

Pancreatic problems

The disease that results from pancreatic problems depends on what part of the pancreas is not working properly. First, let's look at dysfunction arising from the exocrine pancreas.

• Pancreatitis

Acute pancreatitis (inflammation of the pancreas) more commonly affects middle-aged to older dogs, obese dogs, and female dogs. The cause of pancreatitis is not often known, but localized trauma or the ingestion of a fatty meal are often implicated. The disease may be mild to severe. Complications may arise when the stored digestive enzymes (zymogens) are released into the pancreatic and surrounding tissues where they can cause an inflammatory reaction, and in severe cases they may begin to digest the dog's own tissues.

Signs are often nonspecific and vary depending on the severity of the disease. A dog with mild pancreatitis may simply appear to have a "belly ache," and mope around and lose her appetite for a day or two. More severe cases may include a sudden onset of vomiting, loss of appetite, depression, fever, abdominal discomfort, and dehydration. Symptoms may be severe enough to lead to shock and collapse.

Diagnosis is not always easy due to the nonspecific symptoms, but blood tests may be helpful. Serum amylase and lipase or the newer pancreatic lipase immunoreactivity (PLI) or pancreatic trypsin-like immunoreactivity (TLI) tests may be most useful. Radiographs, ultrasound, and CT scans may also be helpful.

Pancreatitis frequently recurs in those critters I refer to as "garbage hounds" – dogs who love to get into the household garbage pails and wolf down forbidden foods with glee. The tendency is for each bout of pancreatitis to be more severe than the one before; the theory is that these recurrences of acute pancreatitis – due to the repeated inflammation, immune response, and tissue necrosis and scarring they create – eventually lead to an increased risk for developing diabetes mellitus.

Treatment is generally nonspecific, varying with the severity of symptoms. A severe case of pancreatitis – intense vomiting, pain, etc. – is a medical emergency: See your vet as soon as possible. Pain control may be necessary, and intravenous fluids may be indicated in cases where shock is a possibility.

After a course of the disease, the pancreas should be rested by restricting food and water for 4 to 5 days. Particularly fatty foods should be severely reduced in the diet, and measures should be instituted to avoid the onset of diabetes: prevent obesity, plenty of exercise, and maintain a nonstressful, dog-friendly environment. The dog's long-term prognosis may not be good, depending on the severity of the lesions suffered by the pancreas.

• Exocrine Pancreatic Insufficiency

Exocrine pancreatic insufficiency (EPI) is caused by a deficiency of pancreatic digestive enzymes that eventually results in malnourishment. In dogs it appears most commonly in German Shepherds. Affected animals typically lose weight even though they have a ravenous appetite (these animals will often eat anything they can get their mouths around). They typically pass large volumes of semi-formed, greasy feces (since dietary fats are not being digested).

Fecal examination will often confirm the problem; your vet can check for undigested food particles and the presence of enzymes in the feces. Most dogs respond favorably when commercially available pancreatic enzyme supplements are added to the diet. However, since pancreatic tissue doesn't regenerate, treatment will generally be lifelong.

• Pancreatic Tumors

The most frequent pancreatic tumor is an islet cell carcinoma (insulinoma) derived from the insulin secreting Beta-cells. These tumors generally are found in dogs 5 to 12 years old; they are frequently hormonally active and secrete excessive amounts of insulin, causing hypoglycemia.

The resulting symptoms are those associated with low blood sugar, including muscular twitching and weakness, exercise fatigue, mental confusion, changes of temperament, and occasionally seizures. The symptoms often come and go, but they typically become worse and more frequent as the disease progresses.

Symptoms are easily confused with other primary neurological diseases such as epilepsy or brain tumors. Dogs with insulinomas typically have abnormally low (< 60 mg/dL) fasting blood glucose. Some veterinarians recommend that any older dog with neurological signs should have his blood glucose monitored.

Cancers of the exocrine pancreas are rare, but when they do occur, they can be aggressive and invasive.

Diabetes: The problem of the endocrine pancreas

Diabetes is a general term referring to disorders characterized by extreme thirst (polydipsia) and excessive urine excretion (polyuria).

The "diabetes" that most of us are familiar with is diabetes mellitus, which comes in several forms (including Type I, Type II, and Type III), all of which involve a relative or absolute insulin insufficiency. Since it is a condition of the pancreas, diabetes mellitus will be discussed here.

