Healthy Holistic
BLUE NATURAL Veterinary Diet®
VOLUME NO. 2

BLUE BUFFALO CLINICAL REPORT

Clinical Evidence for: GI Gastrointestinal Support

KEY POINTS

1. BLUE Natural Veterinary Diet GI Gastrointestinal Support food results in a 29% quicker resolution of acute diarrhea in dogs and cats.

2. Multiple findings support that BLUE Natural Veterinary Diet GI provides an ideal approach for nutritionally managing pets with gastrointestinal conditions:
   - Rich in omega-3 fatty acids to help reduce inflammatory response of intestinal mucosal cells
   - High digestibility for quick resolution of diarrhea
   - Prebiotic and mixed fibers to nourish intestinal cells and support growth of beneficial bacteria
   - Preferred palatability
   - Ingredients preferred by clients

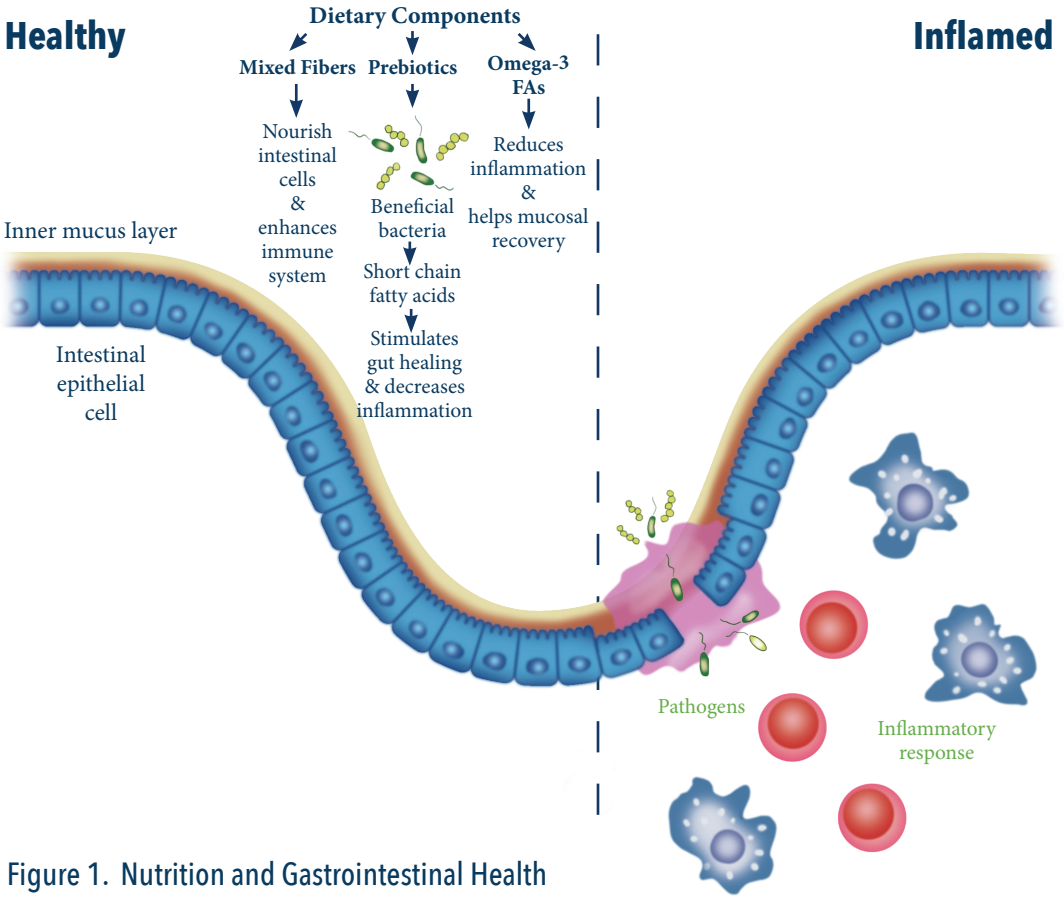


Figure 1. Nutrition and Gastrointestinal Health

BLUE Natural Veterinary Diet GI Gastrointestinal Support for Dogs and Cats

Gastrointestinal disease is a common reason for consultation in veterinary practice and can manifest in a variety of clinical symptoms. A number of acute and chronic enteropathies are recognized including gastritis, inflammatory bowel disease (IBD), protein-losing enteropathy, exocrine pancreatic insufficiency, colitis, pancreatitis and constipation. Currently, inflammatory bowel disease is considered the most common cause of chronic diarrhea and vomiting in dogs and cats.[1, 2] While the etiology of the disease may not be definitively identified in a particular case, the treatment and management of the condition typically revolves around eliminating the cause, controlling the symptoms and aiding the recovery of the gastrointestinal system. In addition to pharmacological and antimicrobial interventions, nutritional management has been clinically proven to help resolve and even control future relapses of gastrointestinal conditions.[3] Controlling inflammation associated with a disease is essential for successful outcomes and is a key aspect of nutritional management. Additionally, enhancing the functional ability of the organ systems to repair and restore to a healthy state is often where nutritional intervention can provide the most significant impact.

