Nutritional Management for Dogs and Cats with Gastrointestinal Diseases

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KEYWORDS
- Gastrointestinal disease • Nutrition • Canine nutrition • Feline nutrition
- Nutritional management • GI nutrition

KEY POINTS
- Diet selection and a dog’s or cat’s feeding plan should be based on the patient’s nutritional assessment and problem list.
- Nutrients of concern that are important when selecting a diet for a dog or cat with gastrointestinal (GI) disease include digestibility, energy, protein, fat, fiber, and cobalamin.
- Nutritional supplements may benefit certain patients with GI disease, but the supplement’s quality control and the evidence of its efficacy should be investigated prior to use.
- Patients with GI disease should be treated as individuals, because not all dietary strategies work for all patients with similar disease processes.

INTRODUCTION

The gastrointestinal (GI) tract includes the oral cavity, esophagus, stomach, small intestine, and large intestine in addition to ancillary organs, such as the pancreas and liver. GI disease is a broad term, encompassing disorders anywhere in the GI tract. Although an individual canine or feline patient may have any of a variety of GI conditions that have an impact on 1 or more organs, patients with GI diseases often present with similar clinical signs, such as vomiting, diarrhea, constipation, dysrexia, and abdominal pain. Although some clinical signs are more indicative of disease in a particular location, such as regurgitation with esophageal disease, the similarities in clinical signs among many GI diseases mean that these diseases can be difficult to diagnose and medically manage and be challenging to manage with nutrition.

Nutritional modification is integral in the management of GI diseases, both in prevention of recurrence and in reduction of clinical signs. For example, dogs with chronic pancreatitis can benefit from being on a highly digestible and lower-fat diet long term, helping to prevent recurrence even when there may be predisposing factors, such as hyperlipidemia. For dogs and cats with acute gastroenteritis, nutritional management
can help manage clinical signs, such as vomiting, by reducing meal volume with small, frequent meals.\textsuperscript{2} There is no single diet or nutritional approach, however, that meets the needs of every patient with GI signs. In order to select a nutritional plan for a dog or cat with GI disease, the patient’s nutritional assessment (Table 1),\textsuperscript{3,4} clinical signs, history and physical examination findings, laboratory findings, imaging, medication history, and other factors must be considered. Once a patient is evaluated from both nutritional and medical perspectives, the general nutritional case approach (Box 1) can be followed to select an appropriate diet and feeding plan for the dog or cat. This includes making a problem list, selecting nutrients of concern for the individual patient, and using that information in addition to the nutritional assessment to choose a diet and make feeding recommendations. Because there are a variety of nutritional options for GI disease, it is important to follow this process for all patients to create an individualized approach for dogs and cats with GI disease.

This review focuses on factors to consider when making a nutritional plan for a dog or cat with GI disease. This includes the nutrients of concern, nutritional approaches for common GI diseases, feeding management strategies, dietary options, dietary supplements, and diet selection for a small animal patient with GI disease.

**NUTRIENTS OF CONCERN FOR GASTROINTESTINAL DISEASE IN DOGS AND CATS**

After a problem list is made, there are a variety of different nutrients to consider when selecting a diet for GI disease in dogs and cats. These nutrients, which should be increased or decreased relative to the current diet, are called nutrients of concern or key nutritional factors. For many nutrients, there also is a target maximum level or minimum level to strive for when selecting a diet.

Nutrients and other factors to consider for patients with GI disease include digestibility, energy, protein, fat, fiber, and cobalamin. Not every nutrient of concern for GI disease is relevant for every patient. For example, cobalamin is not a nutrient of concern for a dog or cat with a single episode of acute gastroenteritis due to dietary indiscretion, but it is a key nutrient to consider for patients with chronic enteropathy. The nutrients of concern vary depending on the patient’s clinical status, the nutritional assessment, the clinical signs present, the nature of the GI disease, and the chronicity of disease.

