



Lilydale Clinic
484 Maroondah Highway
Lilydale VIC 3140
P (03) 9739 5244 F (03) 9735 5509

Yarra Glen Clinic
28 Bell Street Yarra Glen VIC 3775
P (03) 9730 1569

www.yarrarangesvet.com.au
clinic@yarrarangesvet.com.au

DIABETES MELLITUS

What is diabetes mellitus?

Diabetes mellitus is a fairly common disorder and is most often seen in dogs 5 years of age or older. Diabetes mellitus is a disease of the pancreas. This is a small but vital organ that is located near the stomach. It has two significant populations of cells. One group of cells produces the enzymes necessary for proper digestion. The other group, called beta-cells, produces the hormone called insulin. Simply put, diabetes mellitus is a failure of the pancreas to regulate blood sugar.

Some people with diabetes have to have daily injections of insulin and others take oral medication. Is this true for dogs?

In humans, two types of diabetes mellitus have been discovered. Both types are similar in that there is a failure to regulate blood sugar, but the basic mechanisms of disease differs somewhat:

1. Type I, or Insulin Dependent Diabetes Mellitus, results from total or near-complete destruction of the beta-cells of the pancreas. This is the only type of diabetes known in dogs. As the name implies, dogs with this type of diabetes require insulin injections.
2. Type II, or Non-Insulin Dependent Diabetes Mellitus, is different because some insulin-producing cells remain. However, the amount produced is insufficient. People with this form may be treated with an oral drug that stimulates the remaining functional cells to produce or release insulin in an adequate amount to normalise blood sugar. Because Type II diabetes is rare in dogs, generally oral medications are not appropriate for treating diabetic dogs.

Why is insulin so important?

The role of insulin is much like that of a gatekeeper: it stands at the surface of body cells and opens the door, allowing glucose to leave the blood stream and pass inside the cells. Glucose is a vital substance that provides much of the energy needed for life, and it must work inside the cells. Without an adequate amount of insulin, glucose is unable to get into the cells. It accumulates in the blood, setting in motion a series of events which can ultimately prove fatal.

When insulin is deficient, the cells become starved for a source of energy. In response to this, the body starts breaking down stores of fat and protein to use as alternative energy sources. As a consequence, the dog eats more; thus, we have weight loss in a dog with a ravenous appetite. The body tries to eliminate the excess glucose by excreting it in the urine. However, the excess blood sugar attracts water; thus, urine glucose takes with it large quantities of the body's fluids, resulting in the production of a large amount of urine. To avoid dehydration, the dog drinks more and more water. Thus, we have the four classical signs of diabetes:

Weight loss

Ravenous appetite

Increased water consumption

Increased urination

How is diabetes mellitus diagnosed?

The diagnosis of diabetes mellitus is based on three criteria: the four classical clinical signs, the presence of a persistently high level of blood glucose and the presence of glucose in the urine.

To prevent glucose loss from the body the kidneys only allow it to pass out in the urine when very high levels of glucose are circulating in the blood. This means that dogs with a normal blood glucose level will not have glucose in the urine. Diabetic dogs, however, have excessive amounts of glucose in the blood, so it will be present in the urine.

**Lilydale Clinic**

484 Maroondah Highway
Lilydale VIC 3140
P (03) 9739 5244 F (03) 9735 5509

Yarra Glen Clinic

28 Bell Street Yarra Glen VIC 3775
P (03) 9730 1569

www.yarrarangesvet.com.au
clinic@yarrarangesvet.com.au

What are the implications for me and my dog?

For the diabetic dog, one reality exists: blood glucose cannot be normalised without treatment. Treatment should be looked upon as part of the dog's daily routine. Treatment almost always requires administration of insulin and some modification of the diet.

For the owner, there are two implications: financial commitment and personal commitment.

