

Your Guide to Gastrointestinal Health:

nutrition for managing gastrointestinal diseases





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Challenging Canine GI Diseases

Pancreatitis

Pancreatitis is either an acute or chronic inflammation of the pancreas. With early and appropriate management, acute pancreatitis is reversible. Chronic pancreatitis implies persistent disease with irreversible morphologic changes. Acute pancreatitis, the more common form, may be life threatening. Risk factors associated with pancreatitis include dietary indiscretion, high fat, low protein foods, fasting hyperlipidemia, hypercalcemia and obesity. Certain breeds are overrepresented in research on breeds associated with pancreatitis. In the United States, the most commonly reported breed is the miniature Schnauzer, while in the United Kingdom, it is the Cavalier King Charles Spaniel.

Clinical signs for acute pancreatitis

- Vomiting
- Diarrhea
- Icterus
- Lethargy
- Anorexia
- Cranial abdominal pain
- Fever

Management

- Fluid therapy to correct dehydration, acid-base, and electrolyte imbalances
- Control vomiting
- NPO if unable to control vomiting
- Begin feeding a low-fat food as soon as vomiting is controlled to maintain intestinal epithelial integrity and minimize bacterial translocation
- Pain management

Hyperlipidemia

Hyperlipidemia is characterized by increased levels of blood lipids in a patient fasted for at least 12 hours. The lipids may be triglycerides, cholesterol or both. Primary hyperlipidemia, the most common form, is a defect in lipid metabolism leading to hypertriglyceridemia and may be hereditary in miniature Schnauzers. Hyperlipidemia may be secondary to an underlying disorder, such as diabetes mellitus or hyperadrenocorticism. Hyperlipidemia is important for two reasons:

1. Lipemic serum may interfere with quantitative analysis of serum analytes
2. Hyperlipidemic patients are at risk for developing significant clinical illness, including acute pancreatitis

Clinical signs and conditions associated with hyperlipidemia in dogs

- Fasting lipemia
- Abdominal discomfort
- Lethargy/inactivity
- Seizures
- Acute pancreatitis
- Intermittent vomiting/diarrhea
- Lipemic changes to the eye

Management

Nutrition is the most important element for managing primary hyperlipidemia. The food should be less than 12% fat on a dry matter (DM) basis. The fat content should be less than the food currently being fed. Management of the underlying condition should resolve secondary hyperlipidemia.



Challenging Canine GI Diseases

Protein-Losing Enteropathy (PLE)

Protein-Losing Enteropathy (PLE) is a term that encompasses infiltrative intestinal disorders that result in gastrointestinal loss of protein resulting in hypoalbuminemia. Primary intestinal disorders, such as inflammatory bowel disease, lymphoma and lymphangectasia may lead to PLE. Systemic disease, such as renal disease and congestive heart disease, also, may lead to PLE. Lymphangectasia, a common cause of PLE in dogs, is characterized by lymphatic hypertension secondary to abnormalities of the intestinal lymphatic system. Breeds at risk for lymphangectasia include Chinese Shar Peis, Rottweilers, Yorkshire terriers, poodles, Golden retrievers, Lundehunds and Dachshunds.

Clinical signs

- Vomiting and diarrhea, although not all seen in all patients
- Progressive weight loss
- Change in appetite with severe hypoalbuminemia, ascites, dependent edema and dyspnea from pleural effusion

Management

With severe hypoalbuminemia, plasma or colloid transfusions may be necessary. Select a food that is appropriate for the underlying cause. A low-fat diet is indicated for patients with lymphangectasia.

Exocrine Pancreatic Insufficiency (EPI)

Exocrine Pancreatic Insufficiency (EPI) is the most common cause of maldigestion in dogs and may result from congenital acinar atrophy and chronic/acute pancreatitis. Any breed may be affected. EPI due to acinar atrophy may occur as a result of genetic predisposition in young large breed dogs including German shepherds, Eurasians and rough-coated Collies. Typically, clinical signs occur when 85-90% of the pancreatic exocrine function is lost. Acquired EPI may result from chronic inflammation and fibrosis of the pancreas secondary to chronic and/or acute pancreatitis. Diabetes mellitus may occur concurrently as a result of loss of pancreatic endocrine function in EPI patients. Dogs with EPI may have concurrent small intestinal bacterial overgrowth. Diagnosis of EPI is based on history, clinical signs and low fasting Trypsin-Like Immunoreactivity (TLI).

Clinical Signs

- Chronic small bowel diarrhea: frequent, voluminous, steatorrheic, pale colored stools
- Poor coat quality
- Polyphagia
- Borborygmus
- Flatulence
- Pica
- Coprophagia
- Vomiting
- Polydipsia
- Stunted growth may occur in dogs with a congenital form of EPI

Management

Both nutrition management and oral supplementation of pancreatic enzymes are essential for management of EPI. Food should be highly digestible and fiber content should be less than 5% dry matter basis. Patients with concurrent diabetes mellitus will require a lower carbohydrate digestibility to maintain glucose levels. The goal of enzyme supplementation and feeding is to normalize body weight and Body Condition Score (BCS) and to alleviate clinical signs. Dogs with concurrent small intestinal bacterial overgrowth may require appropriate antibiotic therapy and dogs with concurrent diabetes mellitus may require exogenous insulin therapy.



Challenging Canine GI Diseases

Idiopathic Inflammatory Bowel Disease (IBD)

Idiopathic inflammatory bowel disease (IBD) is considered a common cause of chronic vomiting and diarrhea in dogs. IBD is characterized by an increase in inflammatory cells in connective tissue of gastrointestinal or colonic mucosa. Increases in lymphocytes and, or plasma cells may be present in dogs with IBD. The diagnosis of canine IBD is based on exclusion of other known causes of chronic vomiting and diarrhea (bacterial, viral and parasitic infections) and histopathological diagnosis of inflammatory cell infiltrate in the stomach, small or large intestine typically determined by endoscopic biopsy. Due to the similarities in clinical and histopathological findings in dogs with IBD and food allergy, a food elimination trial is recommended to rule out food hypersensitivity as a cause of chronic GI signs before a diagnosis of idiopathic IBD is made.

Clinical Signs

- Vomiting
- Weight loss
- Abnormal appetite
- Small and/or large bowel diarrhea
- Dehydration
- Concurrent dermatologic signs (as a result of food allergy)

Management

If dogs improve clinically to a food elimination trial, then long-term management on a hypoallergenic food is recommended. In dogs with moderate to severe lymphocytic plasmacytic enteritis, treatment may include immunosuppressive therapy in addition to appropriate dietary management. Anthelmintics and antibiotic therapies may be used to rule out GI inflammation due to infectious causes.

