

## **Diabetes Mellitus in the Dog**

### **What is diabetes mellitus?**

Diabetes is a condition caused by a deficiency in a very important hormone known as insulin. Insulin is made by the pancreas which is located next to the small intestine. Insulin is released into the bloodstream, where it helps to control and regulate blood glucose levels. Insulin's main job is to help move glucose from the bloodstream into the cells and tissues of the body. Once in the cell, glucose is used as an important energy source for needed cell functions. Glucose is an important fuel source for the body – its function is essentially the same as that of gasoline for a car, it is the fuel source that allows all the body systems to have the energy to go.

### **What causes diabetes?**

In most dogs, diabetes occurs secondary to immune-mediated destruction (self-attack) of that part of the pancreas that makes insulin. The cause of this destruction is unknown although genetic predisposition and environmental factors may play a role in some.

### **What are common clinical signs?**

Without insulin, even though there may be plenty of glucose in the bloodstream, it cannot move into the cell and the cells essentially starve in the face of plenty. The animal starts to show clinical signs due to glucose deficiency inside the cell as well as the excessive build up of glucose in the blood. Each patient is a bit different in the symptoms that they show, but some common clinical signs that may occur include hunger (as the brain senses a lack of glucose), weakness, increased urination (as excess glucose in blood is filtered by kidneys and lost in the urine along with water), and increased thirst (to compensate for increased water loss in the urine). Other clinical problems that may develop include bacterial infection in the bladder (glucose is a good energy source for bacteria) and vision loss due to cataracts. Cataracts (a white to blueish opacity of the normally clear lens of the eye) occur as high blood glucose levels cause sorbitol formation (a large sugar) and subsequent water trapping in the lens. Cataract formation is irreversible once it occurs.

### **How is diabetes diagnosed?**

Diabetes is diagnosed based on history, clinical signs and the results of routine screening tests (CBC, biochemistry profile, urinalysis). Other tests (urine culture, blood pressure assessment, and others) may be recommended based on the results of the screening tests.

### **How is diabetes treated?**

Insulin therapy makes up the cornerstone of management, although diet and exercise are important considerations as well. Initial hospitalization is recommended after the diagnosis is made, so insulin therapy can be started in the hospital. Several (two to four or more) spot blood glucose levels are checked within the four to 12 hours after insulin is given to make sure the starting insulin dose is not too high. Once discharged, your dog will need to continue to receive insulin shots twice daily. It will likely be a bit new and confusing at first, but our nurses will help teach you how to give the insulin injections and in a short time, the process should become quite familiar and comfortable.

### **What type of home care is recommended for the dog with diabetes?**

In general, home care involves consistent and regular exercise habits, dietary recommendations and insulin therapy. Some general guidelines in these areas include:

1. **Diet:** regular daily feedings given at the same time each day (for example, 7 a.m. and 7 p.m.) help to maintain optimum diabetic regulation. Maintaining an appropriate body weight is also important (we will help you determine the optimum weight for your pet). Specific guidelines for exactly how much to feed, when to feed and what type of diet to feed will be recommended. Meals and treats outside of the regular schedule are discouraged as they will make regulation of blood sugar levels more challenging.
2. **Recommended diets:** while earlier studies seemed to indicate that diets higher in fiber and lower in fat were optimal in the management of diabetes in the dog, today the consensus of opinion of diabetic specialists is that a nutritionally complete maintenance diet is perfectly adequate. The most important part of dietary management is that your dog is fed a high quality diet in the appropriate amount at specific times.
3. **Consistent exercise habits are beneficial.** Sudden increased bouts of strenuous exercise (eg, such as a spontaneous long weekend hike) may increase glucose requirements, decrease insulin needs, and interfere with adequate regulation.

### **How is insulin therapy given?**

There are several different types of insulin to choose from for treatment of diabetes. Generally speaking, at the time of diagnosis, an appointment time will be set up so the nurse and doctor can go over specific recommendations as to the type of insulin recommended, dose recommended, and special precautions that need to be taken in regards to appropriate storage and handling of insulin for your pet. The doctor and nurse will also teach you how to give insulin shots, so you are very comfortable and confident before you leave the office and embark on home care on your own. A schedule for follow up appointments will be recommended – these follow up appointments are critically important in insuring ongoing regulation of diabetes in your pet.

**What type of monitoring and rechecks are recommended?** Diabetes is often a constantly changing disease and frequent veterinary rechecks are often necessary to help guide therapy and provide for the early detection of complications. Some general guidelines include the following:

#### **1. Regular rechecks**

Your pet should return for a recheck evaluation (examination, CBC, profile, UA and urine culture) every four to six months.

#### **2. Glucose profile**

This test involves taking a very small sample of blood every two hours for 12 to 24 hours. It is critical in determining how your pet is responding to insulin therapy. Glucose profiles are done initially to determine the best insulin dose, as well as whenever the insulin dose is changed, or if clinical signs suggest poor regulation.

#### **3. Planning for the recheck blood glucose profile**

When you return for a blood glucose profile, the doctor will often ask you to bring with you in a small cooler your pet's insulin, insulin syringes, and enough food for the next meal. We will likely ask you to feed your pet breakfast at home before you come. When you arrive at the clinic, a nurse will assist you while you administer

your pet's morning insulin shot. The nurse will then get your pet set up in a comfortable cage for the glucose profile, while you fill out a recent history form letting us know how your pet has been doing and if any new problems have arisen. If you are interested in learning how to do a blood glucose profile at home, we can assist you in getting properly set up for it. |

#### **4. Other testing**

If your dog becomes sick, or develops symptoms which suggest poor regulation (decreased appetite, increased thirst, increased urination, urinary accidents in the house, depression, etc), then a recheck visit should be scheduled more immediately.

#### **5. What about glucose monitoring of the urine?**

As excess glucose can be noted in the urine both with insulin overdose and underdose, this method is not recommended for monitoring.

#### **What about home blood glucose monitoring?**

If you are interested in performing home glucose profiles, our nurses can assist (many owners do this very successfully at home). You will need to be taught how to obtain blood samples from your dog (our nurse can show you during an appointment time) and you will need to purchase a device that measures glucose levels in the blood (a glucometer). Our currently recommended glucometer is AlphaTrak by Abbott Veterinary. During the beginning stages of insulin therapy, it is important to bring along your glucometer with your pet during scheduled blood glucose rechecks (so we can compare the values with our in house glucose lab measurements to insure accuracy). Once we are certain that blood glucose values agree with those obtained in our clinic, blood glucose profiles can be performed at home and the results reported to the doctor for ongoing recommendations in regards to insulin therapy.