OPTIMAL NUTRITION TO MANAGE GASTROINTESTINAL CONDITIONS:

1) THE RIGHT NUTRIENTS FOR A HEALTHY GI TRACT

Critically important aspects of managing gastrointestinal disease include short-chain fatty acids, mixed fiber sources and omega-3 fatty acids (See Figure 1). Short-chain fatty acids are the principal end-products of bacterial fermentation of dietary fibers and have profound effects on normal intestinal cell metabolism and proliferation. Short-chain fatty acids have the potential to improve overall intestinal health, stimulate intestinal healing, and decrease intestinal inflammation.[4] Mixed fiber sources help nourish intestinal cells and promote a balanced and healthy intestinal bacterial population, modify intestinal pH, enhance the immune system, and inhibit the growth of intestinal pathogens to promote optimal stools and reduce diarrhea.[5-8] Omega-3 fatty acids may also be useful to reduce intestinal immune cell damage and inflammation as well as protected against the damage of colitis.[9, 10] There is evidence that the gastrointestinal mucosa is highly responsive to long-chain polyunsaturated fatty acids such as omega-3s.[11] The intake of omega-3s can be helpful in the treatment of gastrointestinal conditions as it can alleviate the symptoms and help the recovery of the mucosal due to its anti-inflammatory properties.[12, 13]

STUDY: RESOLVING ACUTE DIARRHEA

PURPOSE

The following studies were conducted to show that feeding BLUE Natural Veterinary Diet GI Gastrointestinal Support can improve stool quality and speed the resolution of acute diarrhea in dogs and cats.

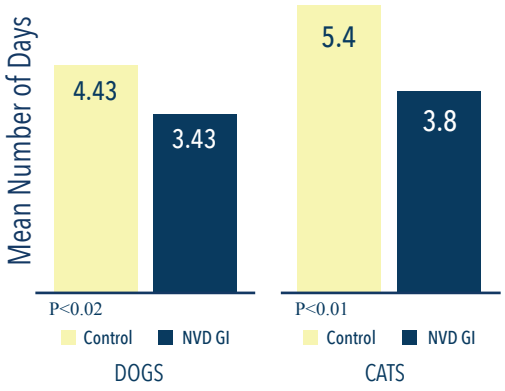
STUDY DESIGN

Dogs and cats older than 8 weeks that developed diarrhea on arrival at an animal shelter were fed either a species-appropriate control diet (leading dry pet food) or BLUE Natural Veterinary Diet GI food for 7 days in a randomized blind study. The Canine Acute Diarrhea Study included 21 dogs in the control group and 21 dogs in the BLUE Natural Veterinary Diet GI group. The Feline Acute Diarrhea Study included 20 cats in the control group and 30 cats in the BLUE Natural Veterinary Diet GI group. Animals selected were otherwise clinically healthy and both groups were managed in the same manner. Twice daily stool quality assessments including average daily scores and clean up characteristics were recorded. Stool samples were scored based on a numerical scale. Stools were further characterized as "pick up" with a score 4 or less, and "wipe up" when the score was 5 or more. Time to resolution of diarrhea was determined for each animal as the number of days from day 0 (initiation of feeding) to achieving a stool score of 3 (ideal). Food intake and general health was assessed twice daily.

RESULTS[14]

Dogs fed BLUE Natural Veterinary Diet GI food had mean time to diarrhea resolution of 3.43 days vs. 4.43 days for the control fed dogs, a 29% quicker resolution of diarrhea (P<0.02). Cats fed BLUE Natural Veterinary Diet GI food had mean time to diarrhea resolution of 3.8 days vs. 5.4 days for the control fed cats, a 29% quicker resolution of diarrhea (P<0.01). Results of monitoring general health, food intake, body weight, and blood variables were within normal ranges.

CHART 1. LESS TIME TO DIARRHEA RESOLUTION



STUDY: IMPROVING CHRONIC DIARRHEA IN CATS WITH INFLAMMATORY BOWEL DISEASE

PURPOSE

This study was conducted to show that feeding BLUE Natural Veterinary Diet GI Gastrointestinal Support can improve stool quality in cats with chronic diarrhea due to inflammatory bowel disease.