Three types of food may be useful in managing IBD:

- Highly digestible foods containing small amounts of soluble/mixed fiber
- Fiber-enhanced foods containing moderate amounts of fiber
- Elimination foods containing a highly digestible novel or hydrolyzed protein source

Large Bowel Diarrhea (colitis)

Large bowel diarrhea (colitis) occurs commonly in dogs and may be acute or chronic in nature. Inflammation of the large intestine may occur as a result of parasitic or bacterial infections, ingestion of toxins or foreign materials, food allergy or dietary factors. Most commonly inflammatory infiltrate would be characterized as lymphocytic plasmacytic. Acute colitis may be self-limiting once the inciting cause is treated or cleared from the gastrointestinal tract. Routine evaluation includes history, physical examination, hematologic and serum chemistry evaluations, and fecal examinations. Chronic or persistent colitis may require endoscopic evaluation to determine infiltrative diseases including inflammatory bowel disease, neoplasia, systemic fungal infections or other causes.

Clinical Signs

- Tenesmus
- Urgency
- Dyschezia
- Mucus and/or blood in stools

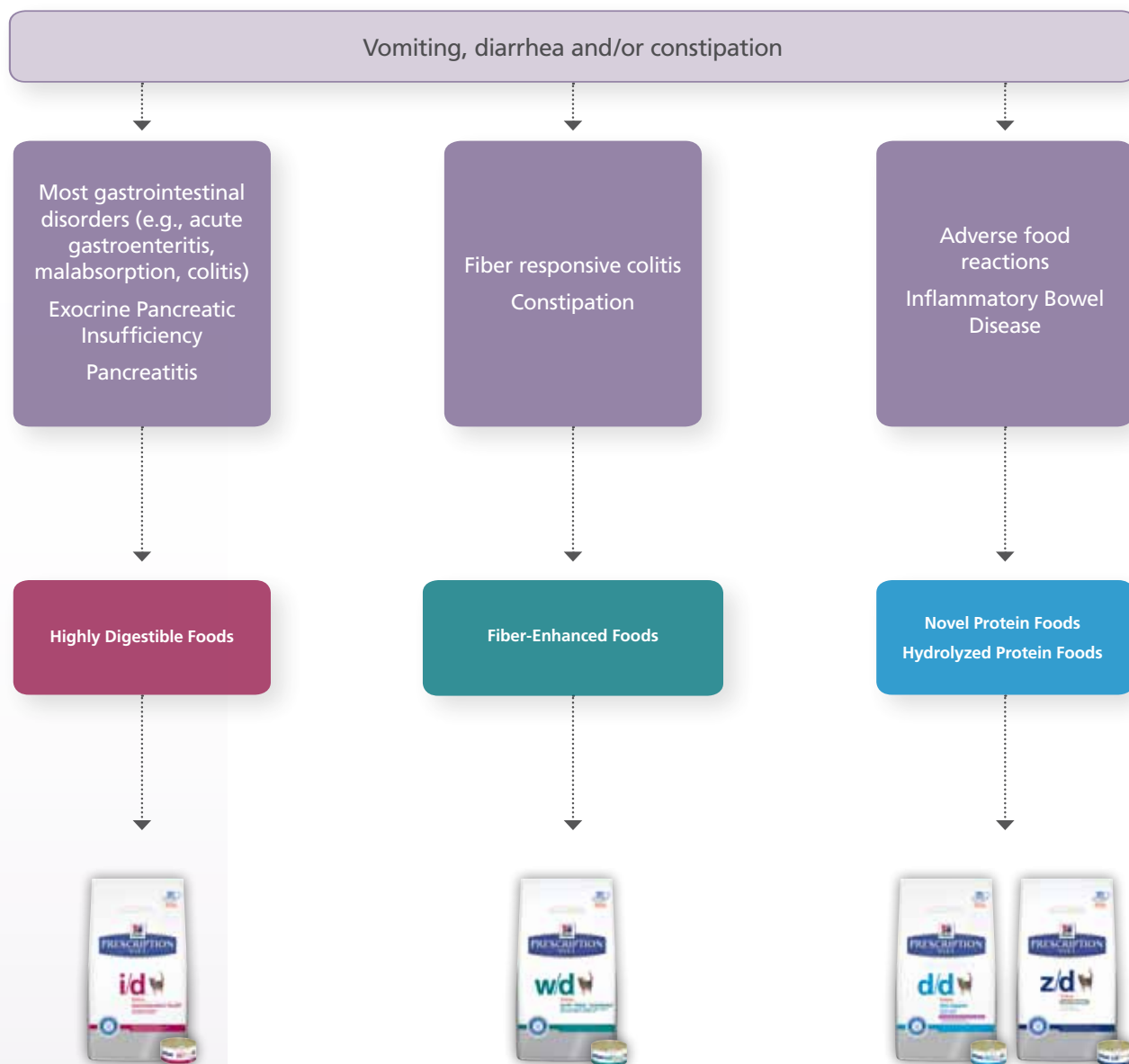
Management

1. Highly digestible foods
2. Fiber-enhanced foods
3. Elimination foods if food allergy is suspected

Appropriate concurrent anthelmintic or antimicrobial therapy may be indicated in colitis associated with infection. In some severe chronic cases of colitis, immunosuppressive therapy may be indicated.



