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Diabetes

New therapies on the horizon

Diabetes is one of the most common glandular disorders of cats. It is a condition in which the blood sugar levels remain chronically elevated. This occurs because the pancreas cannot make enough insulin, or the cat becomes insensitive to available insulin. Insulin is the main hormone that regulates blood sugar.

Cats and dogs can get diabetes, although cats are affected more often. Male cats get diabetes about twice as often as female cats. Obese cats run a greater risk of becoming diabetic, however, if left untreated, diabetic cats will lose weight over time.

The classic clinical signs of diabetes are increased water consumption, increased urination, excellent (almost ravenous) appetite, and weight loss. Other diseases, such as hyperthyroidism, may show similar signs, however, blood tests and physical examination allow a definitive diagnosis of diabetes to be made.

Treatment of diabetes usually involves insulin injections to stabilize blood sugar. Occasionally, oral medications are successful in controlling the diabetes, however, most cats given oral medications eventually require insulin injections.

Dietary therapy has always been an important part of diabetes management. For many years, diets that were high in complex carbohydrates, such as fiber, have been recommended for diabetic humans. These recommendations were extrapolated to other veterinary patients, including cats, with good results. However, recent studies suggest that a high-protein, low-carbohydrate diet may be superior to high-fiber diets in the management of diabetes.

The most significant study was described in the Summer 2001 issue of *Veterinary Therapeutics*. Nine adult, client-owned cats with diabetes of at least four-months duration were initially fed a high-fiber, moderate-fat canned diet for 1 to 2 months, to establish a standardization period. All cats were then transitioned onto a high-protein, low-carbohydrate canned diet for the three-month treatment period. A complete blood count, chemistry panel, and several other blood, urine, and behavioral parameters were assessed at the start, the midpoint, and the end of the study. Cats were monitored closely during the treatment period, and insulin dosages were adjusted as necessary. Cat owners were asked to maintain a diary to record food intake, changes in their cat's activity, drinking habits, excretory habits, and any other significant observations.

The clients' recorded perceptions of appetite, activity, urination, and health showed a slight improvement, and all cats did well during the treatment period. Body weight remained stable throughout the study. The most significant findings were related to the insulin requirements. The total dose of insulin required to regulate the diabetes decreased significantly during the treatment period. The daily dose of insulin decreased in 8 of the 9 cats. Remarkably, 3 cats no longer required any insulin at all to control their disease! The response to dietary change occurred quickly, during the first half of the treatment period.

The primary goal of diabetes therapy is to control the clinical signs that result from excessively high blood sugar, i.e. excessive thirst and urination, ravenous appetite, and weight loss. Many owners of diabetic cats find the act of administering daily injections of insulin disconcerting. For those owners unwilling or unable to administer once or twice daily insulin injections, a high-protein, low-carbohydrate diet may be able to improve and prolong an acceptable quality of life in a diabetic cat.

Cats, like humans, can develop two forms of diabetes. In Type-1 diabetes, the pancreas is incapable of making sufficient quantities of insulin to control the blood sugar, and insulin injections are required to regulate the disease. Cats with Type-2 diabetes are able to produce insulin, however, their bodies become insensitive to their insulin and don't respond properly. Type-1 diabetics require insulin injections; they will not respond to oral medication designed to lower the blood sugar. Type-2 diabetics, however, they may respond to oral medications as well, eliminating or delaying the need for injections. Unfortunately, there is no definitive test to determine whether a cat has Type-1 vs. Type-2 diabetes. Oral therapy often involves trial and error on the part of the veterinarian.

For years, glipizide was the only oral medication prescribed for diabetic cats with Type-2 diabetes. The drug works by enhancing insulin secretion from the pancreas. Response to this drug, in my experience, has been disappointing, and side effects, such as vomiting, limit the effectiveness. However, many new oral formulations have become available for the treatment of diabetes in humans, and it may not be long before their use in cats becomes routine. (See Sidebar)

Metformin is an oral drug that works primarily by inhibiting the release of sugar into the bloodstream by the liver. The drug seems to work well in humans, however, studies in cats are currently lacking. Acarbose is a drug that works in an entirely different fashion. It blocks dietary glucose absorption from the intestine. Initially developed as a starch blocker to treat obesity in humans, this drug may have application in the treatment of obese diabetic cats. A third group of drugs that may offer hope for diabetics are those drugs that enhance the body's sensitivity to its own insulin. Troglitazone has been used successfully in humans with Type-2 diabetes, and studies suggest that it may slow the progression of diabetes when used early in the course of the illness. Studies in cats are currently underway. Compounds containing the metals vanadium and chromium have been shown to have insulin-like properties when administered in the drinking water of diabetic mice. A United States Department of Agriculture Study of 180 people with Type-2 diabetes found that chromium picolinate given once daily ameliorated the classic signs of diabetes. Vanadium compounds hold promise as a future therapy for people with Type-2 diabetes, are currently being investigated for this purpose. Preliminary studies in

cats show that oral vanadium will decrease blood sugar concentrations and alleviate some of the clinical signs of diabetes in cats with early Type-2 diabetes.

With appropriate treatment, diabetic cats can live for many years. Continued research on dietary therapy, oral medications, and insulin treatment has important implications on longevity and quality of life for diabetic cats.

Oral medications that may have application in the treatment of diabetes in cats:

Drug	Mechanism of Action
Glipizide	increases insulin secretion from the pancreas
Metformin	inhibits release of glucose from the liver
Acarbose	impairs glucose absorption from the intestine
Troglitazone	increases body's sensitivity to insulin
Chromium	increases body's sensitivity to insulin
Vanadium	increases body's sensitivity to insulin