**Digestibility**

Although digestibility is a diet characteristic and not an actual nutrient, it is an important consideration in the selection of a diet for patients with GI disease. Digestibility

<table>
<thead>
<tr>
<th>Table 1</th>
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<tr>
<td><strong>Components of a nutritional assessment</strong>\textsuperscript{3,4}</td>
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<tr>
<td>Patient assessment</td>
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<td>Feeding management assessment</td>
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refers to the ability of a diet to be digested by an animal, which has an impact on nutrient absorption in the GI tract and ultimately nutrient utilization. Digestibility is impacted by mechanical, enzymatic, chemical, and bacterial breakdown of the diet. Digestibility considerations can be applied to the diet as a whole or to individual nutrients in the diet, such as the dietary protein.

The goal for patients with GI disease is to provide a highly digestible diet, except in cases of fiber-responsive disease. Overall digestibility and fecal quality have been better when dogs were fed highly digestible proteins compared with proteins with lower digestibility. Fat and carbohydrate digestibility, however, also are important for the digestibility of the diet as a whole. Many patients with GI disease have difficulty digesting and tolerating dietary fat, such as those with exocrine pancreatic insufficiency. Varying the starch or soluble carbohydrate sources also can have a significant impact on diet digestibility, although processing of raw materials also can have a major impact. Finally, the overall diet digestibility is impacted by the amount and type of dietary fiber, which vary for GI patients depending on the condition managed and the chosen diet. Because digestibility is not listed on pet food labels, veterinarians may need to contact a manufacturer to ask about the digestibility of a given diet.

The ability of animals with GI disease to digest food and absorb dietary nutrients can be compromised, so a more digestible diet is used to compensate for this. All animals with GI disease can benefit from a highly digestible diet, unless the dog’s or cat’s condition is fiber-responsive. When a higher-fiber diet is needed, special attention should be paid to the digestibility of the ingredients providing dietary protein, fat, and soluble carbohydrate to ensure that these nutrients are easy to digest and absorb. Higher-fiber diets are lower in total digestibility, but it still is important to have highly digestible proteins, fats, and soluble carbohydrates.

**Energy**

Providing adequate energy allows an animal to continue normal physiologic processes while ill. Energy requirements may vary depending on many factors, including age, spay/neuter status, life stage, breed, illness, activity level, and other factors. For most patients, the goal when providing energy and estimating or calculating energy requirements is to achieve and maintain ideal body condition. In sick patients with GI or other diseases, however, this may not be a primary goal. Daily energy
intake for hospitalized patients should be calculated as resting energy requirement (RER) × 1.0 (with RER = 70 × [current body weight in kg]0.75) for most patients, and daily energy intake should be increased gradually up to this amount in malnourished patients.10 For patients that are discharged, the energy intake typically is increased to maintenance energy requirements (MERs) (also called daily energy requirement), which are calculated as RER × the appropriate factor based on life stage and activity. This calculation can be performed using current or ideal weight, depending on the patient. Animals with decreased digestive capacity may need more energy than the average animal. For patients that are underweight at discharge, or for patients with compromised digestion, a starting point for calorie intake can be obtained by calculating RER for ideal weight and then multiplying by 1.4 to 1.6 (adult dogs) or 1.2 to 1.4 (adult cats) to calculate MER for weight gain. These MER factors are derived from the factors used to maintain weight in adult dogs and cats,12,13 so it is important to calculate ideal weight and use ideal weight in the RER and MER calculations to allow for weight gain. One method to calculate estimated ideal weight for underweight patients is to divide current body weight by the percent of ideal weight the patient currently is at, which is based on body condition score (BCS). For BCS 4/9, divide by 90% (0.9); for BCS 3/9, divide by 80% (0.8); for BCS 2/9, divide by 70% (0.7); and for BCS 1/9, divide by 60% (0.6).