Managing Cats with Gastrointestinal Disorders



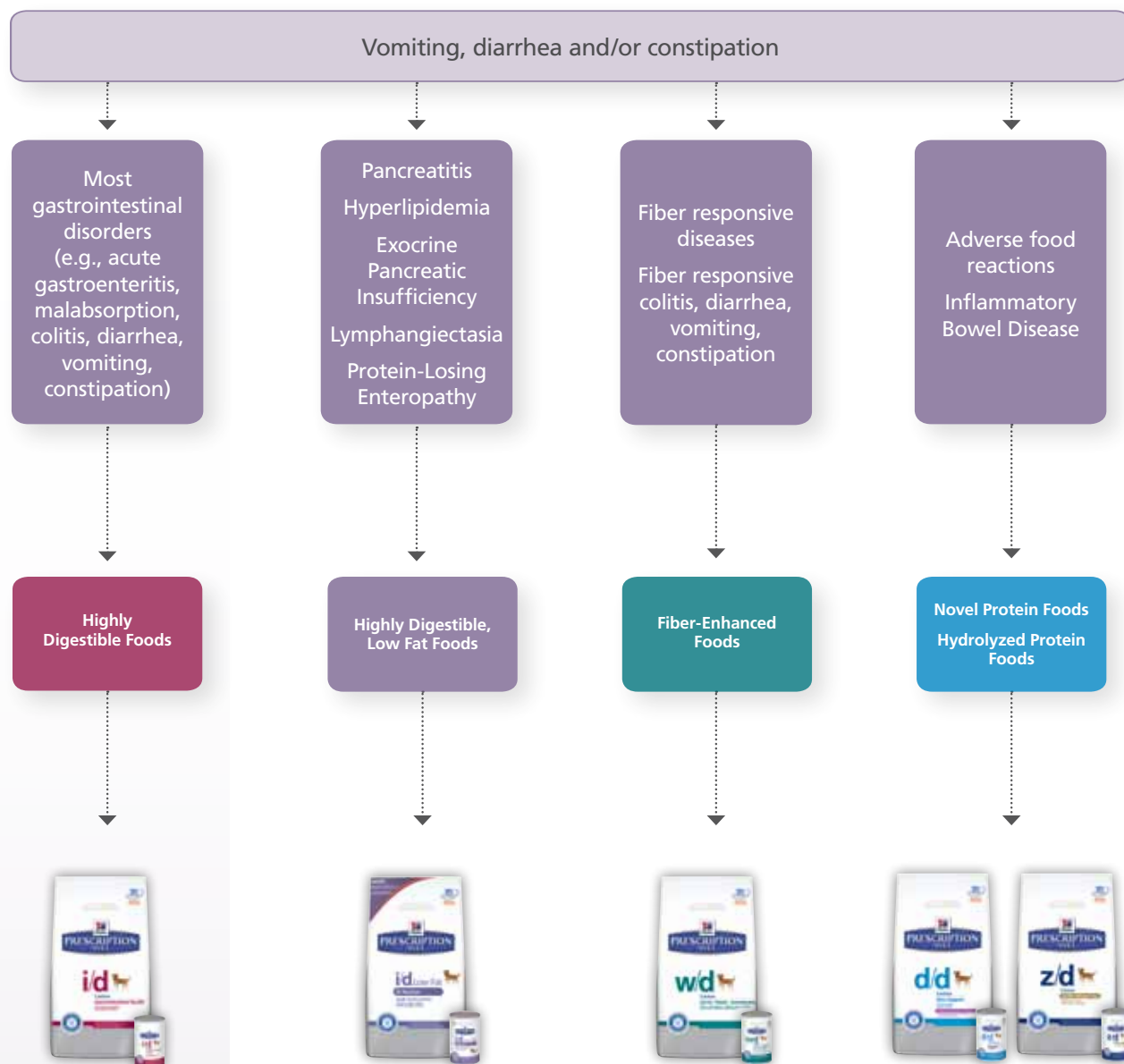
Hill's® Prescription Diet® Feline Foods

	i/d®	w/d®	d/d®	z/d®**
% Fat*	20.1	9.3 – 9.5	21.3	16.4
% Fiber*	3	7.7 – 8.0	4.7	2.6
Kcal/cup	498	278 – 281	466 – 470	396
Kcal/5.5 oz. can	161	127	189 – 197	169

*% Fat and % Fiber are based on dry food, dry matter basis

** For z/d Feline - dry values are z/d® Low Allergen, canned values are z/d ULTRA Allergen-Free

Managing Dogs with Gastrointestinal Disorders



Hill's® Prescription Diet® Canine Foods

	i/d®	i/d® Low Fat	w/d®	d/d®	z/d® ULTRA
% Fat*	14.3	7.4	8.7	15.5 – 16.7	13.3
% Fiber*	2.8	1.7	16.4	1.5 – 1.8	2.9
Kcal/cup	379	331	243	366 – 383	254
Kcal/13 oz. can	369	351	329	356 – 404	360

*% Fat and % Fiber are based on dry food, dry matter basis

i/d
LOW FAT

Nutritional Solutions



When it comes to GI problems, the right nutrition makes all the difference. That's why Hill's offers a complete line of precisely balanced, clinically proven solutions to nutritionally manage *all* kinds of GI issues to provide the relief your feline and canine patients deserve.

Hill's® Prescription Diet® i/d® Feline Gastrointestinal Health

Highly digestible for adult cats and kittens with GI conditions

- **Increased B-Complex vitamins and potassium** help replace nutrients lost with diarrhea and vomiting
- **High digestibility** ensures easy assimilation by the GI tract
- **Moderate fat** ensures adequate nutrient intake with smaller portions of food



Hill's® Prescription Diet® w/d® Feline Low Fat-Diabetic-Gastrointestinal

Low calorie, increased fiber to help manage feline GI health

- **Increased fiber** modifies bowel transit time and provides bulk to the stool (colitis), as well as absorbs water and increases intestinal motility (constipation)
- **Low calories and fat** help avoid weight gain and lowers lipid levels
- **Target urinary pH (6.2 – 6.4)** helps limit the formation of struvite crystalluria and uroliths



Hill's® Prescription Diet® z/d® Feline Low Allergen

Highly digestible hydrolyzed animal protein to help eliminate potential for allergic response

Hill's® Prescription Diet® d/d® Feline Skin Support

Novel protein source helps avoid common food allergens and limits the amount of undigested protein in the gastrointestinal tract able to provoke an allergic reaction





Hill's® Prescription Diet® i/d® Canine Gastrointestinal Health

Highly digestible for adult dogs and puppies with GI conditions

- **Increased B-Complex vitamins and potassium** help replace nutrients lost with diarrhea and vomiting
- **High digestibility** ensures easy assimilation by the GI tract
- **Moderate fat** ensures adequate nutrient intake with smaller portions of food



Hill's® Prescription Diet® i/d® Low Fat GI Restore Canine

Low-fat to support challenging GI diseases like pancreatitis and hyperlipidemia

- **Omega-3 fatty acids** protect by helping to break the cycle of inflammation
- **Prebiotic fiber** restores balance of intestinal microflora by supporting growth of beneficial bacteria
- **Proprietary blend that contains ginger** helps calm and soothe the GI tract
- **Low-fat, highly digestible nutrition** for longer-term feeding of adult dogs



Hill's® Prescription Diet® w/d® Canine Low Fat-Diabetic-Gastrointestinal

Low calorie, increased fiber to help manage canine GI health

- **Increased fiber** modifies bowel transit time (colitis), absorbs water and normalizes intestinal motility (constipation)
- **Low calories and fat** help avoid weight gain and lowers lipid levels
- **Added antioxidants** promote a healthy immune system



Hill's® Prescription Diet® z/d® Canine ULTRA Allergen-Free

Highly digestible hydrolyzed animal protein to help eliminate potential for allergic response

Hill's® Prescription Diet® d/d® Canine Skin Support

Novel protein source helps avoid common food allergens and limits the amount of undigested protein in the gastrointestinal tract able to provoke an allergic reaction



i/d
LOW FAT

The Right Nutrition for Quick Relief of GI Disorders

Angus



Angus

Diagnosis: Chronic antibiotic responsive diarrhea

Tx Plan: Anthelmintic, antibiotics, Hill's® Prescription Diet® i/d® Canine Gastrointestinal Health pet food and Hill's® Prescription Diet® Hypoallergenic Treats Canine

- Improves diarrhea in as little as 3 days*
- Soluble and insoluble fiber help
 - Normalize intestinal microflora by supporting growth of beneficial bacteria
 - Modify bowel transit time
 - Support short-chain fatty acid production
- Increased electrolytes and B vitamins replenish those lost with diarrhea and vomiting

*i/d Canine Dry, Data on file. Hill's Pet Nutrition, Inc.



