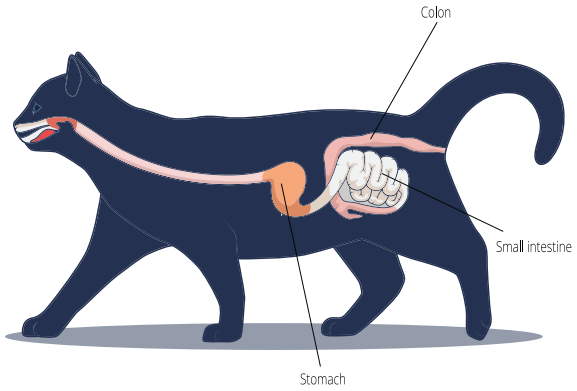
Clinical Evidence Report

Hill's Prescription Diet products with ActivBiome+ Digestion help manage gastrointestinal health in cats and dogs

The gastrointestinal tract is inhabited by communities of microorganisms essential to host health. These microorganisms are referred to as the microbiome, and the exact population of micoorganisms is unique to each host.

These bacteria are functionally and compositionally diverse, allowing contribution to energy homeostasis, metabolism, gut epithelial cell health and immunologic activity. This population is not static and can change due to medications such as antibiotics, environmental factors, disease states and dietary influences. Additionally, it is common to see dysbiosis (imbalance in the gastrointestinal microbiome) in chronic GI disease in cats and dogs.



Over the past several years, Hill's has focused heavily on studying the microbiome, characterizing bacterial populations of the gastrointestinal tract of cats and dogs. Most critically, Hill's has performed analyses to understand the functions of those bacteria in the gastrointestinal tract.

Hill's has found that a pet's gastrointestinal health can be impacted by ActivBiome+ Digestion, a blend of synergistic prebiotic fibers that works with each pet's unique gastrointestinal microbiome.

WHAT IS ACTIVBIOME+ DIGESTION?

Products within the Hill's Prescription Diet GI portfolio contain ActivBiome+. **This is a proprietary blend of synergistic prebiotic fibers that works with and is utilized by each pet's unique bacteria in the large intestine, allowing the beneficial bacteria to flourish and produce postbiotics** (metabolic products of microbial metabolism) to help the host. By promoting the growth of desirable bacteria, it also helps to reduce the growth of potentially undesirable bacteria and their metabolites. The fiber sources in ActivBiome+ Digestion were selected because they have multiple functions and have fiber-bound polyphenols. The microbes ferment the fibers and produce gut-nourishing compounds, releasing and activating antioxidants and anti-inflammatory polyphenols. These postbiotics benefit the gut as well as other organs and tissues.

How does ActivBiome+ Digestion improve gastrointestinal health?

A series of studies at Hill's Pet Nutrition Center (PNC) were conducted to demonstrate how ActivBiome+ Digestion works, clinically showing improvements when this synergistic blend of prebiotic fibers was added to certain foods. **Both dogs and cats showed improvements in markers of gastrointestinal microbiome health**. Dogs also showed improvements in stool quality.[1,2]

One canine feeding study evaluated the benefits of ActivBiome+ Digestion in healthy dogs (n=16) and in dogs with chronic, recurrent enteritis or gastroenteritis (n=16) in a randomized, crossover design study. ActivBiome+ Digestion was added to either a hydrolyzed meat food (Food A, Fig 1) or grain-rich food (Food B, Fig 2) and fed over a 56-day period. **All dogs had significant improvements in stool quality, including those with chronic enteritis/gastroenteritis, when given food that included the ActivBiome+ Digestion fiber blend**.[2]

ActivBiome+ Digestion Improved Stool Quality in All Dogs

Fig 1

Food A

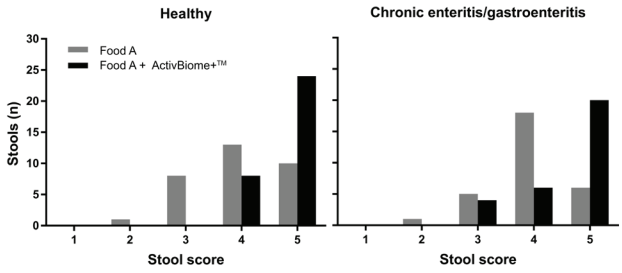
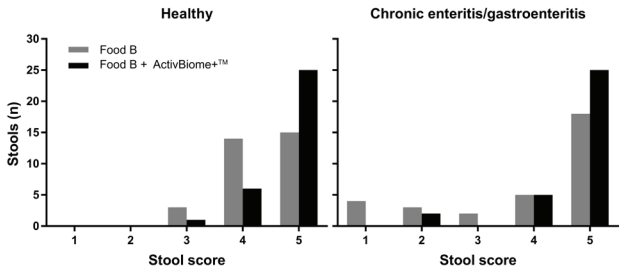


Fig 2

Food B



Figures 1 and 2 illustrate the changes in stool quality among all dogs consuming this fiber blend. By the end of 4 weeks, the stool quality score of the dogs with chronic enteritis/gastroenteritis had improved to the point that they were no longer significantly different from the healthy dogs.