STUDY DESIGN

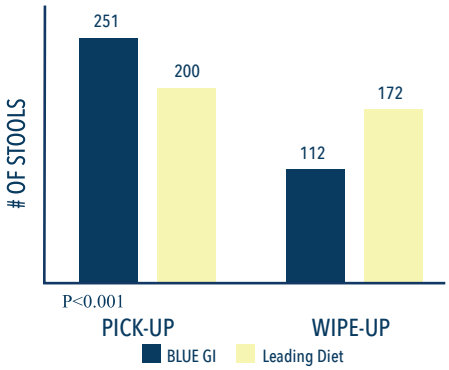
23 adult cats with clinical signs of inflammatory bowel disease including chronic diarrhea were recruited for a cross-over feeding study. These cats were residents of a commercial research facility. All cats were screened for pancreatic disease via assessment of fTLI (feline trypsin-like immunoreactivity) and fPLI (feline pancreatic lipase immunoreactivity)[15] at Texas A&M laboratory and 3 cats with elevated values were excluded. Twenty cats were assigned to the treatment (BLUE Natural Veterinary Diet GI food) or control (leading dry cat food) diet phase for 28 days, then switched to the opposite diet phase, in a cross-over design. Food was offered once daily and available for 20 hours. No other treatments were administered during the study and both groups were managed in the same manner.

The following variables were evaluated during the study. Stool quality was assessed daily and an average stool score was determined for each cat. Stool samples were scored based on a 1 to 5 scale, with scores of 1 through 3 considered "pick up" and 4 through 5 considered "wipe up." Food intake was monitored daily and body weight weekly. Blood samples were analyzed on day 0 and at the end of each 28-day diet phase for: CBC, serum biochemistry, fTLI and fPLI, cobalamin and folate (day 0 only.)

RESULTS[14]

Cats with chronic diarrhea fed BLUE Natural Veterinary Diet GI food had significantly (P<0.001) more stools characterized as "pick up" and fewer stools characterized as "wipe up", compared with those fed the control diet.

CHART 2. IMPROVED STOOL QUALITY IN CATS WITH CHRONIC DIARRHEA



2) ENHANCED DIGESTIVE EFFICIENCY

Feeding highly digestible foods provides several advantages in the management of dogs and cats with IBD.[1, 2] Highly digestible foods are associated with reduced osmotic diarrhea, reduced production of intestinal gas and decreased antigen loads.[16, 17]

STUDY: NUTRIENT ANALYSIS AND DIGESTIBILITY

PURPOSE

Prove that BLUE Natural Veterinary Diet GI Gastrointestinal Support is a highly digestible food for both dogs and cats.

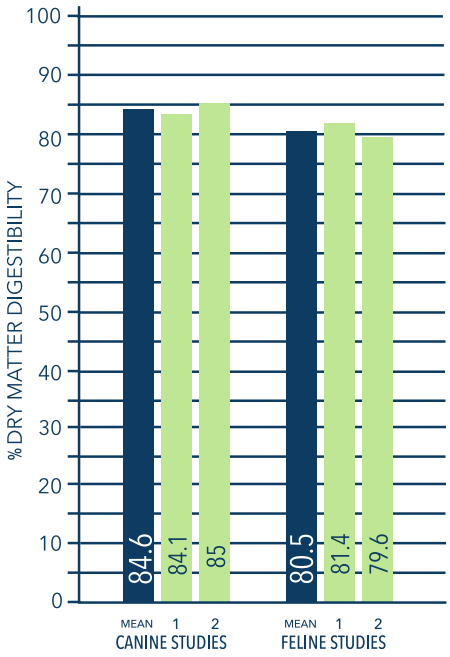
STUDY DESIGN

Two groups of adult dogs (n=6 each for Canine Digestibility Studies 1 and 2) and 2 groups of adult cats (n=7 each for Feline Digestibility Studies 1 and 2) from a commercial research facility were enrolled in the studies. All animals selected were clinically healthy. Animals were individually fed the species-appropriate BLUE Natural Veterinary Diet GI food once daily as their sole source of nutrition for 10 days. Animals were maintained individually in standard, species-appropriate housing and managed consistently during the study, including providing access to activity/exercise. Food consumption was monitored daily and body weights were recorded on days 1 through 6 and on day 10. On the last day of the study, a fecal sample from each animal as well as a sample of the BLUE Natural Veterinary Diet GI food was sent to a commercial laboratory for nutrient analysis. The results of these analyses were used to calculate digestibility values, including dry matter digestibility. Digestibility analysis was performed according to the recommended protocol for use in the determination of metabolizable energy of pet food as defined by AAFCO.[18]

RESULTS[14]

Mean results from two studies in each species showed that BLUE Natural Veterinary Diet GI is highly digestible.

