

## DIABETES MELLITUS

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### *What is Diabetes Mellitus?*

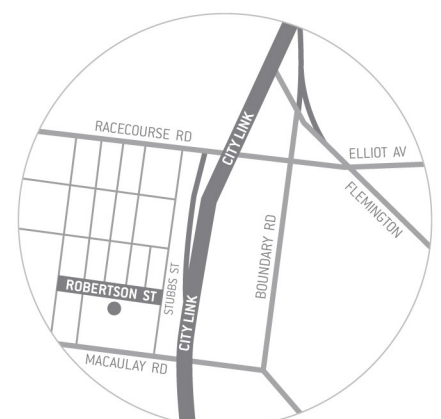
Diabetes mellitus is when the pancreas (a gland near the stomach) does not produce enough insulin to properly regulate blood glucose levels.

The cells of the body rely on glucose (a sugar) for energy. Glucose is carried within the blood and delivered to cells. However without insulin the glucose can not be passed from the blood stream into the cells. So, despite high levels of glucose in the blood, the cells of the body are starving as they do not have 'the key' (insulin) to unlock the door and let in the energy (glucose) to operate normally.

Glucose is a sugar that comes from our diet and is produced from protein and starch. If the cells can not access or obtain their energy from glucose they will use another type of energy source called ketones, which are produced from the breakdown of fat. Large amounts of ketones can be detected in the urine of animals with unregulated or untreated diabetes mellitus. If animals produce large amounts of ketones they can become depressed, start vomiting and become severely dehydrated. This is called Diabetic Ketoacidosis and requires intensive treatment in hospital.

Under normal situations the kidney is able to prevent the loss of glucose in urine. However in the diabetic animal, there is so much glucose in the blood that the kidney is overwhelmed and glucose is lost into the urine. As the glucose is lost into the urine it also pulls extra water with it. This leads to excess urine production and hence the animal must drink more to keep up with all the fluid lost due to the extra urine being produced.

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## ***What are the signs of Diabetes Mellitus?***

- 1. Eating excessively:** The low glucose level in the cells makes the body think it is hungry. As the animal cannot get the energy usually supplied by the glucose carried in the blood it tries to compensate for this by eating a lot more food.
- 2. Drinking excessively:** The high glucose levels in the bloodstream interfere with the kidneys ability to conserve water in the body. This will cause excessive urination. Because they are urinating too much they will need to compensate by drinking much more water.
- 3. Weight loss:** Despite the fact that diabetics often eat more, they often start to lose weight as most of the energy from the food cannot be properly absorbed or stored by the cells in the body.
- 4. Urinary Tract infections:** All the sugar in the urine makes the bladder an excellent place for bacteria to grow.
- 5. Cataracts:** In dogs, high amounts of sugars can enter the eye causing rapid cataract formation. The lens of the cats is different and so this problem really only occurs in dogs
- 6. Severe illness** with an animal not eating and not wanting to move, vomiting and depression can occur if diabetes mellitus is left untreated or the animal develops another disease or problem (such as running out of water on a hot day, developing a urinary tract infection or even just having an episode of gastro-enteritis). This is a severe form of diabetes mellitus called **Diabetic Keto-acidosis** (DKA) and if left untreated can lead to coma and death.

## ***Diagnosis of Diabetes***

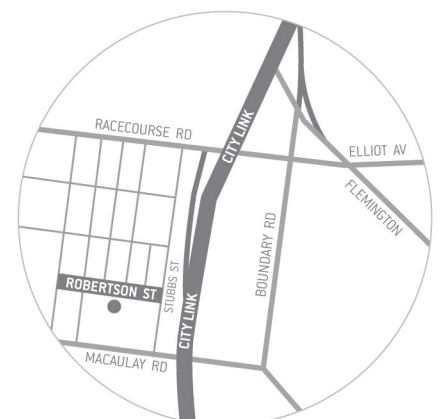
This is usually made by finding a large increase in blood glucose and a large amount of glucose in the urine. Ketones may also be found in the urine.

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Often a full blood screen is done at this time to assess if there are any other changes in other organs (such as the liver and kidney). A urine sample may also be taken to assess if there is a infection in the bladder or kidneys.

### ***Treatment of Diabetes Mellitus***

If the animal has stopped eating and has a build up of ketones in the blood (Diabetic Ketoacidosis), it may need to be hospitalised for intensive treatment with intravenous fluids and insulin therapy until it is stable.

Once an animal is stable and eating and drinking normally treatment involves insulin injections as well as dietary changes and a set exercise routine if possible.

Insulin injections under the skin are usually required twice a day and are usually done morning and night as close to 12 hours apart as possible. Although giving the injections can be a little overwhelming at first it becomes easier with practice and soon becomes part of the regular household routine. Your veterinarian will explain how much insulin to use and will be able to show you how to give these injections at home.

The insulin injections are usually given just under the skin at the back of the neck, between the shoulder blades but are also given in the flank area. Most dogs and cats do not even notice the injection. It is best to offer a meal first, and when they have eaten and/or are eating to give the injection at that time. Usually dogs should only be fed morning and night. No additional food should be fed in between times and the meals should be of equal size morning and night.

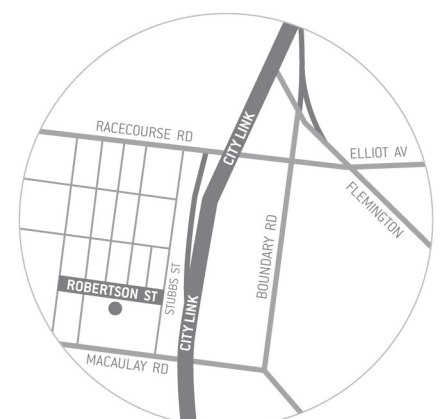
However cats, and some dogs, may be better off with a “grazing” pattern of eating with food available at all times. Your veterinarian will instruct you on the best food to offer and when.