Initially, your dog may be hospitalised for a few days to deal with the immediate crisis and to begin the regulation process. The "immediate crisis" is only great if the dog is so sick that it has stopped eating and drinking for several days. Dogs in this state, called ketoacidosis, may require a week or more of hospitalisation with a number of laboratory tests. Otherwise, the initial hospitalisation may be only for a day or two in order to start stabilisation. At that point, your dog goes home for you to administer medication. At first, return visits are required frequently to monitor progress. It may take several months to achieve good regulation.

The financial commitment may again be significant if complications arise. We will work with you to try and achieve consistent regulation, but a few dogs are difficult to keep regulated. It is important that you pay close attention to our instructions related to administration of medication, to diet, and to home monitoring. Another complication that can arise is hypoglycemia, or low blood sugar. If severe, this can be fatal. This may occur due to inconsistencies in treatment.

Your personal commitment to treating your dog is very important in maintaining regulation and preventing crises. Most diabetic dogs require insulin injections once or even twice daily. They must be fed the same food in the same amount on the same schedule every day. If you are out of town, your dog must receive proper treatment while you are gone. These factors should be considered carefully before deciding to commence treatment.

What is involved in treatment?

Consistency is vital to proper management of the diabetic dog. Your dog needs consistent administration of medication, consistent feeding, and a stable, stress-free lifestyle.

The first step in treatment is to review your dog's diet. Diets that are high in fibre are preferred because they are generally lower in sugar and slower to be digested. This means that the dog does not have to process a large amount of sugar at one time. The preferred diets are on prescription but will be supplied by the veterinary surgeon. If your dog is overweight, a special weight reducing diet may be first prescribed and then once the proper weight is achieved, another diet will be introduced. The best way to feed a diabetic dog is to feed twice daily.

The foundation for regulating blood glucose is the administration of insulin by injection. Many people are initially afraid of giving insulin injections. If this is your initial reaction, consider these points.

1. Insulin does not cause pain when it is injected.
2. We only use tiny needles that your dog hardly feels. The injected volumes are minute.
3. The injections are given just under the skin in areas in which it is almost impossible to cause damage to any vital organ.



Lilydale Clinic
484 Maroondah Highway
Lilydale VIC 3140
P (03) 9739 5244 F (03) 9735 5509

Yarra Glen Clinic
28 Bell Street Yarra Glen VIC 3775
P (03) 9730 1569

www.yarrarangesvet.com.au
clinic@yarrarangesvet.com.au

About Insulin.

Insulin comes in an airtight bottle that is labelled with the insulin type and the concentration. Rock the bottle gently to mix the contents. Some of the types of insulin used in dogs have a strong tendency to settle out of suspension. If it is not mixed well the dosing will not be accurate.

Insulin is a hormone that will lose its effectiveness if exposed to direct sunlight or high temperatures. It should be kept in the refrigerator, but it should not be frozen. Insulin should be kept out of the reach of children.

Drawing up the Insulin. Have the syringe and needle, insulin bottle, and dog ready.

Then, follow these steps:

1. Remove the guard from the needle.
2. Carefully insert the needle into the insulin bottle.
3. Draw back the plunger to the appropriate dose level, thus withdrawing the correct amount of insulin into the syringe.

Injecting the Insulin. The steps to follow for injecting insulin are:

1. Hold the syringe in your right hand (switch hands if you are left-handed).
2. Pick up a fold of skin from with your free hand (pick up a different spot each day).
3. Push the needle through your dog's skin. This should be easy and painless. However, take care to push the needle through only one layer of skin and not into your finger or through two layers of skin. The latter will result in injecting the insulin onto your dog's hair coat or onto the floor.
4. To inject the insulin, place your thumb on the plunger and push it all the way into the syringe barrel.
5. Withdraw the needle from your dog's skin.
6. Stroke your dog to reward it for sitting quietly.
7. Keep the syringe and needle and bring them to us so we can dispose of them for you.

It is neither necessary to swab the skin with alcohol to "sterilise" it.