In addition to the amount of energy provided to the patient, the energy density of the chosen diet should be considered. Many patients with GI disorders have dysrexia, and using a more energy-dense diet can help reduce meal volume. If fat restriction is desired, however, it is more difficult to feed a high energy density to the patient, because protein and carbohydrates are lower in energy density than dietary fat.11

**Protein**

Both the amount of protein and the type of dietary protein should be considered when selecting a GI diet. Unless there are concurrent diseases, the amount of dietary protein most profoundly has an impact on patients with pancreatitis. High levels of dietary protein and/or fat can stimulate pancreatic secretions. In both cats and dogs, diet can increase pancreatic secretions due to stimulation of cholecystokinin and other GI hormones by luminal nutrients, such as long-chain fatty acids, amino acids, peptides, and protein.14–17

The type of protein in the diet also can have an impact on GI health. All patients with GI disease benefit from highly digestible protein sources. In patients with chronic enteropathy or adverse food reactions, however, the source of dietary protein is extremely important in the management of clinical signs. Options for patients needing a specific protein type to manage chronic enteropathy and/or adverse food reactions include hydrolyzed proteins or novel proteins.5 Hydrolyzed proteins are broken down enzymatically with the intent of decreasing stimulation of the immune system.18 Novel proteins are proteins to which the patient never has been exposed, and selection is based on a comprehensive diet history.5

Increasing dietary protein can be beneficial for palatability reasons or for helping replenish the dog’s or cat’s body’s protein supplies after or during GI protein malabsorption or loss. This could occur with maldigestion and protein-losing enteropathies. Decreasing dietary protein relative to the current diet is not necessary for patients with GI disease unless they have concurrent conditions, such as hepatic encephalopathy.

**Fat**

The level of fat in a GI patient’s diet is important for previously mentioned reasons, including the stimulation of pancreatic secretions in both dogs and cats and the
impact of dietary fat on the energy density of a diet. Increasing dietary fat can help patients gain weight and can allow for small meal volumes in dysrexic patients. Dietary fat typically is not difficult to digest unless the fat digestion process is impaired.\textsuperscript{5} When fat malabsorption occurs, there can be steatorrhea and/or significant weight loss. Dogs with pancreatitis or protein-losing enteropathies, such as lymphangiectasia, however, can benefit from fat restriction.\textsuperscript{5} Dogs with pancreatitis benefit from fat restriction because this helps minimize hyperlipidemia and because high dietary fat can stimulate the onset of pancreatitis as well as pancreatic secretions,\textsuperscript{19} whereas dogs with lymphangiectasia benefit from fat restriction because it helps reduce lacteal dilation and lymphatic flow.\textsuperscript{20} Cats with GI disease seem to have more tolerance of dietary fat compared with dogs,\textsuperscript{21} and fat restriction should not be a focus for the majority of cats with GI disease.

Fish oil omega-3 fatty acids, eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA), may be beneficial for patients with GI disease. EPA and DHA are long-chain polyunsaturated fatty acids with beneficial therapeutic effects demonstrated in patients with skin disease, renal disease, and other inflammatory and noninflammatory conditions.\textsuperscript{22} EPA and DHA are thought to have anti-inflammatory effects.\textsuperscript{23} Up to this point, no clinical trial has been done using EPA and DHA in canine or feline patients with intestinal inflammation or other GI diseases, but the anti-inflammatory nature of EPA and DHA suggests that patients with inflammatory GI diseases, such as inflammatory bowel disease may benefit from fish oil supplementation.\textsuperscript{22,24,25}

Although some patients benefit from fat restriction, others can benefit from increased dietary fat. In dogs with GI disease, but without pancreatitis or lymphangiectasia, or if the patient is a cat, increasing dietary fat can be beneficial for patients that cannot tolerate large meal sizes, underweight patients, or dysrexic patients.

