

Treating GI Disease Begins with a GI Diet:

When to Consider GI Low Fat

When to Consider GI High Energy

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The foundation of treatment for the vast majority of gastrointestinal (GI) diseases in dogs and cats begins with diet. In fact, in some cases, it ends with diet. At one end of the spectrum you have patients with Food Intolerance and a single offending component, ingredient, or additive must be eliminated from the patient's diet. At the other end of the spectrum you have idiopathic Inflammatory Bowel Disease (IBD), where in extreme cases, every imaginable antigen must be eliminated using an extensively hydrolyzed diet.^{1,2} This paper will examine the evidence and appropriate use of two of the veterinary diets that fall in between these extremes: a low fat GI diet and a high energy GI diet.

Low Fat GI Diets

The definition of a "low fat" veterinary diet is somewhat arbitrary, and the fat content of a pet food diet may be represented in a variety of ways. Reducing the fat content of a diet is the most effective way to reduce that diet's caloric content, so low fat diets are commonly used for weight loss. The use of a low fat diet in GI disease is aimed at an entirely different target.

- A minimum fat content and essential fatty acids are required for normal metabolic functions.
- A diet with a fat content of less than 25g/1000 kcal (generally less than 8% fat content on a dry matter basis) is considered a low fat diet.
- The best assessment of dietary fat is the fat content based on metabolizable energy (ME), the percentage of calories coming from fat versus protein and carbohydrate.
- The digestion and absorption of fat is a complex process involving pancreatic enzymes, bile acids, micelle formation, and chylomicron absorption.
- It takes significant mucosal inflammation, gallbladder obstruction, exocrine pancreatic insufficiency, or lymphatic dysfunction before significant fat appears in the stool (steatorrhea).
- Dietary fat content is correlated with transit time through the stomach; the more fat, the longer a meal remains in the stomach. This property makes fat content a "motility modifier."

The following table is a small sample of commercially available products and homemade ingredients to provide a general comparison of the fat content of various GI diets.*

Comparison of Select Diets Used in the Management of Gastrointestinal Disease in Dogs			
	Protein Source	% Fat Dry^a	% Fat Can^a
Royal Canin Veterinary Diet® Canine Hydrolyzed Protein Adult HP	Soy protein isolate	43	34
Royal Canin Veterinary Diet® Ultimino®	Hydrolyzed poultry by-products aggregate	38	–
Royal Canin Veterinary Diet® Canine Hydrolyzed Protein Moderate Calorie	Soy protein isolate	29	–
Royal Canin Veterinary Diet® Canine Selected Protein Adult KO	Kangaroo	29	–
Hills Prescription Diet® z/d® Canine	Chicken	32	31
Royal Canin Veterinary Diet® Canine Selected Protein Adult PV	Venison	29	41
Royal Canin Veterinary Diet® Canine Selected Protein Adult PW Moderate Calorie	Whitefish	25	–
Purina® Pro Plan® Veterinary Diet HA Hydrolyzed®	Soy protein isolate	24	–
Hills Prescription Diet® i/d® Low Fat	Chicken, turkey, pork	17	20
Royal Canin Veterinary Diet® Gastrointestinal Low Fat LF	Chicken, pork	17	16
Purina® Pro Plan® Veterinary Diet EN Gastroenteric Low Fat ®	Chicken	16	20
Tilapia/sweet potato (weight ratio 2.5:1 baked tilapia: baked sweet potato) ^b	Tilapia	13	–
White tuna/potato (weight ratio 3:1 canned white tuna in water: boiled potato) ^b	Tuna	10	–

*(from Dr. Sara Wennogle, with permission)

^a% metabolizable energy (ME)

^bNot complete and balanced, should not be fed exclusively for extended period of time without appropriate supplements

Low Fat GI Diets for Pancreatitis

Fat restricted diets are critical in the treatment of hyperlipidemia. Although not a GI disease, hyperlipidemia is one cause of pancreatitis in humans and may be the cause, a contributing factor, or a consequence of pancreatitis in dogs.