Although the above procedures may at first seem complicated and somewhat overwhelming, they will very quickly become second nature. Your dog will soon learn that twice each day it has to sit still for a few minutes. In most cases, a reward of stroking results in a fully cooperative dog.

Is continual or periodic monitoring needed?

It is necessary that your dog's progress be checked on a regular basis. Monitoring is a joint project on which owners and veterinary surgeon must work together.

Home Monitoring

Your part consists of two forms of monitoring. First, you need to be constantly aware of your dog's appetite, weight, water consumption, and urine output. You should be feeding a constant amount of food each day which will allow you to be aware of days that your dog does not eat all of it or is unusually hungry after the feeding. You should weigh your dog at least once monthly. It is best to use the same scales each time. You should develop a way to measure water consumption. Keeping a record of your dog's water consumption.



Lilydale Clinic

484 Maroondah Highway
Lilydale VIC 3140
P (03) 9739 5244 F (03) 9735 5509

Yarra Glen Clinic

28 Bell Street Yarra Glen VIC 3775
P (03) 9730 1569

www.yarrarangesvet.com.au
clinic@yarrarangesvet.com.au

Any significant change in your dog's food intake, weight, water intake, or urine output is an indicator that the diabetes is not well controlled. We should see your dog immediately at that time for blood testing.

Monitoring of Blood Glucose

Determining the level of glucose in the blood is the most accurate means of monitoring. This should be done about every 3-4 months if your dog seems to be well regulated. It should also be done at any time the clinical signs of diabetes are present or if appreciable amounts of glucose are detected in the urine for several days. Timing is important when the blood glucose is determined.

When testing the blood we want to know the highest and lowest glucose readings for the day. The highest reading should occur just before an injection of insulin is given. The lowest should occur at the time of peak insulin effect. This is usually 4-8 hours after an insulin injection, but it should have been determined during the initial regulation process.

Therefore, the proper procedure is as follows:

1. Bring your dog to the hospital early in the morning without giving it insulin (bring your dog's normal morning meal with you).
2. A blood sample will be taken immediately, then we will give insulin and feed your dog if it did not eat at home.
4. A series of blood samples will be taken throughout the day.

What is hypoglycaemia?

Hypoglycaemia means low blood sugar. It can be life-threatening. Hypoglycaemia occurs when:

1. If the insulin dose is too high. Although most dogs will require the same dose of insulin for long periods of time, it is possible for the dog's insulin requirements to change. However, the most common causes for change are a reduction in food intake and an increase in exercise or activity. If your dog does not eat, you need to call your veterinarian. Remember that it is better for the blood sugar to be too high than too low.
2. If too much insulin is given. This can occur because the insulin was not properly measured in the syringe or because two doses were given. You may forget that you gave it and repeat it, or two people in the family may each give a dose. A chart to record insulin administration will help to prevent the dog being treated twice.

The most likely time that a dog will become hypoglycaemic is the time of peak insulin effect (5-8 hours after an insulin injection). When the blood glucose is only mildly low, the dog will be very tired and unresponsive. You may call it and get no response. Within a few hours, the blood glucose will rise, and your dog will return to normal. Since many dogs sleep a lot during the day, this important sign is easily

**Lilydale Clinic**

484 Maroondah Highway
Lilydale VIC 3140
P (03) 9739 5244 F (03) 9735 5509

Yarra Glen Clinic

28 Bell Street Yarra Glen VIC 3775
P (03) 9730 1569

www.yarrarangesvet.com.au
clinic@yarrarangesvet.com.au

missed. Watch for it; it is the first sign of impending problems. If you notice it, telephone and we will organise blood tests.

If your dog is slow to recover from this period of lethargy, you can try feeding sugar or glucose. A teaspoonful of sugar in a little water, poured into the mouth, should bring about an improvement.

If there is still no response, contact us immediately for further instructions.

If severe hypoglycaemia occurs, a dog will have seizures or lose consciousness. This can only be reversed with intravenous administration of glucose. Please telephone immediately, be it day or night.

THIS IS AN EMERGENCY.