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CANINE DIABETIC DIETS

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INTRODUCTION
Diabetes mellitus is a common canine endocrinopathy. There are several recognized types of diabetes mellitus, but insulin-dependent (IDDM) appears to occur most commonly in dogs. Because of this, insulin therapy is most important in managing dogs with diabetes mellitus; however, diet can aid in management. The role of diet in canine diabetes mellitus can be viewed of in terms of (1) dietary ingredients, (2) timing and amount of meals, and (3) nutriceuticals that may aid response to insulin.

DIETARY INGREDIENTS
Fiber – Fiber has received the most attention as a dietary component for management of dogs with IDDM. In the past, dietary fiber was considered to have little, if any, nutritive value, and so was called "filler." Today, fiber is in vogue. Dietary fiber refers to all nondigestible cell wall components of plants including non-starch polysaccharides and non-poly saccharides. Fibers can be classified in many ways, based on their function, solubility in aqueous solutions, and their fermentability. Fibers may be classified according to their functions: structural polysaccharides (cellulose, hemicellulose, and some pectins), non-cellulose polysaccharides (pectins, gums, and mucilages), and structural non-poly saccharides (lignin). Water soluble food fibers include certain hemicelluloses, pectins, gums, mucilages, agar, and carrageenan; water insoluble food fibers include cellulose, certain hemicelluloses, resistant starches, and lignins. Although insoluble fibers tend to have low fermentability and soluble fibers tend to have high fermentability, solubility does not equate to fermentability.

Dietary fiber has many physiological effects that depend, in part, on amount and type present in the diet. Consumption of a high, insoluble-fiber diet (15% dry matter) was associated with better control of alloxan-induced IDDM in dogs. This was also found to be true in dogs with spontaneously occurring IDDM when fed either a 12% (dry matter) insoluble fiber diet or a high fiber diet containing a mix of insoluble and soluble fiber.

Use of high fiber diets may be associated with problems, however. Diets with high insoluble fiber content are associated with a larger fecal volume and bulk, which may be unacceptable to owners. High fiber diets are also typically low fat, which means that dogs must eat a larger quantity of food to meet energy requirements; this may not be possible for some dogs resulting in weight loss.

We have completed a study evaluating consumption of two diets by dogs with spontaneously occurring IDDM: a 7% (dry matter) insoluble fiber diet and a 15% (dry matter) insoluble fiber diet. Glycemic control was as good on the lower fiber diet when compared with the high fiber diet. (Bartges JW, et al. Unpublished data. 2004) Therefore, a diet containing a "moderate" amount of insoluble fiber may be as good as a "high" fiber diet in dogs with IDDM.

Other Dietary Constituents – While dietary carbohydrate restriction is beneficial in some cats with diabetes mellitus, this has not yet been proven to be beneficial in dogs.

Type of Diet – For dogs with IDDM, feeding a diet containing moderate to high amounts of insoluble fiber or a mix of insoluble and soluble fiber is associated with better glycemic control.

TIMING AND AMOUNT OF MEALS
Human beings with diabetes mellitus are often counseled to eat 3 meals a day (breakfast, lunch, dinner) and 3 snacks a day (morning, afternoon, bed). This schedule blunts the post-prandial glycemic response to a meal. While feeding small meals more frequently may help dogs with IDDM, this schedule is often neither possible nor practical. Furthermore, glycemic response to food consumption by human beings is managed by taking short-acting insulin based on the blood glucose and carbohydrate content of the meal, which is not feasible in dogs. Since most dogs are well controlled on intermediate-acting insulin (NPH or Lente) administered q12hr, meals should coincide with the administration of insulin.

NUTRICEUTICALS
Chromium and vanadium influence insulin metabolism, and, while controversial, are sometimes incorporated into management of human beings with diabetes mellitus. Chromium picolinate was not shown to be beneficial in dogs with spontaneously occurring IDDM over a 12-weeks period. Vanadium has not been shown yet to be of benefit either. Certainly, further work is required to determine a role, if any, for nutriceuticals in the management of canine IDDM.

BOTTOM LINE
Most dogs have IDDM and require insulin. Dietary management should include a moderate to high fiber diet fed at least q12hr to coincide with insulin administration. Other dietary components and nutriceuticals have not shown benefit as of yet. Nutritionally, management of obesity and maintaining optimal body condition is important. Dietary management as with pharmacologic management of canine IDDM should be individualized.

REFERENCES