Alice

Diagnosis: Clostridial enteritis

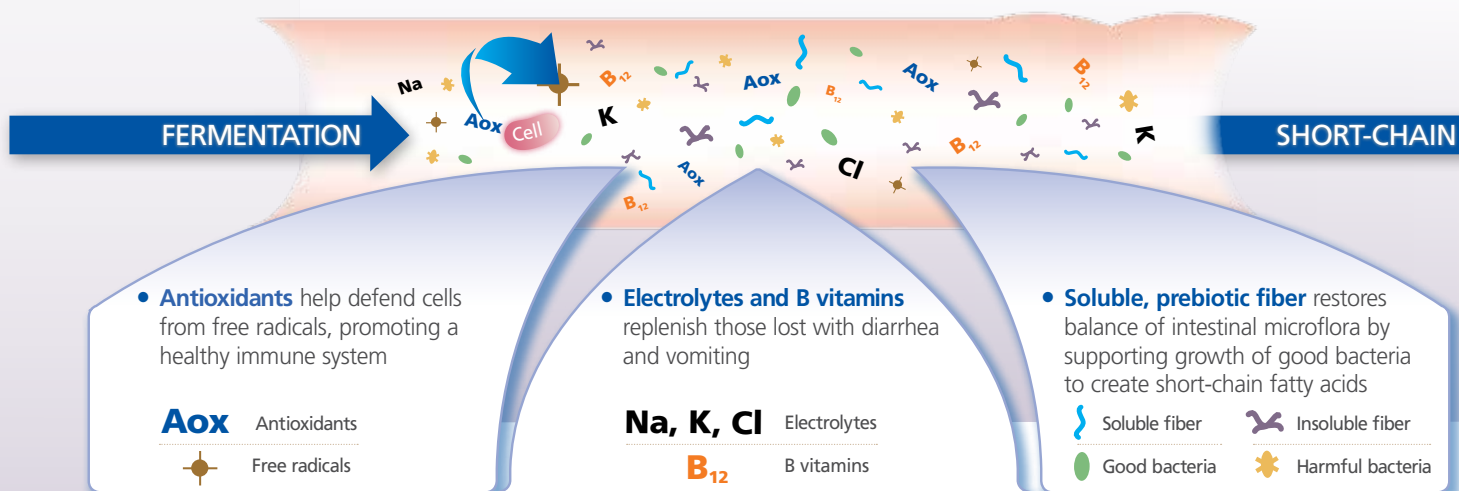
Tx Plan: Antibiotics, fluid therapy, anti-nausea medications and Hill's® Prescription Diet® i/d® Feline Gastrointestinal Health pet food

- Highly digestible to ensure easy absorption and to help resolve diarrhea quickly
- Formulated to ensure appropriate nutrient intake with smaller food portions
- Electrolytes and B vitamins to replace losses
- Mixed fibers to optimize GI health



Alice

The Right Nutrients for a Healthy GI Tract



Trumpy



Trumpy

Diagnosis: Chronic colitis with history of pancreatitis

Tx Plan: Anthelmintic, antibiotics, Hill's® Prescription Diet® w/d® Feline Low Fat-Diabetic-Gastrointestinal with Chicken pet food and Hill's® Prescription Diet® Hypoallergenic Treats Feline

- High in fiber to modify bowel transit time, absorb water and normalize motility
- Clinically proven antioxidants to promote a healthy immune system
- Low fat to avoid stimulation of the pancreas
- Low in magnesium to reduce risk of struvite crystals



Pepper

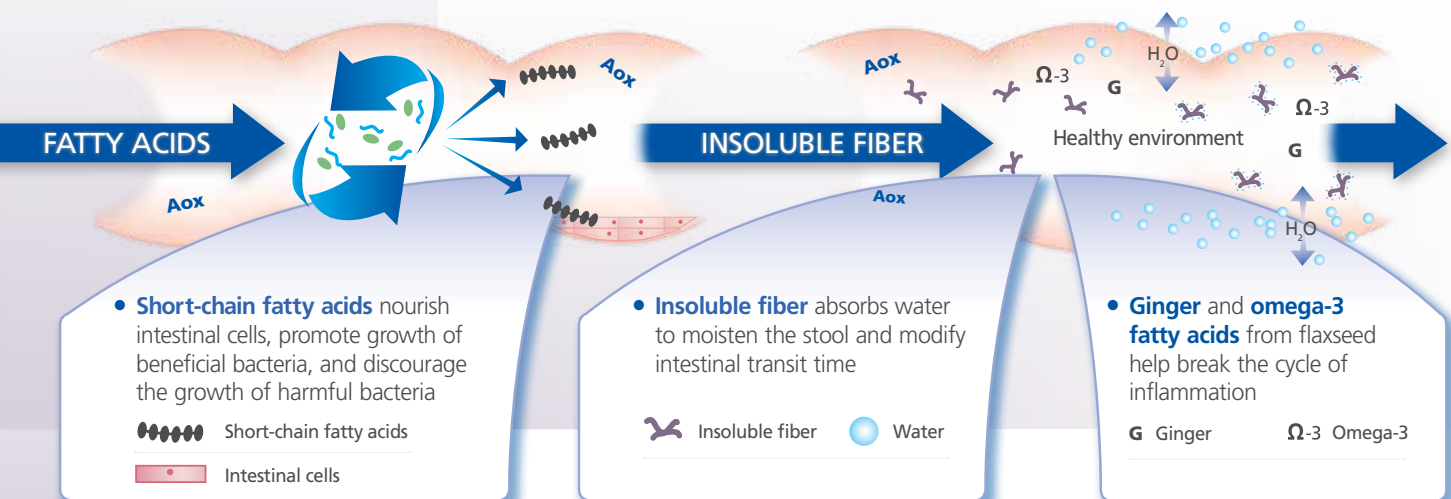
Diagnosis: Hyperlipidemic pancreatitis

Tx Plan: Supportive care and pain management, plus Hill's® Prescription Diet® i/d® Low Fat GI Restore Canine pet food

- Prebiotic fibers to promote growth of beneficial bacteria
- Proprietary blend that contains ginger helps calm and soothe the GI tract
- Omega-3 fatty acids to help break the cycle of inflammation
- Beneficial for long-term feeding to help reduce risk of recurrence