Much of the endocrine function of the pancreas is devoted to the production of insulin; 60 to 70 percent of the islet cell population are insulin-secreting Beta-cells. Insulin is the key factor in the metabolism of glucose (the energy-creating end-product of carbohydrate digestion), but insulin is also involved in the metabolic pathways of fats and proteins.

Glucose does not readily penetrate into cells (except for a few tissues such as the brain, liver, and blood cells); as stated earlier, insulin is critical for the movement of glucose through cell membranes into the cells. The net effects of insulin are to lower blood concentrations of glucose, fatty acids, and amino acids, and to promote intracellular conversion of these compounds to their storage forms (i.e., glycogen from glucose, triglycerides from fatty acids, and protein from amino acids).

The most important factor in the control of insulin secretion is the concentration of blood glucose; it is a positive feedback system in which increased concentrations of glucose (after a meal, for example) lead to increased secretion of insulin.

Diabetes mellitus is an insulin-deficient condition where there is either not enough insulin produced for the amount of glucose in the blood, or where the insulin that is produced is not functionally normal and thus is not able to produce the required cellular reactions.

Some breeds – notably Keeshonds, Pulis, Miniature Pinschers, and Cairn Terriers – seem to have a genetic predisposition to diabetes, and some, including Poodles, Dachshunds, Miniature Schnauzers, and Beagles, have an increased potential for developing the disease.

• **Symptoms:** As mentioned earlier, dogs with diabetes are forever thirsty, and as a consequence they urinate frequently.

The urine from dogs with diabetes mellitus animals will contain glucose. When the blood glucose levels exceed about 180 mg/dL, glucose begins to spill over into the urine, where it can be detected by urine dip sticks – or the good old taste test. If we were living in past centuries, we would simply dip our finger in the urine and taste it; today we have urine dipsticks that measure glucose content. Ancient practitioners also noted that bees were attracted to the urine from animals with diabetes mellitus.

Diabetes mellitus is a chronic and insidious disease. Although dogs are hungry and eat a lot, they lose weight and gradually become weaker. Muscle mass will gradually deteriorate, and the animal will not want to exercise.

The abnormal utilization of fat for energy may lead to an overproduction of ketones. Affected animals will often have the typical diabetic “fruity-sweet” smell of ketones. Note that only some people have the scent receptors that give them the ability to smell ketones; for others (I am one of the others) ketones are a “non-aroma.” Ketoacidosis is a severe overproduction of ketones and may cause disorientation, lethargy, and ultimately collapse. Test strips are available to detect the presence of ketones in the urine.

Many diabetic dogs develop cataracts, and the whitening of the eyes may be the first overt sign the caretaker notices.

Affected animals also become more susceptible to recurrent infections; cystitis, bronchitis, and skin problems are common, perhaps due to decreased neutrophil function associated with the excess of sugar in the blood. The liver, due to increased mobilization of body fats, may enlarge, and its function will be impaired by the fatty accumulations.

Human diabetic patients commonly incur retinitis and/or blood vascular conditions that may ultimately lead to limb amputations, but fortunately these two conditions are not common in diabetic dogs.

• **Diagnosis:** Diagnosing diabetes mellitus is based on persistent fasting hyperglycemia (blood glucose levels higher than normal) and glycosuria (the presence of glucose in the urine). The normal fasting value for blood glucose in dogs (and cats) is 75-120 mg/dL. Some animals may have a transiently high blood glucose level as a result of stress (especially cats), and some drugs (glucocorticoids and others) may elevate blood glucose levels.

There are two additional tests that may be helpful in diagnosis: serum glycosylated hemoglobin and fructosamine. These tests rely on the fact that glucose binds to many proteins in the body, and the “average” amount of glucose present in the blood over a period of time can be determined by evaluating its concentration on these proteins.

Glycosylated hemoglobin measures the average amount of glucose that the hemoglobin in red blood cells (RBCs) was exposed to over their lifespan, and since canine RBCs live for about 120 days, the measurement gives us a picture of average blood glucose levels over those past 120 days. Fructosamine measures glucose amounts bound to serum albumins; values indicate the average glucose concentration over the previous 1 to 2 weeks.

For diagnostic confirmation, to judge the severity of the disease, or (more commonly) to monitor the progress of the therapy being used to control the disease, your vet may want to do a glucose-tolerance curve, which is a way to test the animal’s efficiency in the removal of an excess of ingested glucose over a short period of time.

