

# Low Blood Sugar in Dogs & Cats - Figuring Out Hypoglycemia

Low blood sugar, also known as hypoglycemia, is a relatively common biochemical abnormality documented in sick dogs and cats presented to the emergency room, as well as those hospitalized in Intensive Care Units for various illnesses. This week I spend some time discussing hypoglycemia so pet parents can be aware of this potential health issue. Happy reading!

## Blood Sugar Regulation in the Body

Blood sugar comes from three major sources:

- From absorption of nutrients, particularly carbohydrates, from the gastrointestinal tract
- Breakdown of stored glucose in the body (a process called glycogenolysis)
- Production of glucose in the body from other chemicals in the body (a process called gluconeogenesis)

Maintaining a normal blood glucose level requires an intricate balance of several hormones, including insulin, glucagon, epinephrine, cortisol, and growth hormone. Of particular interest in a discussion of low blood sugar is insulin, a hormone produced by special cells called beta cells in the pancreas. Beta cells secrete insulin in response to chemicals and nutrients present in the bloodstream after a meal. Insulin also inhibits the processes of glycogenolysis and gluconeogenesis mentioned earlier in this post.

## Low Blood Sugar - What causes it?

Hypoglycemia results when the use of blood glucose by the body exceeds the supply to circulation. General mechanisms of hypoglycemia are:

- Decreased nutritional intake
- Excess insulin (e.g.: insulinoma, secondary cancer, certain intoxications, certain medications)
- Increased use of glucose by the body (e.g.: infection & sepsis, pregnancy, secondary to cancer, secondary exercise, elevated red blood cell count)

- Decreased production of glucose by the body (e.g.: liver dysfunction, neonates, [Addison's disease](#), thyroid disease, pituitary gland disease, certain enzyme deficiencies)

Alone, reduced nutritional intake is unlikely to cause hypoglycemia because of compensatory mechanisms in the body. Most often patients with hypoglycemia have abnormalities in more than one mechanism listed above.

## **Low Blood Sugar - How is it diagnosed?**

The first inclination to screen for hypoglycemia is the manifestation of outward clinical signs. The brain requires glucose for normal day-to-day and essential life functions. Without it, patients develop various abnormalities, including:

- Lethargy
- Pacing
- Shaking/Trembling
- Restlessness
- Altered personality (e.g.: dullness, sleepiness)
- Unsteady walking (called ataxia)
- Visual impairment, including blindness
- Seizures
- Vomiting
- Reduced (or loss of) appetite
- Panting
- Elevated respiratory rate
- Diarrhea
- Inappropriate urination

Documenting hypoglycemia in dogs and cats is quite simple. A veterinary healthcare team member will collect a small blood sample from a patient.



Small handheld glucose meters called glucometers can be used to obtain blood glucose readings within seconds. Picture here is the AlphaTrak2 that is specifically designed for use in dogs and cats.

This is a minimally invasive test, and results are often available within seconds. Hypoglycemia is defined as  $<60$  mg/dL (3.3 mmol/L). However, most patients do not develop clinical signs of hypoglycemia until blood sugar levels drop below 50 mg/dL (2.8 mmol/L). Once hypoglycemia has been identified and confirmed, a complete diagnostic investigation to determine the definitive cause is needed. Partnering with a board-certified veterinary internal medicine specialist or emergency/critical care specialist can be invaluable to develop an efficient and cost-effective diagnostic plan for your fur baby.

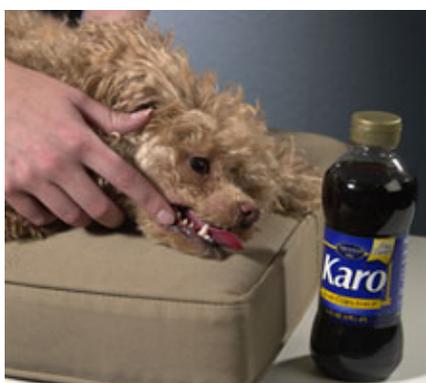
## **Low Blood Sugar - How is it treated?**

Treatment for low blood sugar typically occurs in two stages:

1. Immediate correct of hypoglycemia

## 2. Identification and treatment of the underlying cause

For patients with low blood sugar and compatible clinical signs, initial treatment in hospital is intravenous administration of a sugar solution called dextrose. If pet parents are accustomed to checking blood sugar levels in their fur baby at home and they document hypoglycemia, offering a meal may be adequate to increase blood sugar if the pet is willing and able to eat/swallow adequately. If hypoglycemia is documented at home but a patient is unable/unwilling to eat, pet parents can drizzle Karo® syrup, maple syrup, or honey onto a pet's gums. Pet parents should not place their fingers near the mouth of a pet who is actively seizing, as the animal may inadvertently bite them.



Sugar solutions like Karo syrup can be applied to a non-seizuring pet's gums if hypoglycemia is documented.

The goal of treatment is not to normalize a pet's blood glucose level. Rather the goal is to resolve any clinical signs of hypoglycemia. Once patient's blood sugar has increased enough, serial monitoring is beneficial to make sure the blood sugar level doesn't decrease again. Hospitalization may be needed to provide continued dextrose supplementation. In some circumstances, patients may require a temporary infusion of a hormone called glucagon to help maintain an adequate blood sugar level. Once a patient's blood sugar level is relatively stable, a logical diagnostic investigation should be pursued to determine the definitive cause of the hypoglycemia.

## **The take-away message about low blood sugar in dogs and cats...**

Low blood sugar, also called hypoglycemia, is a commonly blood abnormality in sick dogs and cats. Hypoglycemia causes many problems in the body, and can be life-threatening. Efficient identification and treatment of low blood sugar is vital to maximizing the likelihood of a positive outcome. Consulting with a board-certified veterinary internal medicine specialist can be invaluable to help efficiently identify and accurately treat a hypoglycemic patient.

To find a board-certified veterinary emergency and critical care specialist, please visit the [American College of Veterinary Emergency and Critical Care](#).

To find a board-certified veterinary internal medicine specialist, please visit the [American College of Veterinary Internal Medicine](#).

Wishing you wet-nosed kisses,

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