Nutritional Strategies for Cats With Diabetes

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Abstract

Diabetes mellitus is a common endocrine disorder among cats, and nutritional therapy plays a central role in optimizing glycemic control and supporting diabetes remission. Dietary strategies should account for the cat's carnivorous physiology, with emphasis on reducing carbohydrate intake, maintaining adequate protein, and tailoring energy density to body condition. To restore insulin sensitivity, weight loss in overweight cats should be encouraged by feeding nutrient-dense, moderate-carbohydrate, high-fiber diets designed for calorie restriction; normal-weight or underweight cats likely benefit most from low-carbohydrate, energy-dense diets. Feeding strategies, including dividing meals into smaller portions, may further improve glycemic stability and enhance clinical outcomes.

Take-Home Points

- Low-carbohydrate canned diets are ideal for normal-weight and underweight cats with diabetes, offering lower carbohydrate content and higher moisture.
- A primary goal for overweight cats with diabetes is safe, controlled weight loss; however, moderate dietary carbohydrate content should still be considered.
- Feeding smaller, more frequent meals may improve glycemic stability by reducing glucose fluctuations after each meal.

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Diabetes mellitus affects approximately 0.5% of the feline population and represents one of the most common endocrine disorders among cats.[1] In most cats, the condition closely resembles type 2 diabetes in humans, characterized by insulin resistance and progressive β-cell dysfunction.[2] Although medical management remains the cornerstone of treatment, nutritional therapy plays a major role in achieving optimal glycemic control and, in many cases, diabetes remission.

The nutritional management of cats with diabetes requires a multifaceted approach that considers the feline carnivorous nature, individual patient factors, and therapeutic goals. Cats have evolved as obligate carnivores with unique metabolic adaptations that influence their response to different macronutrients.[3] This article reviews key considerations for nutrition of cats with diabetes, including carbohydrate management, the role of dietary fiber, protein requirements, and how to base dietary strategies on body condition to optimize glycemic control and support successful outcomes.

Nutritional Assessment and Initial Considerations

The first step in nutritional management involves comprehensive assessment of body condition, muscle condition, and current dietary intake. Many cats with diabetes are obese, which significantly affects insulin sensitivity. Research demonstrates that each kilogram increase in body weight can reduce insulin sensitivity by 30% in cats, making weight management critical to successful management and clinical diabetes remission.[4]

Obesity in cats creates a complex metabolic environment that predisposes them to insulin resistance. Adipose tissue in obese cats produces inflammatory cytokines such as serum amyloid A, which interfere with insulin signaling pathways.[5] In addition, enlarged adipocytes become less responsive to insulin, reducing glucose uptake and perpetuating hyperglycemia.[6]

For overweight cats, controlled weight-loss programs should target reduction of 0.5% to 2% body weight per week. Based on ideal weight in kilograms, feeding at or 20% below resting energy requirements by using the equation $70 \times BW\ kg^{0.75}$ is often recommended.[7] However, weight reduction should be delayed until patients with diabetes achieve stable glycemic control and cease unintentional weight loss. Careful monitoring is essential as excessive calorie restriction can trigger hepatic lipidosis, especially in cats with suboptimal glucose regulation.

When evaluating diets for cats with diabetes, it is helpful to understand how macronutrient levels are categorized. Reference ranges for protein, carbohydrate, and fat content are expressed as percentage of metabolizable energy (% ME) and as grams per 1000 kcal (**TABLE 1**).

Carbohydrate Management

Although the overall body of literature remains limited, available evidence supports lowering carbohydrate intake for optimal glycemic control.[8,9] Cats have evolved by consuming prey containing <5% ME from carbohydrates, compared with 20% to 40% ME in many commercial cat foods.[10]

Canned foods may benefit cats with diabetes because they are typically lower in carbohydrates and provide more moisture than dry kibble diets. Many canned foods contain 5% to 10% ME (14 to 28 g/1000 kcal) from

TABLE 1 Macronutrient Levels in Feline Diets*

MACRONUTRIENT LEVEL	% ME	G/1000 KCAL
Protein		
Low	<28	<80
Moderate	28–45	80–129
High	>45	>129
Carbohydrate		
Low	<10	<29
Moderate	10–30	29–86
High	>30	>86
Fat		
Low	<25	<29
Moderate	25–40	29–47
High	>40	>47

ME = metabolizable energy.
**Values are calculated by using modified Atwater factors for pet food (protein = 3.5 kcal/g; carbohydrate = 3.5 kcal/g; fat = 8.5 kcal/g). The ranges represent the author's opinion for categorizing macronutrient levels in feline diets.*

carbohydrates, aligning better with the natural carnivorous diet of cats.

Diabetes management requires understanding glycemic index and glycemic load (TABLE 2).

- **Glycemic index** measures how quickly a carbohydrate source raises blood glucose compared with oral pure glucose (scale of 0 to 100).
- **Glycemic load** accounts for both the glycemic index and the quantity of carbohydrates consumed, reflecting the total glucose burden on the body. Glycemic load provides a more accurate prediction of blood glucose response than glycemic index because it considers portion size and total carbohydrate content.