**Fiber**

Moderate amounts of fiber can be used for multiple GI conditions and to improve GI health, including to manage constipation and to potentially alter the microbiome.\textsuperscript{26} Excessive amounts of fiber, however, are not beneficial for patients with GI disease. Increasing dietary fiber can reduce both the energy density and overall digestibility of the diet.\textsuperscript{27} In patients with impaired digestive capacity, poor appetites, or low BCSSs, high levels of dietary fiber may be contraindicated. In addition, the type of dietary fiber, not just the total amount of fiber, can have an impact on the digestibility of the diet.\textsuperscript{28}

All fibers are classified as nondigestible carbohydrates and can be classified further as fermentable or nonfermentable and as soluble or insoluble. Fermentability refers to the ability of the fiber to be fermented by microbes in the colon of the dog and cat. Fermentation results in short-chain fatty acid production, which can benefit the host.\textsuperscript{29} Solubility is a measure of the ability of the fiber to dissolve in water. In general, soluble fibers tend to be more fermentable than insoluble fibers.\textsuperscript{29} Soluble fibers, such as pectins, gums, and psyllium, dissolve in water, which can result in softer and wetter feces, whereas insoluble fibers, such as cellulose, provide bulk and do not dissolve in water.\textsuperscript{26,30} Many diets formulated for patients with GI disease are formulated with a small amount of dietary fiber but contain mixed fiber, meaning there are both soluble and insoluble fiber sources in the diet.

In patients that can tolerate fiber, it is important to look at both the amount of fiber and the type of fiber. When evaluating a diet for fiber content, it is important to look at both the soluble and insoluble fiber content of a diet. A veterinarian may need to contact the company regarding these values if they are not available in the product guide or other manufacturer materials. The measurement of total dietary fiber represents
both soluble and insoluble fiber, whereas the crude fiber content refers to mostly insoluble fibers.31,32 In patients with GI disease, soluble fiber can increase fecal moisture by dissolving in water in the GI tract and forming a viscous gel. Soluble fiber also can slow gastric emptying.33 Insoluble fibers can decrease GI transit time33 in addition to increasing fecal bulk. Overall, the balance of fibers in a diet influences GI health and fecal quality.34

Prebiotics are fermentable fibers that support the animal by stimulating growth of beneficial bacteria in the GI tract.29 Prebiotics can be included in GI diets and other therapeutic or nontherapeutic diets and potentially can help benefit the dog or cat by altering the GI microbial populations.30,35 Examples of prebiotics used in pet foods include fructooligosaccharides, beet pulp, and inulin.

Although all patients with GI disease can benefit from small amounts of mixed fiber sources, some patients need moderate to high amounts of fiber. Patients that can benefit from diets with higher fiber content include those with colitis, with fiber-responsive diarrhea, and some with constipation.

**Cobalamin**

Cobalamin, or vitamin B₁₂, can become deficient in dogs and cats with GI disease. Although cobalamin deficiency has multiple potential causes, 1 potential mechanism by which vitamin B₁₂ deficiency occurs in dogs and cats with GI disease is poor absorption of cobalamin. Many of the GI conditions that result in hypocobalaminemia are chronic versus acute. Examples of conditions that can be associated with cobalamin deficiency include exocrine pancreatic insufficiency, chronic enteropathies, hepatobiliary diseases, and GI lymphoma.36,37 In dogs with chronic diarrhea, hypocobalaminemia was found associated with more severe disease.38 Cobalamin is absorbed exclusively in the ileum, so the presence of inflammation or other signs of disease having an impact on the ileum can have a significant impact on cobalamin status. Intrinsic factor, which binds vitamin B₁₂ and promotes ileal absorption, is produced primarily in the pancreas in dogs and cats. Pancreatic disease may result in decreased intrinsic factor production and release, which can cause decreased absorption of cobalamin and hypocobalaminemia.36,39 In many cases of dogs and cats with hypocobalaminemia, supplementation of vitamin B₁₂ can result in partial or complete resolution of GI signs, and signs of the primary disease may not resolve without cobalamin supplementation.36,39