• **Predisposing factors:** Surveys indicate that extensive pancreatic damage, likely from chronic pancreatitis, causes about 28 percent of canine diabetes cases. Environmental factors such as feeding of high-fat diets and allowing the animal to become obese are associated with pancreatitis and therefore are likely to play a role in the development of diabetes in dogs.

Diabetes diagnosed in a female during pregnancy or diestrus is comparable to human gestational diabetes. Interestingly, at least one (human) study has shown that secondhand smoke is related to an increased incidence of diabetes, and other studies have demonstrated that correct dietary levels of calcium and vitamin D (or exposure to adequate sunlight) may help prevent diabetes.

While there is not yet any actual published data that show overt Type II diabetes occurs in dogs or that obesity is a risk factor for canine diabetes, an open-minded observation of the actual animals that have the disease leads me to believe that at least some dogs resemble the human Type II diabetes and that obesity is at least one of the causative factors involved in the development of the disease in dogs.

• **Treatment:** Successful therapy, no matter the course chosen, will require that the dog's caretakers be willing to undertake long-term and vigilant monitoring of blood glucose levels. They should also endeavor to thoroughly understand how both the disease and its treatments work, so they will know, by the symptoms of the dog, when to change the rate or dosage of the medicines. They must be willing to give daily insulin injections (if necessary), and be prepared to deal with a hypoglycemic crisis if it occurs from an insulin overdose.

Conventional treatment begins with a combination of weight reduction and diet (high in fiber and complex carbohydrates). Intact females should be spayed, as their blood sugar may prove more difficult to control during estrus.

If diet and weight reduction do not control the disease, injectable insulin will be necessary. There are more than 20 forms of injectable insulin available, with several made especially for dogs. Each form of insulin has a unique time of onset and duration of activity. Your vet will likely recommend the one with which she is most familiar and successful. Insulin injections may be required once or twice daily.

• **Nonconventional therapies** for dia-betes run the usual gamut of medicines, including acupuncture, homeopathy, herbal, and nutritional therapies. Life style changes will almost certainly be needed; more exercise to reduce weight and attention given to reducing stress are commonly prescribed. Therapies such as calming herbs, massage, flower essences, and aromatherapy may be indicated to reduce the dog's stress.

For the obese animal, specific nutritional supplementation should include a high fiber, weight-reducing diet. There are some commercial products available that purport to be supportive of diabetic animals. Check with your holistic veterinarian.

Niacin (vitamin B-3) plays an important role in carbohydrate metabolism, and research shows that one of its precursors, niacinamide (the substance found in most "enriched" grains), can protect pancreatic cells from diabetes-inducing factors. Biotin and vitamin B-6 are also important nutrients in carbohydrate metabolism and for helping prevent diabetic complications.

Vitamin E has been shown to reduce blood sugar levels in diabetics, and thiamine plays a huge role in the proper regulation of glucose metabolism and pancreatic Beta-cell function. Vitamin C is important for blood sugar regulation in humans and animals; supplementation with vitamin C has been shown to decrease insulin resistance and improve glucose regulation (in mice).

Poor control of diabetes has been associated with low serum magnesium, and as already mentioned, low levels of calcium and vitamin D are associated with increased chances for developing diabetes. Zinc and selenium, too, have a proven role in preventing diabetes. Chromium, in just micro doses, appears to be very helpful for some cases of diabetes. Chromium picolonate is the biologically active form, and its action is to increase the number of cell receptors for insulin; it would thus be most helpful for Type II diabetes.

Note: In all cases of nutrient supplementation, be certain that you are providing a balanced level of the nutrients. Check with your holistic veterinarian to be sure.

Worldwide there have been more than 1,200 herbs that have been used to treat diabetes. Out of these, several have shown promise on animals, including: fenugreek, dandelion, garlic, cinnamon, and Madagascar periwinkle. Ask a qualified herbalist who has worked with animals for correct dosages and ways to use the herbs.

I have had success when using classical homeopathy and acupuncture with diabetic patients. Admittedly my cure rates were not as high as with other diseases, but they were high enough to justify the recommendation to try an alternative approach initially.

• **One final caveat:** Diabetes may be the most-discussed disease on this planet – meaning the Internet is chock full of information (correct and incorrect), good and bad advice, cure-all proclamations, and downright hooey. You can learn a lot about diabetes on the Internet, but ... buyer and user beware!