For cats with diabetes, glycemic load may be more clinically relevant than glycemic index because it reflects the total glucose burden imposed on the system. In nondiabetic cats, comparison of carbohydrate sources with varying fiber content and digestibility revealed relatively minor effects on postprandial glucose and insulin concentrations, which contrasts with the more pronounced differences documented in humans and dogs.[11] Portion size also plays a critical role. Even when the same total daily amount of carbohydrate is consumed, offering food in smaller, more frequent meals results in more stable glucose and insulin levels in healthy cats.[12] This approach may improve glycemic stability in cats prone to postprandial hyperglycemia.

The Role of Dietary Fiber

Dietary fiber significantly influences glycemic response and should be evaluated along with total carbohydrate content.[13] Fiber affects glucose metabolism by delaying gastric emptying and reducing nutrient absorption. Soluble fibers form viscous gels that slow gastric transit, moderating the rate at which carbohydrates reach the small intestine.

Because crude fiber measurements required on pet food guaranteed analyses do not capture the soluble fiber fraction, it is difficult to accurately assess the true carbohydrate content of a diet without knowing the total dietary fiber (TDF) content. New labeling standards set by the AAFCO will soon require TDF and carbohydrate contents on feline diet packaging, enabling more accurate evaluation of a food's carbohydrate composition.

There is no recognized formula for assessing the glycemic index or load of a diet based on carbohydrate and TDF content alone. At best, one can estimate available carbohydrate (total carbohydrates minus TDF) and infer that higher fiber generally lowers glycemic response; however, true glycemic response of a particular diet requires in vivo testing.

Protein Requirements

Although no optimal protein level has been established specifically for cats with diabetes, the goal is to provide sufficient protein to maintain muscle mass and nitrogen balance. Protein requirements for cats with diabetes may be higher than for those without, particularly during periods of poor glycemic control when protein catabolism increases. Because dietary energy must be the sum of protein, carbohydrates, and fat, reducing carbohydrates will naturally result in elevated levels of the other 2 macronutrients. Generally, it is recommended that cats with diabetes consume protein at a relatively high level (40% to 50% ME; 114 to 142 g/1000 kcal) unless contraindicated.

Tailoring Dietary Strategy to Body Condition

The optimal dietary approach varies according to the patient's current body condition as weight management significantly affects insulin sensitivity and glycemic control.

TABLE 2 Examples of Glycemic Index and Glycemic Load in Food for Humans[a]

FOOD[b]	GLYCEMIC INDEX	CARBOHYDRATES (PER SERVING, GRAMS)	GLYCEMIC LOAD
Watermelon	High (72)	11	Low (8)
Oatmeal	Moderate (55)	58	High (32)

[a]Application to feline diets: Consider providing smaller, frequent meals to reduce glycemic load and blood glucose variability.
[b]Despite the higher glycemic index for watermelon, oatmeal leads to a significantly greater glucose response due to its larger quantity of carbohydrate, demonstrating why glycemic load is more clinically relevant than glycemic index alone.

Overweight and Obese Cats

For overweight cats with diabetes, the primary goal is achieving weight loss. Choosing a therapeutic weight-loss diet with enhanced nutrient density helps avoid deficiencies, and the typically higher fiber content of these diets can slow carbohydrate absorption and blunt postprandial glucose elevations.[13] Weight-loss diets are also formulated with lower energy density, allowing larger meal volumes that enhance satiety, lessen hunger-driven behaviors, and support better owner compliance. Reviewing nutrient profiles of diets appropriate for weight loss and prioritizing those with lower overall carbohydrate content is recommended. Note that weight loss should be delayed until glycemic control is stable, after which a controlled program targeting 0.5% to 2% body weight reduction per week can be implemented with close monitoring.

Normal-Weight and Underweight Cats

For normal-weight or underweight cats, an energy-dense, low-carbohydrate diet is ideal. These patients do not require calorie restriction; therefore, dietary selection can focus primarily on optimizing macronutrient composition. Energy-dense formulations allow adequate caloric intake in smaller volumes, which is beneficial for cats with reduced appetite.

Meal Timing

Traditional recommendations emphasize feeding cats with diabetes twice daily in conjunction with insulin administration. Part of the rationale of this approach is to prevent hypoglycemia by ensuring that the patients consume a meal before insulin administration. However, feeding 2 large meals per day rather than 4 smaller meals leads to higher overall glucose concentrations in healthy cats, with more pronounced peaks 10 to 12 hours after eating.[12] For patients with poorly controlled diabetes, small meals or grazing may provide better glucose control. Continuous glucose monitoring may help determine optimal feeding strategies for individual patients.

Summary

Nutritional management is an essential component of successful care for cats with diabetes, complementing medical therapy and offering the potential to improve glycemic control and achieve diabetes remission. For normal-weight and underweight cats with diabetes, a low-carbohydrate approach is best, particularly when canned diets can be used, due to their typically lower carbohydrate content and higher moisture levels. For overweight cats with diabetes, safe and effective weight loss should be prioritized while also considering overall carbohydrate intake. Weight-loss diets with higher fiber content can reduce the overall glycemic load even when total carbohydrate percentages seem moderate. In addition, dividing meals into smaller, more frequent portions may reduce glucose variation due to lower glycemic loads at each meal.

Although low-carbohydrate diets remain ideal for many cats with diabetes, clinical reality often demands flexibility. Understanding the principles of glycemic load, fiber effects, and individual patient factors enables veterinarians to develop practical nutritional strategies that optimize metabolic control and compliance. TVP

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