CHART 3. DIGESTIBILITY RESULTS



STUDY: DETERMINING STOOL QUALITY

PURPOSE

These 4 studies were conducted to show that feeding BLUE Natural Veterinary Diet GI Gastrointestinal Support can result in ideal stool quality (fecal consistency) in healthy dogs and cats.

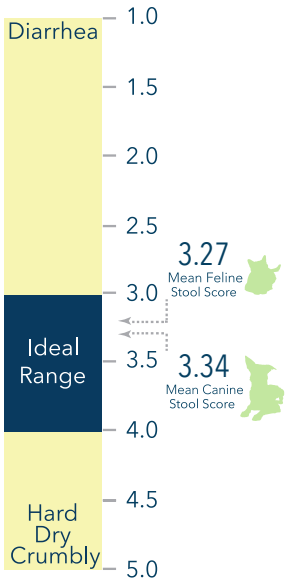
STUDY DESIGN

Two groups of adult dogs and 2 groups of adult cats (n=10 each for Canine Stool Quality Studies 1 and 2 and for Feline Stool Quality Studies 1 and 2) from a commercial research facility were enrolled in the studies. All animals selected were clinically healthy. Animals were individually fed the species-appropriate BLUE Natural Veterinary Diet GI food once daily as their sole source of nutrition for 7 days. For cats, food was made available over a 4-hour period. Animals were maintained individually in standard, species-appropriate housing and managed consistently during the study, including providing access to activity/exercise. Food consumption was monitored daily and body weights were recorded prior to study initiation and on study days 1, 3 and 5. Stool quality observations were made at least twice daily and scores were recorded. The scoring scale ranged from 1 for diarrhea to 5 for hard, dry crumbly feces and was aided by photographs of examples. In this study, a stool score between 3 and 4 is considered to represent ideal fecal consistency for dogs and cats.

RESULTS[14]

Overall, feeding BLUE Natural Veterinary Diet GI food in both dog and cat studies resulted primarily in moist, formed (score of 3) or well-formed, sticky (score of 3.5) stools.

FIGURE 2. STOOL QUALITY SCORING



3) HIGH PALATABILITY

Because of its impact on compliance and acceptability, high palatability is an important component of the nutritional approach to gastrointestinal conditions. Studies show cats prefer BLUE Natural Veterinary Diet GI food over the leading gastrointestinal therapeutic pet food.[19]

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STUDY: PALATABILITY TESTING UTILIZING TWO-PAN STANDARD ASSAY TECHNIQUES

PURPOSE

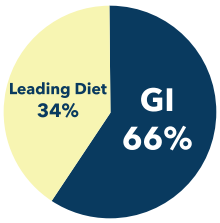
Compare responses of cats to BLUE Natural Veterinary Diet GI Gastrointestinal Support palatability versus the leading gastrointestinal therapeutic cat food.[19]

STUDY DESIGN [20, 21]

Thirty adult cats were enrolled in the studies. All animals selected were from calibrated palatability panels and were clinically healthy. Cats were maintained individually in standard, species-appropriate housing and managed consistently during the study, including providing access to activity/exercise. Per standard protocol, each cat was individually offered 2 stainless steel bowls, one containing 100 g of BLUE Natural Veterinary Diet GI food and the other 100 g of the leading gastrointestinal therapeutic pet food (leading diet) once daily for 2 days. Bowl placement was reversed daily and both bowls were presented for 4 hours. If one diet was completely consumed prior to the end of the 4 hours, both bowls were removed. Food consumption was recorded for each cat and each diet on each day.

RESULTS[14]

CHART 4.
FELINE PALATABILITY
INTAKE RATIO



Cats consumed significantly ($P<0.001$) more BLUE Natural Veterinary Diet GI food than the leading therapeutic brand.

4) CLIENT INGREDIENT PREFERENCE

PET OWNER INSIGHTS[22]

In a survey of 300 pet owners, owners report that they prefer the top ingredients in BLUE Natural Veterinary Diet GI food 5 to 1 over the ingredients in the leading therapeutic GI diet. Meeting client needs and preferences is key to encouraging increased client compliance.

CLINICAL IMPACT

The studies discussed in this Clinical Report provide evidence supporting the clinical efficacy, digestibility, palatability and consumer insights for BLUE Natural Veterinary Diet GI food. These findings support that BLUE Natural Veterinary Diet GI food provides an ideal approach to nutritionally manage pets with gastrointestinal conditions while satisfying pet owners preferences for quality, natural ingredients.

For more information about Blue Buffalo Quality Assurance Testing and Clinical Research, please visit TrueBLUEVets.com or call 1-888-323-BLUE.