

Insulin

What is insulin?

Insulin (brand names: ProZinc®, Vetsulin®, Caninsulin®, Lantus®, Basaglar®, Humulin®, Novolin®, Humalog®, Novolog®, Levemir®) is a hormone used to treat ketoacidosis, diabetes mellitus, and in conjunction with other medications to treat high potassium levels (hyperkalemia). Its use in cats, dogs, birds, small mammals, and large animals to treat ketoacidosis, diabetes, or hyperkalemia is sometimes '**off label**' or '**extra label**'. Many drugs are commonly prescribed for off label use in veterinary medicine. In these instances, follow your veterinarian's directions and cautions very carefully as their direction may be significantly different from those on the label.

How is insulin given?

Insulin is typically given by injection under the skin. In the hospital/clinic setting, certain insulins may be injected into the vein. Follow your veterinarian's instructions on how to administer the injection under the skin. It should be given at the same time(s) each day with respect to feeding (e.g., always given immediately after a meal).

Wash your hands prior to administering the medication. Follow the directions on the packaging for how to handle the insulin; some insulins should be gently rolled and not shaken, others should be shaken thoroughly. Your veterinary healthcare team will also advise you how to handle the insulin. Inspect the insulin to make sure the solution is clear or the suspension is a uniform milky solution without particles or clumps; if the solution has clumps or looks different, it may be contaminated and it should not be given. Make sure the proper syringe is used for each specific insulin; some insulins use U-40 and some use U-100 syringes. Again, your veterinary healthcare team will advise you on the proper syringe.

Measure the dose carefully, as overdoses can be life-threatening. If storing insulin in the refrigerator, allow the injection to warm to room temperature before injecting. Ensure there are no bubbles in the syringe as this can affect the dose. Do not give injections in the same skin area every time as this can cause a skin reaction at that site. Do not give insulin to a pet that is showing signs of low blood sugar levels (see side effects below).

This medication should take effect within 1 to 2 hours; however, effects may not be noted outwardly and therefore laboratory tests will need to be done to evaluate this medication's effectiveness.

What if I miss giving my pet the medication?

If you miss a dose, **contact your veterinarian for advice on when to give the next dose**. If you cannot reach your veterinarian and your pet is acting normally and is eating, skip the missed dose and give the usual dose at the next soonest regularly scheduled time. Never give your pet two doses at once or give extra doses.

Are there any potential side effects?

Side effects include low or high blood sugar levels (at doses that are too high), insulin resistance, and skin allergic reactions to the injections. High blood sugar levels may cause increased drinking, increased urination, or increased appetite.

Serious side effects due to low blood sugar levels include weakness, lack of energy, shaking, head tilting, sleepiness, incoordination, stumbling, seizures, blindness, abnormal behavior, restlessness, twitching, or coma.

Serious side effects indicating an allergic reaction may include hives, swelling of the head or neck, or difficulty breathing. If serious side effects are noted, this is an emergency, please see what to do in case of an emergency below and take your pet to the veterinarian immediately.

This short-acting medication should stop working within 24 hours.

Are there any risk factors for this medication?

Do not use insulin in pets who are having an episode of low blood sugar levels; this can be caused by not eating, strenuous exercise, changes in the body's need for insulin, and effects of other drugs/diseases. Do not use Vetsulin® or other pork insulins in pets with a pork allergy. Insulin should be used cautiously in pregnant pets.

Are there any drug interactions I should be aware of?

The following medications should be used with caution when given with insulin: alcohol, anabolic steroids, ACE-inhibitors, angiotensin II receptor blockers, aspirin, beta-adrenergic blockers, beta-agonists, calcium channel blockers, clonidine, corticosteroids, danazol, diazoxide, digoxin, disopyramide, diuretics, fluoxetine, fluoroquinolones, oral hypoglycemics, isoniazid, MAOIs (antidepressants), niacin, pentoxifylline, phenothiazines, somatostatin derivatives, sulfonamides, or thyroid hormones.

Be sure to tell your veterinarian about any medications (**including vitamins, supplements, or herbal therapies**) that your pet is taking.

Is there any monitoring that needs to be done with this medication?

Blood glucose levels will need to be monitored on a regular basis, especially when first starting this medication; glucose monitoring tests may include glucose curves, spot glucose testing, fructosamine levels, or at home urine testing to check for ketones. Your pet's weight, appetite, fluid intake, and urination amounts should also be monitored at the clinic and at home. Monitor for serious side effects, such as signs of abnormally low blood sugar levels.

How do I store insulin?

Store unopened insulin in the refrigerator between 2°C and 8°C (36°F and 46°F). Protect from temperature extremes such as freezing (less than 2°C or 36°F) or higher temperatures greater than 30°C or 86°F. Protect from direct sunlight. Some brands of opened insulin may be stored at room temperature and other brands require refrigeration, so refer to the label on your specific bottle of insulin for exact recommendations.

What should I do in case of emergency?

If an overdose of insulin is suspected based on signs of low blood sugar levels, mildly low blood sugar levels can be treated by offering your pet some of his/her food. In more severe cases, rub Karo syrup, honey, or some other sugar syrup (**do not use sugar substitutes**) on the gums as long as your pet is not having an active seizure.

If you suspect an overdose or an adverse reaction to the medication, call your veterinary office immediately. If they are not available, follow their directions in contacting an emergency facility.

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