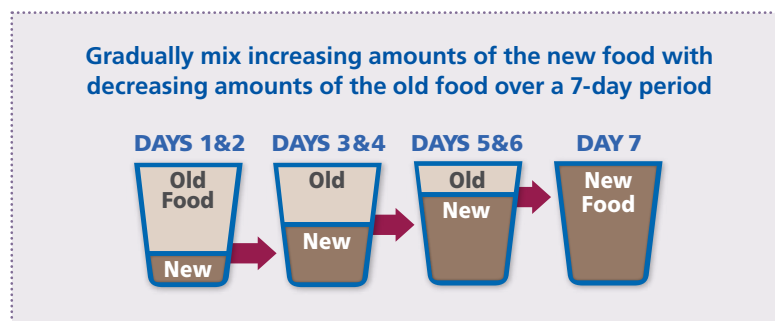
Pepper



Answering Pet Owner Questions

Answering Pet Owner Questions About Hill's® Prescription Diet® i/d® Low Fat GI Restore Canine

Transitioning to a new food



Question: *This food is called i/d Low Fat – does that mean it's for weight loss?*

Answer: i/d Low Fat is not a diet food; it is a food specifically formulated to meet the nutritional needs of dogs with gastrointestinal (GI) diseases such as pancreatitis, hyperlipidemia, protein-losing enteropathy or exocrine pancreatic insufficiency. The food is formulated to be low in fat to meet the nutritional needs of these dogs, and includes omega-3 fatty acids, prebiotic fiber and antioxidants to support their GI tract health and immune systems.

Question: *How long does my dog need to eat i/d Low Fat?*

Answer: Your veterinarian is the expert on your pet's nutritional needs. i/d Low Fat is suitable for long term feeding for adult and mature adult dogs, and should be fed long term to manage chronic GI disease and minimize risk of recurrence or relapse.

Question: *Is it ok to feed my dog canned food with the i/d Low Fat dry dog food? What about treats?*

Answer: i/d Low Fat dog food is formulated to be low in fat to meet the nutritional needs of dogs with specific GI diseases. If your veterinarian has recommended i/d Low Fat for your dog, the canned food and treats you give your dog need to be similarly low in fat. You can supplement i/d Low Fat dry dog food by giving individual kibbles as treats, with i/d Low Fat canned dog food, **Prescription Diet® Canine Treats**, or by making your own treats. (See more on opposite page)

Question: *Now that my dog is eating i/d Low Fat dog food, it seems like there's less waste to pick up — is that normal?*

Answer: i/d Low Fat is a highly digestible food, so there should be less waste produced resulting in less stool to pick up.

Follow-up for Increased Compliance

To increase compliance, check in with your client over the phone a couple of days after they begin the transition to i/d, i/d Low Fat or w/d, and then again another seven to 14 days later.

Homemade Treat Recipe

If your dog eats **Hill's® Prescription Diet® i/d® Low Fat GI Restore Canine**, then the treats below will not only help him feel his very best, but also allow him to feel spoiled and oh so special.

Snack triangles from canned food

1. Preheat oven to 350° degrees.
2. Spread ½ can of i/d Low Fat onto a sheet of waxed paper.
3. Cut the flattened food into triangles, each ½ inch thick.
4. Place the triangles on a cookie sheet and bake in oven for 15 minutes.
5. Flip the triangles and bake for another 15 minutes.
6. Let treats cool completely before serving to your dog.

Gravy from canned

1. Crumble ½ can of i/d Low Fat into a measuring cup.
2. Add ⅓ cup of water to the measuring cup.
3. Stir ingredients until the mixture is combined to the consistency of gravy.

Snack cookies from dry food

1. Preheat oven to 350° degrees.
2. Using a blender, grind i/d Low Fat kibbles into a fine powder.
3. Transfer kibble powder to a bowl, and slowly add water to form a dough consistency.
4. Shape into cookies no more than ¼" to ½" thick (the cookies will not flatten like standard "people cookies" do).
5. Place on ungreased cookie sheet and line with parchment paper if desired.
6. Bake at 350° degrees for 30 minutes or until crispy.
7. Let treats cool completely before serving your dog.



Important!

- All homemade treats need to be stored in a refrigerator no longer than five to seven days to maintain their freshness and prevent spoilage.
- Homemade treats should not exceed 10% of your pet's total daily food intake.
- Baking the kibble alters the nutritional characteristics of the food.

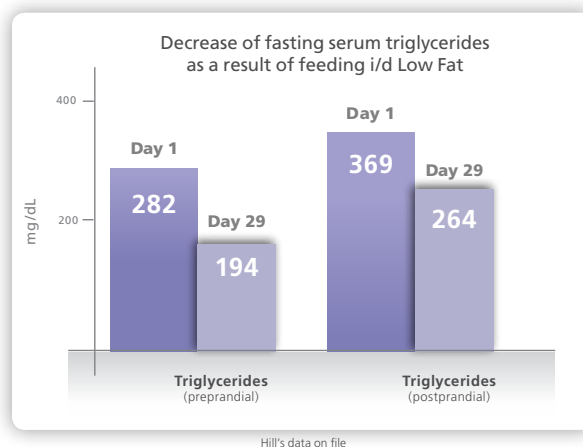
i/d
LOW FAT

Appendix

Hill's Evidence Based Clinical Nutrition

Key Points

- Hill's® Prescription Diet® i/d® Low Fat GI Restore Canine was effective in the management of dogs with hyperlipidemia reducing both pre-prandial and postprandial serum triglyceride values.
- Healthy dogs fed a food with a prebiotic blend of beet pulp and flaxseed significantly increased the number of beneficial bacteria in the feces:
 - Significant increase in *bifidobacter* compared to baseline (9.1 vs. 8.3 CFU log 10/g feces; P=0.03)
 - Significant increase in *lactobacillus* compared to baseline (11.1 vs. 10.3 CFU log 10/g feces; P=0.04)



Efficacy of a low fat diet in the management of dogs with hyperlipidemia

Purpose:

To demonstrate that i/d Low Fat is appropriate to manage hyperlipidemia in dogs.

Design:

Nine Beagle dogs (2 female, 7 male. Average age: 9 years), with serum triglyceride values >150 mg/dL (fasted samples) were enrolled in the study and fed i/d Low Fat for 29 days. Blood samples were collected after 20 hours of fasting, on day 1 and day 29 and analyzed for serum chemistry. Within 2-4 hours after feeding the dogs, an additional blood sample was drawn to analyze postprandial serum levels. Each dog served as its own control. Baseline food was a grocery brand food. Reference range for triglyceride concentrations (pre-and-post prandial) was 50-100 mg/dL.

Results:

i/d Low Fat significantly reduced both pre-prandial and post-prandial serum triglyceride values (P<0.01).