- Humans with hyperlipidemia are at increased risk of developing acute, severe pancreatitis.^{3,4}
- In these patients, dietary intervention is potentially the sole successful treatment for severe hypertriglyceridemia.^{3,4}
- Feeding a low fat diet is used to reduce the discomfort of chronic pancreatitis in human patients.⁵
- Hypertriglyceridemia also appears to be a risk factor for canine pancreatitis.^{6,7,8}
- Pancreatitis is prevalent in Miniature Schnauzers and a number of other breeds with primary hypertriglyceridemia.^{9,10}

- Although direct evidence to support the use of a low fat diet for the prevention or the treatment of canine pancreatitis is lacking, preliminary work and expert opinion strongly favors this approach.¹¹⁻¹⁵
- It has not yet been demonstrated that fat restriction is an important component in the prevention or treatment of feline pancreatitis. With the decrease in caloric density and increase in carbohydrate content of low fat diets, these are not considered necessary or appropriate for cats with pancreatitis.¹⁶⁻¹⁸

Low Fat GI Diets for Lymphangiectasia

Intestinal lymphangiectasia is, by definition, a malabsorption of lipids through the lymphatic system of the GI tract. The lymphatic vessels are dilated, often to the point of being visible on gross endoscopic examination, and dysfunctional, resulting in chronic diarrhea.¹⁹ This condition is often severe enough to result in a protein-losing enteropathy. Lymphangiectasia may be a primary GI problem, as seen in Yorkshire terriers, or it may be an important component of the more commonly diagnosed condition, IBD.²⁰

- It is critical that dogs diagnosed with intestinal lymphangiectasia be treated with a low fat GI diet. This is, in fact, the foundation of treatment in these cases.²¹
- A low fat diet is especially important in dogs with lymphangiectasia that fail treatment with glucocorticoids. In fact, an argument can be made for treating canine lymphangiectasia with a low fat diet before instituting steroid therapy.²¹
- Because lymphatic dilation is frequently observed as part of the histopathology of biopsy reports that conclude with a diagnosis of IBD, instituting a low fat or even an “ultra-low fat” diet (between 14 and 20 grams/1000 kcal) may be an important therapeutic trial in IBD dogs that fail glucocorticoid and hypoallergenic dietary treatment.²²

Use of a Low Fat GI Diet for Gastric Motility Modification

In assessing the effect of dietary fat on gastric and intestinal function in humans, it has been shown that a high fat diet will alter pyloric pressure, delay gastric emptying, decrease intestinal transit time, and increase gastroduodenal reflux.^{23,24}

- Diet modification, i.e. increased fiber and decreased fat, is used as one intervention to help prevent gastroesophageal reflux disease (GERD) and reduce clinical symptoms of gastroparesis in humans.^{25,26,27}
- GERD in dogs and cats is most commonly recognized in association with anesthesia but can be demonstrated (e.g. using fluoroscopy) in a number of cases as a component of esophageal or gastric dysmotility.^{28,29,30}
- Although pharmacologic intervention with gastric acid reducers is the most common approach to GERD in veterinary patients, it would appear sensible to have these patients on a low fat GI diet.
- A similar argument might be made for any condition where it would be beneficial to move gastric contents in an aboral direction relatively quickly: chronic vomiting, regurgitation, GDV, bloat, etc.

High Energy GI Diets

The basic premise of a High Energy GI Diet is to provide a high caloric density formula with ingredients that are “GI friendly,” i.e. highly digestible and very palatable to the patient. GI diets will frequently contain prebiotics, omega-3 fatty acids and/or antioxidants to directly enhance the health and function of the GI mucosa. These high energy GI diets are most commonly seen in the critical care setting or in pets recovering from diseases associated with hyporexia – a patient population that frequently requires a feeding tube where small volume-high kcal, highly digestible feedings are ideal.