Patients with chronic GI signs should be tested for cobalamin deficiency and supplemented if deficient. One example of a cobalamin supplementation protocol includes both oral and parenteral supplementation recommendations. In this commonly used parenteral protocol, cobalamin (250 μg for cats and 250–1500 μg for dogs, depending on body weight) is given subcutaneously weekly for 6 weeks and then repeated in a month. Testing should be repeated 1 month after the last dose to determine if further supplementation or work-up is needed.40 The alternative oral supplementation protocol involves cobalamin (250 μg for cats and 250–1000 μg for dogs, depending on body weight) given daily for 12 weeks and then testing 1 week later to determine the next course of action.40

**NUTRITIONAL APPROACHES FOR COMMON GASTROINTESTINAL DISEASES IN DOGS AND CATS**

Once a patient is assessed for medical and nutritional issues, diagnostics are performed, and a final or tentative problem list is established, it is important to identify which problems in the patient’s problem list can be managed by nutritional
modification. Although many diseases have a nutritional component of management, there are some that do not. It is important to identify which problems are addressed with diet.

Once a clinician narrows down the problem list and includes aspects of the nutritional assessment in that problem list (problems like an abnormal BCS or decreased muscle condition), it is important to identify goals for nutritional modification and the nutrients of concern that help the clinician manage the disease with nutrition. One example of a goal for nutritional modification is providing supportive care for recovery in patients with pancreatitis. The nutrients of concern are increased digestibility, decreased dietary fiber, the use of moderate levels of dietary protein, and reduced dietary fat.1

Examples of common GI diseases in dogs and cats include pancreatitis, acute gastroenteritis, chronic enteropathy and inflammatory bowel disease, protein-losing enteropathy and lymphangiectasia, and chronic constipation. Table 2 outlines the key nutrients of concern for these conditions and the levels of these nutrients that are beneficial for these patients.1,5,26,41–50 Often, these goals for nutrients of concern are in relation to a pet’s current diet. For example, a patient that develops pancreatitis while consuming a low-fat diet (less than 30 g of fat per 1000 kcal of food) may need to be switched to an ultra–low-fat diet (less than 20 g of fat per 1000 kcal) to help manage clinical signs of pancreatitis. The diet history of the dog or cat is essential when making a dietary recommendation for a pet with GI disease, because it is important to know what levels of the key nutrients of concern the patient currently is being fed. In addition, the problem list of the patient is important to ensure that these recommendations for diet selection are appropriate. If the patient has another major systemic disease, such as chronic kidney disease, recommendations and nutrients of concern may change depending on the dog’s or cat’s diagnoses.

**DIETARY OPTIONS FOR PATIENTS WITH GASTROINTESTINAL DISEASE**

There is a vast selection of diets that can be used for dogs and cats with GI disease. Box 2 includes a comprehensive list of different diet options for patients with GI disease. There is no specific diet option that works for all patients with a single disease. Patients should be evaluated and managed as individuals. For example, some dogs and cats with chronic enteropathy respond well to elimination diets (novel or hydrolyzed protein), whereas others do not. Another example is cats with pancreatitis, which may but does not always occur in conjunction with intestinal inflammation and cholangiohepatitis.42 In cases of feline pancreatitis with concurrent intestinal inflammation, a novel or hydrolyzed protein diet may be beneficial, whereas cases without intestinal inflammation may benefit from a highly digestible GI diet.

One important consideration when selecting a diet is that calories have to come from some combination of the 3 macronutrients: protein, fat, and carbohydrate. If the primary goal is fat restriction, then the relative amount of protein and carbohydrate in the diet increases to provide calories to the patient. Because many GI diets are fat restricted, they have higher levels of soluble carbohydrate and/or protein.