The effects of commercially available probiotics and a prebiotic blend on the gastrointestinal microflora of healthy dogs

- Purpose:** To determine if a prebiotic blend (beet pulp, flaxseed) increases concentration of beneficial bacteria in the feces of healthy dogs that is seen when probiotics FortiFlora® and ProStora™ Max are fed.
- Design:** Twenty adult Beagle dogs (10 females, 10 males, average age: 4 years) were fed a control food (**Science Diet® Adult**) for 4 weeks. At the beginning of this period, feces were collected for 4 days and a baseline composite sample was frozen for bacterial PCR analysis. During the treatment phase, each dog was fed a “treatment” for 2 weeks in a Latin square/crossover design. The treatments consisted of control food, control+FortiFlora®, control+ProStora™, and control+prebiotic blend with a soluble fiber content of no less than 2% of the diet. Feces were collected during the last 4 days of each treatment; a composite sample was frozen for bacterial PCR. Feces were analyzed using bacterial PCR by the University of Illinois Animal Science Laboratory.
- Results:**
1. The prebiotic food group had a significant increase in *bifidobacter* compared to baseline (9.1 vs. 8.3 CFU log 10/g feces ; P= 0.03)
 - The control+FortiFlora® group had a significant increase in *bifidobacter* compared to baseline (9.3 vs. 8.3 CFU log 10/g feces; P=0.007,)
 - The control+ProStora™ group had a significant increase in *bifidobacter* compared to baseline (9.6 vs. 8.3 CFU log 10/g feces; P=0.0002)
 2. The prebiotic group had a significant increase in *lactobacillus* compared to baseline (11.1 vs. 10.3 CFU log 10/g feces; P=0.04)
 - The control +FortiFlora® group had a significant increase in *lactobacillus* spp. compared to baseline (11.3 vs. 10.3 CFU log 10/g feces; P= 0.01)
 - The control+ProStora™ group had a significant increase in *lactobacillus* spp. compared to baseline (11.5 vs. 10.3 CFU log 10/g feces; P= 0.003)

The prebiotic blend tested reached the beneficial bacteria fecal concentrations that are seen with commonly prescribed probiotic supplements.



Appendix

The benefit of low fat diets in dogs with gastrointestinal disease

Jörg M. Steiner

Dr.med.vet., PhD, DACVIM, DECVIM-CA

From the Gastrointestinal Laboratory at Texas A&M University, College Station, TX, USA



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Introduction

Lipids are water-insoluble molecules that have many crucial functions in dogs. There are a variety of different lipids, but the only lipids that are routinely quantified in dogs are triglycerides and cholesterol. Hyperlipidemia refers to a state of abnormally increased blood concentrations of triglycerides, cholesterol, or both.

One indication for low fat diets in dogs with gastrointestinal (GI) disease is the management of dogs with hypertriglyceridemia with GI disease presumed to be due to or related to hypertriglyceridemia. The second indication is a group of dogs that have a normal serum triglyceride concentration, but have GI disorders resulting in difficulty to digest and/or absorb normal amounts of fat in the diet or dogs with lymphatic abnormalities.

Hypertriglyceridemia is very common in dogs.¹ In one recent study, 611 routine chemistry profiles in dogs performed at a private veterinary laboratory in Italy were evaluated and 33 dogs (5.4%) showed hypertriglyceridemia.¹ Certain breeds have been identified to be much more commonly affected by hypertriglyceridemia. In a recent study of 192 healthy miniature Schnauzers, 63 (32.8%) had hypertriglyceridemia.²

Definitive differentiation between primary or secondary hypertriglyceridemia is sometimes difficult, but is based on exclusion of known or suspected risk factors of secondary hypertriglyceridemia, such as diabetes mellitus, obesity or pancreatitis.³ Also, primary hypertriglyceridemia is often associated with a higher breed-related frequency, as described in miniature Schnauzers in the US.²

The clinical relevance of hypertriglyceridemia in dogs is due to its complications. By far the most important consequence of hypertriglyceridemia in dogs is **pancreatitis**. In a recent study the risk of pancreatitis was shown to be about 5-fold higher in miniature Schnauzers with severe hypertriglyceridemia (above 10.17 mmol/l or 900 mg/dl) than in control dogs.⁴

There is still some debate as to whether hypertriglyceridemia causes pancreatitis, pancreatitis causes hypertriglyceridemia, or both are caused by the same pathogenetic mechanism without one of them causing the other. However, in a recent study, miniature Schnauzers with a previous history of pancreatitis had significantly higher serum triglyceride concentrations than miniature Schnauzers without such history.⁵ Pancreatitis is of great clinical significance because an acute episode can be associated with systemic complications and death, and chronic disease leads to destruction



of exocrine and endocrine pancreatic tissue that can lead to exocrine pancreatic insufficiency and/or diabetes mellitus.⁶

Generally, treatment of hypertriglyceridemia is recommended when serum triglyceride concentrations are above 5.65 mmol/l (500 mg/dl), though there is little scientific evidence for this cut-off value.³ The primary therapeutic approach for treatment of hypertriglyceridemia in dogs is feeding a **low fat food** (generally less than 20 g of fat/1000 kcal).³ In a recent study miniature Schnauzers with hypertriglyceridemia were successfully managed by dietary change to a low fat food alone.⁷ This study showed that while many dogs continued to have serum triglyceride concentrations above the upper limit of the reference range, none of them had serum triglyceride concentrations that were above 500 mg/dl after the dietary change.⁷ Also, interestingly, the lipoprotein profile of the dogs changed, more closely resembling the lipoprotein profile of healthy dogs. A more recent study showed similar results in dogs with mild to moderate hypertriglyceridemia.⁸ Serum triglyceride concentrations should be rechecked after withholding food for at least 12 hours approximately 3-4 weeks after changing the diet.

Dogs without hypertriglyceridemia

The digestion of dietary fat is more complex than the digestion of proteins or carbohydrates and it can easily be compromised. Therefore, dogs with a wide variety of GI problems can show maldigestion and/or malabsorption of fat. Decreasing the fat content in the diet may improve clinical signs in these patients. Essentially, any severe gastroenteritis, including IBD (Inflammatory Bowel Disease) with or without protein-losing enteropathy can lead to fat malabsorption. Even though patients do not have hypertriglyceridemia, they cannot appropriately deal with the normal amount of fat in the diet and require the feeding of a low-fat diet and the avoidance of fat-containing treats.

There are many diets on the market that have a moderately decreased fat content, but only few that have a severely decreased fat content. Also, since these conditions can be complex, these patients may also benefit from prebiotics, probiotics, antibiotics, or anti-inflammatory or immunosuppressive agents.

Conclusion

In summary, low fat diets can play a crucial role in the management of dogs with hypertriglyceridemia and secondary GI disease or in dogs without hypertriglyceridemia, but primary GI disease.