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Twice daily injections of insulin have to be continued for life for all diabetic dogs. Cats may not always require insulin therapy and can sometimes be managed on other medications. In cats there is also the potential for the diabetes to resolve if the pancreas is able to improve its insulin secreting ability.

The amount and type of insulin can vary – as can the syringes that the insulin is given by. Make sure that you always obtain the correct syringes from your veterinarian for the insulin that you are using. All animals are different and so initially regular checks to monitor the blood glucose levels, and therefore the amount of insulin to be given, will be required. Your veterinarian will be able to tell you how often these checks will be required. Often these checks will initially be every 2 to 4 weeks and will require that your pet stays a day in hospital for regular blood glucose testing to occur.

### ***Monitoring and Treating a Diabetic at Home***

Often it is best to start a diary for a diabetic at home. This makes it easier to monitor not only how much they are eating and drinking but also if they are gaining or losing any weight. Urine reaction test strips can also be used (available from your veterinarian or a chemist) if necessary to monitor the levels of glucose and ketones in their urine.

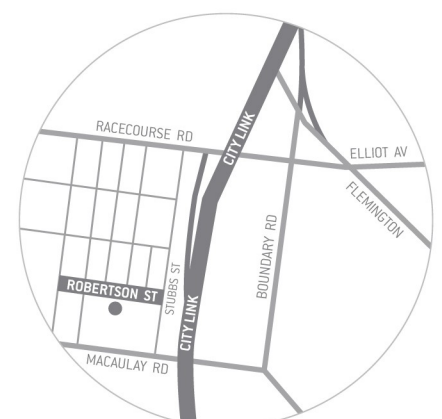
#### **Drinking**

A diabetic animal should have a source of clean water available at all times. The normal water intake for a dog or cat is around 60 to 100ml per kg of body weight in a day. This will vary with temperature and amounts of exercise but excessive drinking is a sign of unstable diabetes. Initially the water intake may have to be measured daily. Once a diabetic is stable it may only be required to measure how much water is being drunk once or twice a month.

#### **Eating**

Regulation of both exercise and diet helps all diabetic animals – usually we aim to feed 50-

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70kcal/kg/day divided into twice daily feeds. If your animal is underweight this may be increased – if overweight it may be decreased. For cats a low carbohydrate, high protein diet is ideal. Your veterinarian can recommend appropriate diets for your pet. Treats and any fatty foods should be avoided.

If it is not possible to change your pet's diet then regulation will have to be worked out around whatever your pet will eat.

## Insulin

The initial dose of insulin your pet goes home on is unlikely to be the dose they stay on forever. Sometimes a lot of fine-tuning is required to get the dose of insulin just right for your pet.

Not getting enough insulin will result in **hyperglycaemia** (high blood glucose). If this happens your animal will drink excessively, be very hungry and have a lot of glucose or even ketones present in the urine.

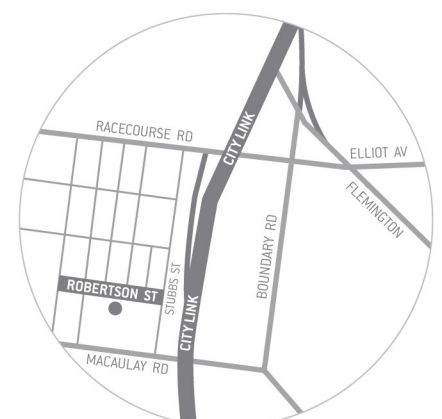
Getting too much insulin, not enough food or over exercising can result in a low blood glucose or **hypo-glycaemia**. Hypoglycaemia can be **life threatening and the symptoms** of this are varied but can include falling over, appearing very 'spaced out', shaking, lethargic or reluctant to move and will eventually progress to **seizures**. If you think that your pet may be hypoglycaemic, put some honey or glucose syrup on your pet's gums and then see a vet as soon as possible.

## Urine monitoring

Sometimes your veterinarian may wish you to monitor the amount of glucose and ketones in your animal's urine and this can be done via glucose and ketone urine test strips available from most chemists and your vet. Initially you may need to do this every day to start with and then on a weekly basis if necessary.

**Ketones:** We always aim for negative ketones. The presence of any ketones in the

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urine could mean your pet is becoming unstable and you should phone your vet clinic straight away.

**Glucose:** To start with we will not be too worried about how much glucose there is in the urine. A negative glucose means that your pet may be getting too much insulin and be at risk of a hypoglycaemic (low blood glucose) episode. Eventually we would like to see the glucose in the 1+ or 2+ range.

### ***When to return to hospital/or ring your veterinarian.***

Your veterinarian will advise you as to how often a recheck is required and if any adjustments need to be made to your animal's insulin dose.

However, you should ring your veterinarian or bring your pet in for a recheck if you note any of the following:

- Your pet seems to feel ill or is not eating
- Your pet is losing weight but still seems to have a ravenous appetite
- Your pet seems to be drinking or urinating excessively
- Ketones are present in the urine for three days in a row
- Your pet becomes disorientated or groggy

If your pet appears wobbly, 'spaced out' or appears 'drunk', the blood sugar level may have dropped too low and may have become hypo-glycaemic. This usually occurs after too much insulin has been given. First try to get your pet to eat. If they will not eat place a small amount of glucose syrup or honey on their gums and then contact your veterinarian immediately.

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