

## Canine Microbiota Dysbiosis Index



The Dysbiosis Index (DI) is a rapid PCR based assay that quantifies the abundances of 8 bacterial groups and summarizes them in one single number. As a secondary interpretation, the individual microbial profile can predict normal or abnormal conversion of fecal bile acids (i.e., lack of conversion of primary to secondary bile acids). Both interpretations will be listed on the results form.

### Sample requirements:

Approximately 1 gram of feces (size of one grape) is needed. Samples must remain **cold** until receipt in the lab. Ship samples by overnight courier with frozen gel ice packs. Samples can be stored in the refrigerator over the weekend if you cannot ship by Thursday (lab personnel are not here on weekend to receive samples) Results will be reported within 2 days.

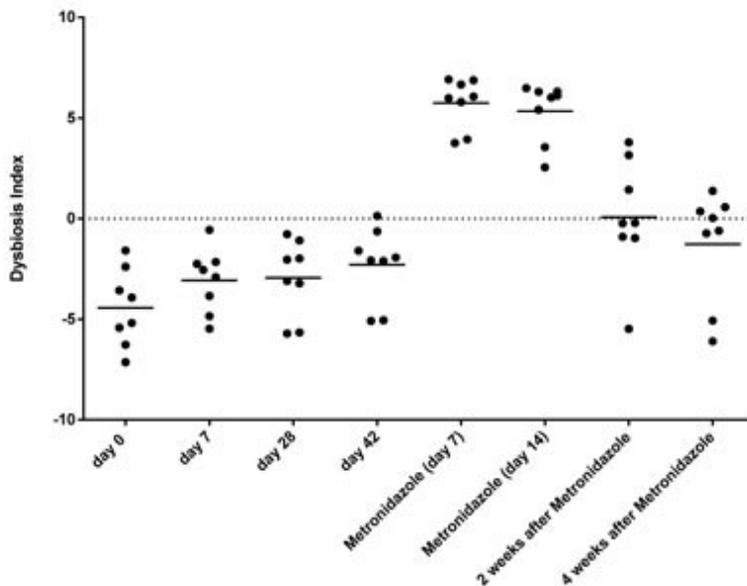
See [Collections and Shipping information for fecal PCR, IFA and Bacterial Toxin Assays for more information](#)

**A DI below 0 indicates normal fecal microbiota**

**A DI of 0 or above indicates fecal dysbiosis**

An increase in the Dysbiosis Index is observed in

- dogs with chronic enteropathy (food-responsive and antibiotic-responsive diarrhea, idiopathic IBD)
  - due to residual histological inflammation, the Dysbiosis Index may stay increased for several months, despite reduction in CIBDAI
  - dysbiosis is a component of chronic enteropathies, and the presence of dysbiosis does not predict to which therapy a dog will respond best (i.e., also dogs with food-responsive diarrhea may have an increased Dysbiosis Index)
  - a small subset of dogs with acute diarrhea may have a  $DI > 0$ , but the microbiota normalizes typically within 7-14 days ( $DI < 0$ )
- exocrine pancreatic insufficiency (EPI)



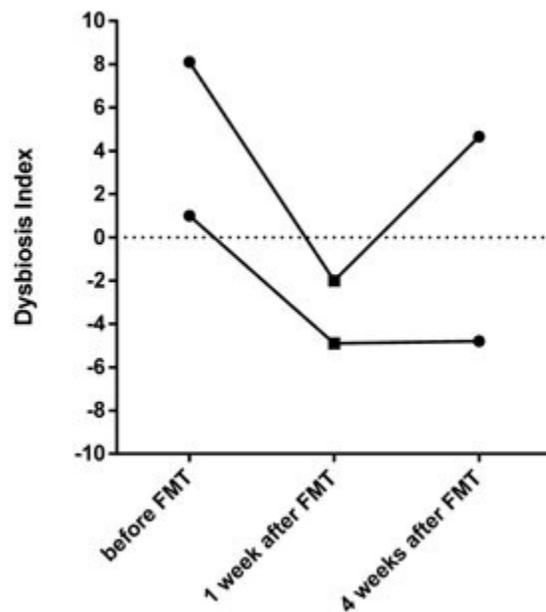
- antibiotic-induced dysbiosis - in most dogs, the microbiota recovers within a few weeks after cessation of antibiotic administration, but some dogs may have prolonged microbiota dysbiosis, potentially causing signs of intestinal disease
- approximately 15% of clinically healthy dogs have an increased Dysbiosis Index and/or abnormal bile acid conversion, with most falling in the equivocal range between 0 and 2

**Figure 1. The fecal microbiota was assessed in healthy dogs over 42 days. The Dysbiosis Index is below 0, indicating normal microbiota.**

Administration of metronidazole, started at day 42 and given orally for 14 days,

induced intestinal dysbiosis, as indicated by an increase in the Dysbiosis Index. In most dogs, the microbiota recovers within a few weeks of end of antibiotic administration, but some dogs may have prolonged microbiota dysbiosis.

**Figure 2. The Dysbiosis Index in 2 dogs with chronic diarrhea before and after Fecal Microbiota Transplantation (FMT).** Both dogs had also predicted abnormal bile acid conversion. The FMT procedure leads to a normalization in the Dysbiosis Index, that was also associated with normalization of fecal bile acid metabolism. Depending on the underlying disease process, the microbiota may remain normal or return to a dysbiotic state. The Dysbiosis Index is helpful in monitoring the microbiota before and after FMT, and may also be useful to screen dogs as potential donors for normal microbiota and bile acid metabolism, as the normalization of fecal bile acid conversion has been associated with beneficial outcome after FMT in humans with *C. difficile* infection.



#### References:

- Suchodolski JS.** Diagnosis and interpretation of intestinal dysbiosis in dogs and cats. *Vet J Sep*;215:30-7, 2016
- AlShawaqfeh M, Wajid B, Guard M, Minamoto M, Lidbury JA, Steiner JM, Serpedin E, **Suchodolski JS.** A Dysbiosis Index to Assess Microbial Changes in Fecal Samples of Dogs with Chronic Enteropathy. *J Vet Intern Med* 30:4, p1536, 2016
- Suchodolski JS,** Olson E, Honneffer JB, Guard B, Blake A, AlShawaqfeh M, Steiner JM, Barr J, Gaschen F. Effects of a hydrolyzed protein diet and metronidazole on the fecal microbiome and metabolome in healthy dogs. *J Vet Intern Med* 30:4, p1455, 2016
- Guard B, Toresson L, Honneffer JB, Blake A, Lawrence Y, Lidbury JA, Steiner JM, **Suchodolski JS.** Altered fecal bile acid metabolism in dogs with chronic enteropathy. *J Vet Intern Med* 30:4, p1455, 2016
- Weingarden AR, Chen C, Bobr A, Yao D, Lu Y, Nelson VM, Sadowsky MJ, Khoruts A. Microbiota transplantation restores normal fecal bile acid composition in recurrent *Clostridium difficile* infection. *Am J Physiol Gastrointest Liver Physiol.* 15;306(4):G310-9, 2014
- Gerbec Z. [Evaluation of therapeutic potential of restoring gastrointestinal homeostasis by a fecal microbiota transplant in dogs.](#) MS thesis, University of Ljubljana, Slovenia, 2016