References

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- ⁴Xenoulis PG, Suchodolski JS, Ruaux CG, et al. Association between serum triglyceride and canine pancreatic lipase immunoreactivity (cPLI) concentrations in Miniature Schnauzers. *J Vet Int Med* 2006;20:750-751.
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- ⁷Xenoulis PG, Suchodolski JS, Steiner JM. Effect of a low-fat diet on serum triglyceride, cholesterol, and Spec cPL concentrations in Miniature Schnauzers with hypertriglyceridemia. *J Vet Int Med* 2011;25:20-25.
- ⁸Unpublished data. Hill's Pet Nutrition.

Appendix

i/d Low Fat Nutritional Information



Prescription Diet® i/d® Low Fat GI Restore Canine

Prescription Diet® i/d® Low Fat GI Restore Canine

Gastrointestinal Disorders — Low Fat



i/d® Low Fat GI Restore Canine: Cans of 13 oz (1863) in cases of 12



i/d® Low Fat GI Restore Canine: Bags of 8.5 lbs (1861) and 17.6 lbs (1862)

Indications

- Pancreatitis, Hyperlipidemia, Lymphangiectasia, Protein-Losing Enteropathy, Exocrine Pancreatic Insufficiency.
- GI diseases requiring a low fat food.



Not recommended for

Growing puppies, pregnant or nursing dogs.



Evidence-Based Clinical Nutrition

Shown to decrease fasting serum triglycerides in hyperlipidemic dogs.¹



Additional information

- Enhanced with omega-3 fatty acids to break the cycle of inflammation.
- Includes ginger to help calm and soothe the GI tract.
- Contains soluble/prebiotic fiber that normalizes intestinal microflora by supporting growth of beneficial bacteria without the need for prebiotic or probiotic supplements.
- Designed with high quality ingredients that taste great, helping patient acceptance and pet owner compliance.
- Formulated for breeds/dogs predisposed to the development of pancreatitis.
- **Prescription Diet® i/d® Low Fat GI Restore Canine** should be fed long-term to manage chronic GI disease and minimize risk of recurrence/relapse.

Other products to consider

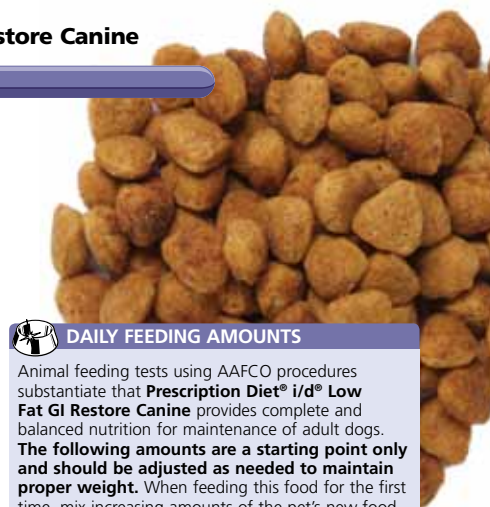
- For dogs with gastrointestinal disorders and recovery problems, or growing puppies: **Prescription Diet® i/d® Canine**.
- For dogs with colitis, diarrhea or constipation: **Prescription Diet® w/d® Canine**.
- For dogs with gastroenteritis, vomiting, or inflammatory bowel disease (IBD): **Prescription Diet® z/d® Canine ULTRA Allergen-Free** or **Prescription Diet® d/d® Canine**.

These characteristics make **Prescription Diet® i/d® Low Fat GI Restore Canine** veterinary exclusive pet food useful as a nutritional aid for dogs with pancreatitis, hyperlipidemia, exocrine pancreatic insufficiency, and protein-losing enteropathy.

KEY BENEFITS

Fat	Low	Optimal choice for canine GI patients that need low fat, great tasting nutrition therapy. Minimizes stimulation of the pancreas, decreasing risk of relapsing pancreatitis.
Omega-3 Fatty Acids	High	Helps reduce painful inflammation.
Prebiotic/Soluble Fiber Blend	Added	Promotes growth of beneficial bacteria without the need for supplements.
Digestibility	High	Ensures easy assimilation by the GI tract.
Antioxidants	Added	Defend cells from free radical oxidation, promoting a healthy immune system.

¹Data on File, Hill's Pet Nutrition, Inc.



DAILY FEEDING AMOUNTS

Animal feeding tests using AAFCO procedures substantiate that **Prescription Diet® i/d® Low Fat GI Restore Canine** provides complete and balanced nutrition for maintenance of adult dogs. **The following amounts are a starting point only and should be adjusted as needed to maintain proper weight.** When feeding this food for the first time, mix increasing amounts of the pet's new food with decreasing amounts of the old food (if pet is eating) over a 7-day period. Small, frequent meals (3-6 times daily) are often appropriate in the types of cases for which **i/d® Low Fat** is typically used. When using both canned and dry foods, decrease the amounts to avoid overfeeding.

Body Weight (lb)	Can(s) (13 oz)	Dry – Cups
5	1/2 – 2/3	1/2 – 3/4
10	3/4 – 1 1/4	7/8 – 1 1/4
15	1 1/4 – 1 1/2	1 1/4 – 1 2/3
20	1 1/3 – 2	1 1/2 – 2
30	2 – 2 2/3	2 – 2 3/4
40	2 1/3 – 3 1/4	2 1/2 – 3 1/2
50	2 3/4 – 3 3/4	3 – 4
60	3 1/4 – 4 1/2	3 1/2 – 4 3/4
70	3 2/3 – 5	3 3/4 – 5 1/3
80	4 – 5 1/2	4 1/4 – 5 3/4
100	4 3/4 – 6 1/2	5 – 7

1 cup is equal to 1 can. 1 can is equal to 1 1/8 cups



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VETERINARY TEAM ONLY

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INGREDIENTS

CANNED

i/d® Low Fat GI Restore Canine: Water, Turkey Liver, Pork Liver, Rice, Egg White, Rice Flour, Pork By-Product, Whole Grain Corn, Egg Product, Flaxseed, Dried Beet Pulp, Oat Fiber, Calcium Carbonate, Chicken Liver Flavor, Soybean Oil, Ginger Root Powder, Potassium Chloride, Sodium Tripolyphosphate, Choline Chloride, Iodized Salt, Vitamin E Supplement, Taurine, L-Carnitine, Ascorbic Acid (source of vitamin C), Thiamine Mononitrate, Zinc Oxide, Ferrous Sulfate, Beta-Carotene, Copper Sulfate, Niacin, Manganous Oxide, Pyridoxine Hydrochloride, Calcium Pantothenate, Vitamin B12 Supplement, Riboflavin, Biotin, Calcium Iodate, Vitamin D3 Supplement, Folic Acid, Sodium Selenite.