Home-cooked diets should be used with caution. They can be beneficial in cases of multiple disease processes present and there is no commercial option available for the patient and in cases of a dog’s or cat’s appetite that is poor and the patient will not consume a commercial diet. Home-cooked diets must be properly formulated, however, in order to provide complete and balanced nutrition for the patient as well as address the pet’s medical issues. There are several reports of nutritional inadequacy of home-cooked diet recipes that have been found in books and on the Internet.51–54
<table>
<thead>
<tr>
<th>Condition</th>
<th>Energy Densityb</th>
<th>Protein Amount</th>
<th>Protein Type</th>
<th>Fat</th>
<th>Fiber</th>
<th>Fiber typec</th>
<th>Cobalamin Supplementation Needed?</th>
<th>Benefit of Common Supplements Discussed?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pancreatitis (dogs)1</td>
<td>Moderate</td>
<td>Moderate</td>
<td>Highly digestible</td>
<td>Low to ultralow</td>
<td>Low</td>
<td>Mixed</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Pancreatitis (cats)1,41,42</td>
<td>Moderate to high</td>
<td>Moderate</td>
<td>Highly digestible, novel, or hydrolyzedd (depending on the presence of concurrent inflammatory conditions)</td>
<td>Moderate</td>
<td>Low</td>
<td>Mixed</td>
<td>Yes, after testing (especially if occurring in conjunction with inflammatory bowel disease)</td>
<td>Probiotics or synbiotics may be helpful, depending on clinical signs (especially if occurring in conjunction with inflammatory bowel disease)</td>
</tr>
<tr>
<td>Acute gastroenteritis2</td>
<td>Moderate to high</td>
<td>Moderate</td>
<td>Highly digestible</td>
<td>Low to highe</td>
<td>Low</td>
<td>Mixed</td>
<td>No</td>
<td>Probiotics or synbiotics may be helpful, depending on clinical signs</td>
</tr>
<tr>
<td>Chronic enteropathy/inflammatory bowel disease5,43–46</td>
<td>High</td>
<td>Moderate</td>
<td>Highly digestible, novel, or hydrolyzedd</td>
<td>Low to moderate (can go high in patients with low BCS)</td>
<td>Low (some animals may respond to higher fiber)</td>
<td>Mixed</td>
<td>Yes, after testing</td>
<td>Probiotics or synbiotics may be helpful, depending on clinical signs</td>
</tr>
<tr>
<td>Condition</td>
<td>Energy Density</td>
<td>Protein Type</td>
<td>Dietary Fiber Type</td>
<td>Diet Manifestation</td>
<td>Probiotics or Synbiotics</td>
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<tr>
<td>Colitis[^2,^47]</td>
<td>Moderate</td>
<td>Moderate to high</td>
<td>Highly digestible, novel, or hydrolyzed[^d]</td>
<td>Moderate</td>
<td>High (if fiber is tolerated) or low (if fiber is not tolerated)</td>
<td>Mixed No, unless concurrent ileal inflammation is suspected</td>
<td>Probiotics or synbiotics may be helpful, depending on clinical signs</td>
<td></td>
</tr>
<tr>
<td>Protein-losing enteropathy/lymphangiectasia[^2,^48]</td>
<td>Moderate</td>
<td>Moderate to high</td>
<td>Highly digestible, novel, or hydrolyzed[^d]</td>
<td>Low to ultra-low</td>
<td>Low</td>
<td>Mixed Yes, after testing</td>
<td>Probiotics or synbiotics may be helpful, depending on clinical signs</td>
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<tr>
<td>Chronic constipation[^26,^49,^50]</td>
<td>Low to moderate</td>
<td>Moderate</td>
<td>Highly digestible</td>
<td>Moderate</td>
<td>Low to high</td>
<td>Mixed, mostly soluble</td>
<td>No Fiber supplementation may be helpful, depending on selected diet, response, and clinical signs</td>
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</table>

