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INTRODUCTION
A dysbacteriosis or dysbiosis refers to an alteration of the small intestinal bacterial ecosystem. It has long been recognized that a small intestinal dysbiosis can lead to clinical signs of gastrointestinal disease. However, this condition has only been poorly characterized and there are still questions about the correct terminology. While some clinicians prefer the term antibiotic-responsive diarrhea, others prefer the term tylosin-responsive diarrhea, and yet others prefer the term small intestinal bacterial overgrowth. These terms likely all refer to the same condition and may be best summarized by the term small intestinal dysbiosis. However, it should be recognized that not all patients with small intestinal dysbiosis respond to antibiotics in general or to tylosin more specifically, and not all patients with a small intestinal dysbiosis have an overgrowth of bacteria, but may rather have an alteration of the species present.

The primary therapeutic goal in dogs with a small intestinal dysbiosis is the identification and treatment of a potential underlying cause. For example, serum TLI concentration should be evaluated. Dogs with EPI and a secondary small intestinal dysbiosis usually do not require specific therapy for the dysbiosis once they are treated with enzyme supplementation. In patients where an underlying cause cannot be identified, a small intestinal dysbiosis can be treated with prebiotics, probiotics, or antibiotics.

PREBIOTICS
Prebiotics are substances that preferentially support the resident bacterial ecosystem of the intestine. Basically, prebiotics are non-digestible food components (dietary fibre) that are being fermented by intestinal bacteria. This can lead to normalization of the intestinal microbiota. In a recent study the use of fructooligosaccharides (FOS) in the diet showed a lasting advantageous effect. While this has not been evaluated as of yet, other prebiotics, such as inulin or beet-pulp may also prove to be beneficial.

PROBIOTICS
Probiotics have garnered a lot of interest in both human and veterinary medicine. Initially, probiotics were mostly embraced by holistic physicians and veterinarians and the expectations for probiotics were
dramatic, with probiotics being hypothesized to be of benefit in disorders ranging from stress to gastrointestinal health, weight management, and even the prevention of cancer. These unrealistic expectations have been replaced with well-defined requirements for probiotics and controlled studies of their beneficial effects.

The three key requirements for a probiotic for use in dogs are: 1) the probiotic must be safe; 2) the probiotic must be stable; and 3) the probiotic must be efficacious. In a recent study, 8 veterinary and 5 human probiotics were evaluated and only 2 of the 13 products contained the strains and concentrations of those strains indicated on the label. Several of the products contained bacterial species that could potentially act as pathogens. Thus, in order to ensure safety, the probiotic product should adhere to strict production and storage requirements. The probiotic also must be stable throughout transport and storage until the product is being administered by the pet-owner. In order to ensure that a certain number of colonies are administered to the patient, the colonies in the product should neither proliferate nor die. Finally, a probiotic must be efficacious. In order to be efficacious, the bacteria must reach the intestinal lumen. This requires that the bacterial species being used in the formulation are both acid- and bile-acid-resistant. Also, the bacterial species of the probiotic preparation should adhere to the intestinal mucosa to prolong the time of interaction. Finally, the presence of the probiotic species must have beneficial effects in the host. Several controlled studies have been conducted in dogs that also show that certain probiotics carry health benefits in dogs with gastrointestinal disorders.

**ANTIBIOTICS**

Oxytetracycline (10-20 mg/kg BID to TID for 4-6 weeks) used to be the therapy of choice. Unfortunately, oxytetracycline for oral use has become largely unavailable. Tylosin (25 mg/kg BID for 6 weeks) is the new antibiotic agent of choice. Other antibiotics, such as metronidazole can also be used. Some dogs respond to therapy rapidly and do not have a recurrence. However, other dogs do not respond to antibiotic therapy alone. If there is no marked improvement after 2 weeks of appropriate antibiotic therapy further work-up is necessary. Some dogs may respond to therapy with a complete resolution of clinical signs but may have a recurrence of clinical signs as soon as antibiotic therapy is discontinued. These patients require further diagnostic work-up. In some of these patients a specific underlying cause of the dysbiosis can be identified and treated accordingly. However, in some dogs no specific cause can be identified and prolonged, maybe even life-long, antimicrobial therapy is required.

**SUPPORTIVE THERAPY**

If serum cobalamin concentration is decreased below the lower limit of the reference range cobalamin should be supplemented parenterally.

**REFERENCES**