Additionally, a significant increase in beneficial bacteria taxa (e.g., Lachnospira sp., Fig 3) and a decrease in harmful bacteria taxa (e.g., Desulfovibrio sp.) was observed. **This positive change in the microbiome leads to an increase in the production of helpful postbiotics. ActivBiome+ Digestion also significantly increased fecal levels of numerous other helpful postbiotics, including certain polyphenols and short-chain fatty acids (SCFAs)**. The SCFAs help reduce fecal pH, creating an environment that favors the growth of beneficial bacteria in the host. Potentially harmful postbiotics (fecal polyamines such as putrescine and spermidine) were also measured and were reduced by the addition of ActivBiome+ Digestion.[2]

ActivBiome+ Digestion Shifts the Microbiome to a Healthier Balance

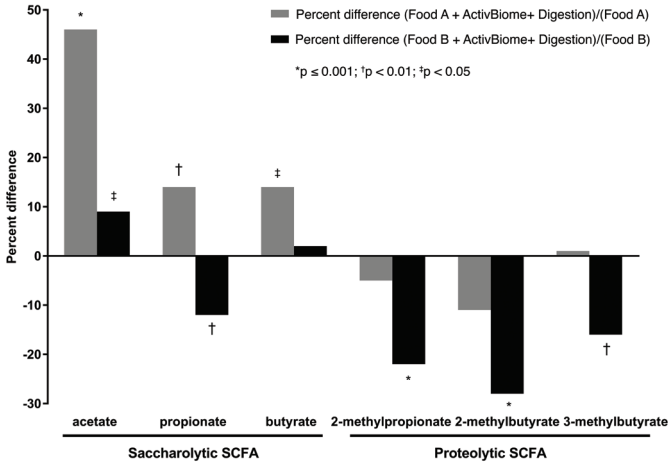
Fig 3

Genus	Food A %Change w/ActivBiome+ Digestion	Food A p=	Food B %Change w/ActivBiome+ Digestion	Food B p=
Lachnospira	↑ 330	0.001	↑ 285	0.001
Desulfovibrio	↓ 86	0.03	↓ 30	0.04

- ↑ Saccharolytic bacteria and those involved in polyphenol catabolism
- ↓ Some detrimental proteolytic bacteria or those involved in inflammatory activity

ActivBiome+ Digestion Increases Healthy Short-Chain Fatty Acids

Fig 4



Similar to dogs, the feline research done at the PNC on 28 healthy cats showed that ActivBiome+ Digestion helped create a more positive gastrointestinal microbiome environment. There was a significant increase in beneficial bacteria. There was also a significant increase in key postbiotics such as SCFAs (acetic & propionic acids) from fiber fermentation and a decrease in fatty acids (isobutyric, 2-methylbutyric & isovaleric acids) from protein breakdown (Fig 4). Increased stool moisture and decreased pH were also achieved while maintaining acceptable stool scores.[1]

ACTIVBIOME+ DIGESTION

ActivBiome+ Digestion has been tested in both cats and dogs and provides numerous benefits.

- **Nourishes** the pet's individual gut microbiome and promotes a beneficial microflora
- **Activates** the microbiome to release and convert fiber-bound polyphenols into more potent anti-inflammatory and antioxidant postbiotics
- **Increases** short-chain fatty acid production to nourish colon cells
- **Promotes** healthy stool quality in healthy dogs and dogs with enteritis[2]

Hill's PRESCRIPTION DIET

HillsVet.com/GI

[1]Hills data on file

[2]Matthew I. Jackson & Dennis E. Jewell (2018) Balance of saccharolysis and proteolysis underpins improvements in stool quality induced by adding a fiber bundle containing bound polyphenols to either hydrolyzed meat or grain-rich foods, Gut Microbes, DOI: https://doi.org/10.1080/19490976.2018.1526580