AVERAGE NUTRIENT CONTENTS

	As Fed ¹	Dry Matter ²	As Fed, Caloric Basis ³
Protein	6.5 %	25.1 %	6.9 g
Fat	2.2 %	8.5 %	2.3 g
Carbohydrate (NFE)	15.1 %	58.3 %	15.9 g
Crude Fiber	0.6 %	2.3 %	0.6 g
Total Dietary Fiber	1.4 %	5.4 %	1.5 g
Calcium	0.19 %	0.73 %	200 mg
Phosphorus	0.14 %	0.54 %	148 mg
Sodium	0.10 %	0.39 %	105 mg
Potassium	0.22 %	0.85 %	232 mg
Magnesium	0.024 %	0.093 %	25 mg
Vitamin E	147 IU/kg	568 IU/kg	16 IU/100kcal
Vitamin C	29 mg/kg	112 mg/kg	3.1 mg
Total Omega-3 Fatty Acids	0.21 %	0.81 %	222 mg

METABOLIZABLE ENERGY

kcal/kg	948	3,660
kcal/can	351	
% Calories from:	Protein 24	Fat 20
	Carbohydrates 56	

INGREDIENTS

DRY

i/d® Low Fat GI Restore Canine: Corn Starch, Brewers Rice, Corn Gluten Meal, Whole Grain Wheat, Chicken By-Product Meal, Chicken Liver Flavor, Flaxseed, Oat Groats, Cracked Pearled Barley, Dried Beet Pulp, Lactic Acid, Ginger Root Powder, Soybean Oil, Dicalcium Phosphate, Potassium Citrate, Potassium Chloride, Iodized Salt, Choline Chloride, vitamins (L-Ascorbyl-2-Polyphosphate (source of vitamin C), Vitamin E Supplement, Niacin, Thiamine Mononitrate, Vitamin A Supplement, Calcium Pantothenate, Biotin, Vitamin B12 Supplement, Pyridoxine Hydrochloride, Riboflavin, Folic Acid, Vitamin D3 Supplement), L-Lysine, Calcium Carbonate, Vitamin E Supplement, Taurine, minerals (Ferrous Sulfate, Zinc Oxide, Copper Sulfate, Manganous Oxide, Calcium Iodate, Sodium Selenite), L-Carnitine, preserved with Mixed Tocopherols and Citric Acid, Beta-Carotene, Phosphoric Acid, Rosemary Extract.



AVERAGE NUTRIENT CONTENTS

	As Fed ¹	Dry Matter ²	As Fed, Caloric Basis ³
Protein	23.7 %	25.9 %	7.1 g
Fat	6.8 %	7.4 %	2.0 g
Carbohydrate (NFE)	54.3 %	59.3 %	16.2 g
Crude Fiber	1.6 %	1.7 %	0.5 g
Calcium	0.65 %	0.71 %	193 mg
Phosphorus	0.55 %	0.60 %	164 mg
Sodium	0.29 %	0.32 %	86 mg
Potassium	0.82 %	0.90 %	244 mg
Magnesium	0.087 %	0.095 %	26 mg
Vitamin E	604 IU/kg	660 IU/kg	18 IU/100kcal
Vitamin C	329 mg/kg	360 mg/kg	9.8 mg
Total Omega-3 Fatty Acids	0.84 %	0.92 %	250 mg

METABOLIZABLE ENERGY

kcal/kg	3,360	3,672
kcal/cup	331	
Weight oz/cup	3.5	
Cups per lb	4.6	
% Calories from:	Protein 25	Fat 17
	Carbohydrates 58	

¹Differs from label guarantees which are either maximums or minimums. ²The nutrient in the product after moisture is removed. It is used to make direct comparisons of nutrient profiles with differing moisture contents. ³Nutrient intake for every 100 kilocalories consumed.



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i/d
LOW FAT

Appendix

Frequently Asked Questions

Question: *Is Hill's® Prescription Diet® i/d® Canine Low Fat GI Restore appropriate for long-term feeding in dogs prone to pancreatitis?*

Answer: i/d Low Fat is suitable for long-term feeding of adult and mature adult dogs, and should be fed long-term to manage chronic GI disease and minimize risk of recurrence/relapse. Specifically, i/d Low Fat is shown to decrease fasting serum triglycerides, therefore reducing risk factors of pancreatitis in dogs. Animal feeding tests using AAFCO procedures substantiate that i/d Low Fat provides complete and balanced nutrition for maintenance of adult dogs.

Question: *Is i/d Low Fat more appropriate for dogs with pancreatitis than i/d or w/d®?*

Answer: In many cases, yes; i/d Low Fat is lower in fat (dry matter basis and % calories as fat) than w/d, and also lower in fiber, which is appropriate in some instances where a low-fat food is needed.

Question: *Is i/d Low Fat a low residue diet?*

Answer: Yes, i/d Low Fat is highly digestible and should produce a small stool volume.

Question: *Is there a compatible treat for dogs eating i/d Low Fat?*

Answer: Clients can supplement i/d Low Fat dry dog food with i/d Low Fat canned food, Prescription Diet® Canine Treats, or make their own treats from dry or canned food. (See more on page 16)



Question: *Is i/d Low Fat a lower-fat version of Hill's® Prescription Diet® i/d® Canine Food?*

Answer: No, i/d Low Fat is a brand new formula. Hill's scientists started from scratch to develop a low fat food that would help restore GI tract health in dogs prone to diseases like pancreatitis, hyperlipidemia, EPI and PLE.

Question: *Is i/d Low Fat a replacement for i/d Canine?*

Answer: No, i/d Low Fat is a new food, specifically formulated for dogs that need a low fat food. Hill's will continue to sell both i/d Canine food and i/d Low Fat Canine food.

Question: *What are the contraindications for i/d Low Fat?*

Answer: Growing puppies, pregnant or nursing dogs.



i/d
LOW FAT

Appendix

Competitive Comparison

Typical Analysis, Dry Matter Basis	Hill's® Prescription Diet® i/d® Low Fat GI Restore Canine	Royal Canin® Veterinary Diet Gastrointestinal Low Fat LF20*	Iams® Veterinary Formula Intestinal Plus (formerly Low Residue)**
Crude protein%	25.9	24.4	24.6
Crude fat%	7.4	7.2	10.7
Crude fiber%	1.7	1.8	2.36
ME, kcal/kg (calculated)	3672	3492	3464
ME % Calories as fat	17	15.5	24
Vitamin E, IU/kg	660	658	Data not available
Total Omega-3's, %	0.92	0.23	Data not available
ME, Kcal/cup	331	257	259
ME, Kcal/can	351	369	417

* Royal Canin® Veterinary Product Guide, Fall 2011

** Iams® Veterinary Formula Product Reference Guide, 2011 Edition

Contact Us

Access these resources for more information or answers to questions.

For healthcare team members:

- HillsVet.com
- Hill's Veterinary Consultation Service at 1-800-548-VETS (8387)
- Hill's Board on vspn.org and vin.com

 [@HillsVet.com](https://twitter.com/HillsVet.com)

For pet owners:

- HillsPet.com
- Hill's Consumer Affairs at 1-800-445-5777

 Facebook.com/HillsPetUS





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