[^a]: The definition of the values associated with “low” or “high” or other values used in this table may vary among nutritionists. The values provided here are those used by the author. For the purposes of this table, energy density greater than 4000 kcal/kg is considered high, whereas low is less than 3100 kcal/kg for dogs and 3250 kcal/kg for cats (according to the Association of American Feed Control Officials definition of “low calorie”).[^66] For protein, less than 45 g/1000 kcal can be considered low for a dog, whereas greater than 70 g/1000 kcal can be considered high. For cats, a protein less than 70 g/1000 kcal is considered low, and greater than 100 g/1000 kcal is considered high. For dogs, ultralow can refer to a fat level less than 20 g/1000 kcal, low can refer to a fat level less than 30 g/1000 kcal, and high can refer to anything greater than 45 g/1000 kcal. In cats, under 30 g/1000 kcal to 35 g/1000 kcal can be considered low fat and high can refer to anything greater than 50 g/1000 kcal. For total dietary fiber (soluble fiber + insoluble fiber), less than 30 g/1000 kcal can be considered low whereas greater than 45 g/1000 kcal can be considered high. When selecting a diet, however, there are many factors to consider. Veterinarians may not be able to select a diet that fits all parameters at the same time. In these cases, prioritizing the problem list is important and making nutritional decisions based on priorities may be necessary.

[^b]: Energy density depends on the nutrient composition of the diet, including the dietary fat and fiber.

[^c]: Fiber type can be mainly soluble, mainly insoluble, or mixed soluble/insoluble.

[^d]: The protein type depends on the response to a food trial and the presence of intestinal inflammation.

[^e]: The ideal level of dietary fat for dogs and cats with acute gastroenteritis remains to be determined. Sources say that low fat can be beneficial for these patients[^2] but there is no study investigating the benefits of fat restriction versus the benefits of providing a diet with high energy density to reduce meal volume.
There also is a report of lack of owner compliance with home-cooked diets.\(^5\) If a home-cooked diet is needed for an individual patient, it is recommended that the diet be formulated by a board-certified veterinary nutritionist and that regular client follow-up is done to ensure that the home-cooked diet recipe is fed as intended. A board-certified veterinary nutritionist can be found at www.acvn.org/directory.

### FEEDING MANAGEMENT STRATEGIES FOR PATIENTS WITH GASTROINTESTINAL DISEASE

Because patients with GI disease frequently have dysrexia in addition to clinical signs, such as vomiting or diarrhea, it is recommended that most patients be fed small, frequent meals when food is introduced. Most patients can be started at 25% to 50% of their RER for current weight, depending on the degree and duration of anorexia, clinical signs, and underlying disease.\(^2,10\) If a patient has more severe clinical signs, complete anorexia, and/or a long duration of dysrexia, it is wise to start at the lower end of this range (ie, 25% of RER) and gradually work up to 100% of RER over 3 days to 7 days. Once the patient has stabilized, clinical signs have resolved, and the patient has been discharged, it usually is safe to work up to the patient’s MER over the course of a week or 2.

Assisted feeding also may be beneficial for patients with GI disease. In patients lacking a gag reflex, or in patients with intractable vomiting or severe malabsorption, partial parenteral nutrition may be warranted. Most patients respond well, however, to antiemetics and assisted enteral nutrition can be used. Enteral nutrition is more physiologic versus parenteral nutrition and can benefit the GI tract by providing luminal nutrients for the enterocytes.\(^5\) Early enteral nutrition has been shown to improve morbidity and mortality in dogs with pancreatitis,\(^5\) be well tolerated in cats with pancreatitis,\(^5\) and improve clinical outcome and weight gain in dogs with parvovirus enteritis.\(^6\)

Patients do not need to be fasted through periods of vomiting and diarrhea, especially if the vomiting can be controlled with antiemetic therapy. Several studies have shown the benefit of early enteral nutrition, and it is well tolerated, even in both canine and feline patients with pancreatitis.\(^5\) Patients with diarrhea do not benefit from fasting, and gut barrier function may be impaired by fasting.\(^6\) Feeding through the GI tract, even if feeding small, frequent meals, is easy, safe, and physiologic for most patients.\(^6\)