The following table highlights several of the high energy diets used predominantly in critical care patients.

Comparison of Select Diets Used in the Management of Critical Care Patients	Metabolizable Energy (ME)		
	Kcal/can*	% Fat	% Protein
Royal Canin Veterinary Diet® Feline & Canine Recovery® RS	183	59	37
Purina® Pro Plan® CN Critical Nutrition®	211	63	28
Hills Prescription Diet® Urgent Care a/d®	183	33	44

*These cans are often mixed with water to produce a formula that approximates 1-2 kcal/ml for use through a feeding tube.

The caloric content can be further increased by blending the canned diet with CliniCare.

Although currently there is a paucity of literature or clinical trials in this area, in theory the use of a high energy GI diet may have a number of benefits in a more diverse, non-critically ill patient population.

- Dogs consuming a high volume of food are at increased risk for gastric dilatation-volvulus (GDV).³¹ GDV is most prevalent in large and giant breed dogs, where the daily caloric requirement might necessitate feeding a large volume of food. One solution is multiple small meals per day, but another strategy would be to feed smaller amounts of a higher caloric density GI diet.
- Maintaining an optimal weight is an important component of the quality of life for dogs and cats with cardiac disease or cancer.^{32,33} These patients often have decreased appetites and experience nausea for a variety of reasons, e.g. medications, stress, metabolic changes, intestinal perfusion and motility abnormalities, etc.
- Although cardiac patients may have a number of specific dietary requirements, maintaining optimal weight with a high caloric density GI diet may be appropriate in a number of cases.
- Cancer cachexia results from alterations in metabolism and can impact quality of life, treatment schedules and success, and, ultimately, life expectancy. As with cardiac disease, there may be a number of specific dietary or supplementation requirements, but a high caloric density GI diet may be beneficial in a number of these cases.
- Feline hepatic lipidosis is a unique condition of anorectic cats where the foundation of successful treatment is getting nutrition in to these patients. Feeding energy dense diets high in protein is critical and does not promote increased hepatic lipid accumulation.³⁴
- Part of the treatment for many esophageal motility disorders, megaesophagus, and regurgitation involves labor-intensive modifications in the frequency, volume, pace, and positioning of patients during feedings. This places a premium on getting as many kcal as possible into as small a volume of food as possible.

The following table highlights several of the high energy GI diets available for use in non-critically ill patients.

Comparison of Select Diets Used in the Management of non-Critical Care Patients	Metabolizable Energy (ME)		
	Kcal/can or cup	% Fat	% Protein
Royal Canin Veterinary Diet® Canine GI High Energy® Can	424	51	27
Royal Canin Veterinary Diet® Canine GI High Energy® Dry	394	44	22
Royal Canin Veterinary Diet® Feline GI High Energy® Can	180	51	30
Royal Canin Veterinary Diet® Canine GI High Energy® Dry	441	48	29
Purina® Pro Plan® EN Gastroenteric Canine Formula® Can	405	38	32
Purina® Pro Plan® EN Gastroenteric Canine Formula® Dry	397	29	25
Purina® Pro Plan® EN Gastroenteric Feline Formula® Can	151	44	40
Purina® Pro Plan® EN Gastroenteric Feline Formula® Dry	610	38	47

Conclusion

The increased understanding and ongoing diversification of veterinary nutrition has greatly expanded the potential use of GI diets as both diagnostic and therapeutic tools. Although the veterinary practitioner cannot be expected to double as a nutritionist, they can and will be called upon to make informed decisions (and educated guesses!) regarding the optimal dietary strategy for a variety of GI signs and diseases. There are huge gaps in our knowledge, and in order to make evidence-based decisions our profession is in dire need of well-designed clinical investigations. In the interim, it will benefit our patients if we make the effort to base dietary recommendations on thoughtful consideration of the patient's problem, and the dietary possibilities.

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