapy, it could be argued probiotics play a role in the treatment of canine hookworm infestation.

Simpson et al (2009) looked at the effect of *Enterococcus faecium* probiotic in giardiasis and found no benefit of short-term therapy (six weeks).

The findings were in contrast to those seen in rodents where the probiotic reduced cyst shedding and antigen shedding due to stimulation of both mucosal and systemic immunity (increased production of IgA and enhanced phagocytosis).

Idiopathic inflammatory bowel disease

One of the suggested aetiologies underlying canine idiopathic inflammatory bowel disease (IBD) is intestinal dysbiosis (in particular with favour towards Gram-negative bacteria) and reduction in commensal bacteria leading to an aberrant immune response.

Only one recent study examines the use of probiotics in canine idiopathic IBD (Rossi et al, 2014). This paper compared the microbiological, histological and immunomodulatory parameters in 20 dogs with idiopathic IBD treated with either a combination therapy (prednisolone and metronidazole) or a probiotic alone (a combination of *Lactobacillus*, *Bifidobacterium* and *Streptococcus*).

The results are interesting in that both groups of dogs demonstrated a similar statistically significant reduction in the clinical disease activity – using the canine IBD activity index (CIBDAI) score, histological score (WSAVA scoring system) and degree of mucosal infiltration with CD3+ T-cells. The results of this study suggest probiotics may have a useful role in the management of canine idiopathic IBD.

Food-responsive enteropathies

Sauter et al (2006) examined the use of a *Lactobacillus* in dogs with food responsive diarrhoea. The aim was to evaluate the impact of the probiotic when administered alongside a novel protein-based diet on disease severity (CIBDAI score) and inflammatory cytokine expression. While no obvious benefit was found supporting the use of probiotics in canine food-responsive diarrhoea, the authors were able to demonstrate the supplemented bacteria were able to survive, at least to some extent, in the canine GI tract.

Dermatological disease

Human studies examining the use of probiotics as a treatment for atopic dermatitis have shown some promising results. A canine model of the disease demonstrated early exposure to *Lactobacillus rhamnosus* significantly decreases allergen-specific IgE and partially prevents clinical signs developing over a follow-up period of three years (Marsella et al, 2012). While no treatment recommendations for dogs with atopic dermatitis can be given at this time, future work examining this may be forthcoming.

Urogenital disease

Studies in women have demonstrated patients with recurrent urinary tract infections (UTIs) often have depletion of the normally predominant *Lactobacillus* species and an increased vaginal colonisation with this bacteria have a reduction in recurrence.

Lactobacillus species produce lactic acid and their presence may decrease vaginal pH, thus inhibiting colonisation of uropathogenic bacteria.

Hutchins et al (2013) examined the use of a probiotic containing *Lactobacillus*, *Bifidobacterium* and *Bacillus* species in 35 female neutered beagles with no previous history of recurrent UTIs. Results of the study did not support the use of probiotics in canine recurrent UTIs and actually found there was no increase in the prevalence of *Lactobacillus* in the vagina of dogs receiving this supplement over a four-week period.

Feline studies

The evidence to support the use of symbiotics in feline medicine is more limited, with the majority of studies investigating the effect on the GI tract in both healthy and unhealthy cats. The most relevant studies are discussed; however, this is a very active area of ongoing research, with further studies likely to be published in the near future.

Gastrointestinal disease

Bybee et al (2011) performed a double-blinded placebo study examining the effect of *Enterococcus faecium* SF68 on diarrhoea in shelter cats.

Results showed the percentage of cats with greater than two days of diarrhoea was statistically lower in those receiving the probiotic when compared to the placebo. The aetiology of the diarrhoea was not confirmed in the majority of cases, with similar parasitic infection rates between cats with and without diarrhoea.

Dogs were also assessed in the study, but there was no statistical difference between the rate and duration of diarrhoea in the dogs treated with the probiotic versus those that received a placebo. While the results are promising and could be extrapolated to cats with acute diarrhoea in practice, further work in this area is warranted.

A research abstract was presented by Lalor et al (2012) assessing the effect of concurrent ronidazole and probiotics therapy in 26 cats with *Tritrichomonas foetus*-associated diarrhoea. This prospective, double-blinded, placebo-controlled trial found cats receiving a symbiotic containing *Enterococcus faecium* NCIMB 10415 E 1707 were less likely to relapse when compared to those receiving a placebo.

Respiratory infection

The use of *Enterococcus faecium* SF68 was assessed by Lappin et al (2008) in 12 cats with FHV-1. The authors hypothesised that episodes of clinical disease, episodes of FHV-1 shedding and numbers of FHV-1 DNA copies shed would be reduced in cats receiving the probiotic, compared to those receiving a placebo.

Although not statistically significant, the authors reported the six cats receiving the probiotic tended to have fewer days with conjunctivitis than the six cats receiving a placebo. No difference between the shedding and numbers of FHV-1 DNA was detected between the two groups. The results of this study should be interpreted with caution given the small numbers.

Interestingly, in human medicine, a systematic review into the use of probiotics by Vouloumanou et al (2009) in the prevention of respiratory tract infections concluded probiotics may have a beneficial effect on the severity and duration of symptoms, but did not appear to reduce the incidence of infection.

Conclusion

Mounting evidence exists in both the human and veterinary field that probiotics can be beneficial in a wide variety of conditions. Given the lack of substantial side effects, probiotics should be considered in certain situations when treating dogs with GI disease and with dermatological disease and cats with GI disease and respiratory tract infections.

It is likely developments over the coming years will provide greater understanding into the mechanisms of action and the specific indications in canine and feline medicine.

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