**Box 2

Dietary options for dogs and cats with gastrointestinal disease**

- “Sensitive digestion” over-the-counter diets
- Low-fat commercial veterinary therapeutic GI diets
- High-fiber GI diets
- Hydrolyzed protein diets
- Novel protein diets
- Moderate-calorie commercial veterinary therapeutic GI diets
- Moderate-fat to high-fat commercial veterinary therapeutic GI diets
- Commercial veterinary therapeutic GI diets formulated or Association of American Feed Control Officials feeding trial-tested for growth
- Home-cooked diets
For any patient that benefits from an elimination diet, either novel or hydrolyzed protein, a food elimination trial is required to make a diagnosis of food-responsive enteropathy. Food trials require strict elimination of all known dietary antigens. A full diet history (Box 3) is necessary to select a diet for the trial, especially if utilizing a novel protein diet. Once a diet is selected, that diet alone should be fed for the duration of the trial, which generally is recommended to be 1 week to 4 weeks in patients with GI signs alone and up to 12 weeks in patients with signs of cutaneous adverse food reactions in addition to GI signs. A diet challenge should be done at the end of the trial to confirm the diagnosis of adverse food reactions.

**COMMON DIETARY SUPPLEMENTS FOR GASTROINTESTINAL DISEASE**

There are many dietary supplements available for dogs and cats, some of which are marketed for patients with GI disease or GI signs. Some common dietary supplements for dogs and cats with GI disease include probiotics, synbiotics, and fiber supplements. Dietary supplements are not closely regulated, so caution should be used when veterinarians are recommending them.

Probiotics are live microorganisms that may provide the animal with a beneficial health effect. Synbiotics contain both prebiotics and probiotics, which provide an animal with similar benefits but in different ways. Although probiotic and synbiotic supplements are used frequently in veterinary medicine, and may have some benefits, there is limited evidence that these supplements have a strong positive benefit in dogs and cats with specific GI diseases. As with all supplements, it is important to use a quality probiotic or synbiotic supplement from a trusted brand or reputable company with published research on its products as well as to investigate the quality control of the supplement.

Fiber supplements also are utilized in patients with GI disease. In general, fiber supplementation is most beneficial for dogs with constipation or fiber-responsive diarrhea, cats with constipation, or cats with large bowel signs due to inflammatory bowel disease or other conditions. Some investigators recommend pure psyllium supplementation at 1.25 mL or 0.25 tsp per meal, but the ideal dosing strategy for psyllium or other fiber supplements has not been determined at this time. Severely constipated cats with additional conditions, such as chronic kidney disease, who cannot consume a high fiber GI diet due to concurrent diseases, may require more

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**Box 3**

**Components of a full diet history**

- Diet type, amount, and frequency + duration of feeding + how it is measured
- All treat types, amounts, and frequency
- Table scraps/human foods amounts and frequency
- Food for medication administration
- Food for training
- Other pets’ food (if any access)
- Any other food or treats the pet may consume
- Dietary supplements
- Flavored medications
- Flavored toothpaste
than a 1.25 mL or 0.25 tsp twice daily. When veterinarians recommend fiber supple-
mentation, ensuring adequate water intake is essential.

Some veterinarians also recommend canned pumpkin as a fiber supplement. Canned pumpkin is mostly water (90 g water per 100 g canned pumpkin) with little fi-
ber (2.9 g total dietary fiber per 100 g canned pumpkin). It may, however, be bene-
ficial for some patients.

SUMMARY

Although there are many factors to consider when managing dogs and cats with GI
diseases with nutrition, the most important things to keep in mind are the primary pri-
orities for the patient (which usually are 1 to 2 items on the patient’s problem list that
require the most attention) and that an individualized approach should be taken for all
patients. Not all patients with 1 disease process benefit from a single diet. There are
many dietary options for GI disease because different patients benefit from different
diets and nutritional strategies. Box 4 contains guidelines for selecting a GI diet.

Diet selection should be tailored to the individual patient, and, because nutrition is
an iterative process, the dog or cat should be reassessed to ensure that the diet se-
lection and nutrition plan is ideal for that patient.

DISCLOSURE

Dr C.E. Lenox discloses that she is a full-time associate of Royal Canin.

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