# Oh no! My Ferret has Insulinoma!

*The American Ferret Association Education Committee and Health Affairs Committee,* updated 2026

Dooking and bouncing, weasel-war-dancing, romping through tunnels, chasing one another and fearlessly climbing to the highest possible spot in the room…these are just a few of the things that we ferrents (parents of ferrets) love about our fur babies. It is this incredible energy that makes ferrets such dynamic and entertaining companions. So, if you begin to notice your ferret slowing down or becoming lethargic and sleeping more, the ferret should be evaluated by your vet. Many people just assume their ferret slowing down is due to "old age" but actually, one of the most common causes is insulinoma.

Insulinoma, adrenal disease and lymphoma are the most prevalent diseases in ferrets. A ferret may even develop some combination of all three at the same time. And while veterinarians and researchers work to provide treatments and cures, it is still disheartening for a ferrent to hear of such diagnoses. With all of these diseases, early diagnosis and treatment are critical to improving the ferret's prognosis and continued quality of life. In the case of insulinoma, there are two main modes for treatment.

**Insulinoma is a form of cancer affecting the islet cells (also called Beta cells) of the pancreas**. These cells regulate sugar (glucose) levels in the blood by producing insulin. Insulin is a hormone essential for the body's metabolism of carbohydrates and fats. When the islet cells proliferate out of control, they produce too much insulin for the body to use. The overabundance of insulin drives down the ferret's blood sugar, depriving cells of their primary source of energy. The ferret becomes hypoglycemic. A ferrent may notice that the ferret is not as playful, sleeps more and is generally lethargic. Other symptoms include hind-end weakness resulting in dragging the back legs or difficulty walking, drooling, "stargazing," and pawing at the mouth. The blood sugar may drop so low that the ferret has a seizure. Left untreated hypoglycemic seizures can lead to coma, and even death.

With ferrets, any new symptoms or behaviors noted by the ferrent that are not "normal" should warrant a trip to the vet. Your vet will examine the ferret and likely do tests such as a complete blood count (CBC) and blood chemistry profile (similar to the Basic Metabolic Panel your primary care doctor does annually) that will assist in getting a better picture of the ferret's overall health. It may surprise you to know that the most important test for diagnosing insulinoma is not a measure of the ferret's insulin levels, but by checking the ferret's blood glucose (BG). Two very important points to note here: 1) A single abnormal BG should NOT be used to conclusively diagnose insulinoma but should be used as the basis for further investigation. 2) While less common, other conditions besides insulinoma can cause an abnormally low BG. Which is why, again, a

single low BG warrants further investigation, not immediate diagnosis and treatment for insulinoma.

The average or mean BG for a healthy ferret is around 110 mg/dl, while the “acceptable” range for ferrets is from 65-164 mg/dl. (Exact ranges may vary from lab to lab). Ferrets with a BG lower than 70 mg/dl may have insulinoma, although some veterinarians might suspect insulinoma if a ferret tests with a BG lower than 90 mg/dl. If your ferret tests within the 70-90 mg/dl range, your veterinarian will likely want to retest in a week’s time or periodically after that.

Once diagnosed by the vet, there are a few options for treatment of insulinoma in ferrets. First, medical treatments involving drugs such as prednisolone and diazoxide are most commonly used. Prednisolone acts to increase the sugar level in the ferret’s blood, while diazoxide inhibits the production of insulin. The vet may prescribe these medications individually or together. Regardless, ferrents
must be vigilant in monitoring the ferret to assist in appropriate dosing.

This can be done at home using a human glucometer or one made for pets called the AlphaTrak. Human glucometers may be challenging to use because they generally require a larger drop of blood and accuracy can vary wildly between models if used with animal blood. Your veterinarian can recommend a glucometer and teach you how to test glucose at home using your device. It's helpful to bring your home meter with you to the vet’s office. Your veterinarian can compare its results to the clinic’s. This way, at home, you know to add or subtract a general amount to get the range more similar to that of your vet’s machine. However your device tends to test, whether a bit low or high, isn’t as critical as that it be consistent, so it can show you trends.

**Surgical treatment** of insulinoma is one treatment option. Surgery to remove the tumors may be performed with an “abdominal exploratory" surgery, allowing the vet to biopsy the pancreas to confirm the diagnosis. One tumor or multiple tumors may be removed, as well as a portion of the pancreas itself. Exploration of the other organs should also take place during the procedure to get a better overall picture of the ferret’s health and provide all treatment necessary.

While surgery has been shown to offer the longest remission time, (Weiss 19998) this should be noted with a huge caveat: the insulinoma should be removed as early in the disease process as possible. Unfortunately, that optimal period is often before the ferret is showing any symptoms. Back in the days when Ferret Adrenal Disease (FAD) was most commonly treated with surgery, insulinomas were often an incidental finding. The vet would operate to remove the diseased adrenal gland, and if insulinoma nodules were

observed on the pancreas, these could be removed during the same surgery. We are truly blessed these days to be able to treat adrenal disease without surgery, but this means that most insulinomas go undiscovered until the ferret shows symptoms. Because the insulinomas can be tiny and diffuse, even surgical removal of visible nodules and/or partial pancreatectomy (the entire pancreas cannot be removed) while reducing the overall production of insulin, is unlikely to decrease it enough that the ferret will not require medication to treat the hypoglycemia.

It is important to understand that neither surgery nor medication can cure insulinoma. It should be seen as a progressive degenerative condition. If caught early, surgery can buy time before medical management is started. But eventually with medical management, the maximum dosing is reached and the meds no longer improve the BG. While some people may turn to surgery at this point, it's important to understand that by this time, not only has the disease spread to the point that insulin production might not noticeably be affected, but the ferret is older and weaker and therefore a riskier surgical candidate. If you think surgery is an option you might want to pursue, it should be done sooner rather than later.

To manage the disease with medication, **Prednisolone** is usually prescribed to be given twice per day. It is important for ferrents to maintain a consistent dosage schedule so that the ferret does not suffer from major spikes or drops in blood sugar level. Like insulin for type 1 diabetics, doses should never be skipped. Prednisolone is a common corticosteroid drug, often prescribed in both human and veterinary medicine for a variety of ailments. Everything from inflammatory bowel disease, to insulinoma and lymphoma are commonly treated with prednisone and its metabolite, prednisolone. While the two drugs sound very similar and are in fact closely related, for ferrets and cats prednisolone is the preferred form, while dogs are generally given prednisone. Always carefully read the label of the medication dispensed to you, especially when using a human pharmacy and do not accept the tech's word that "It's pred." (Another point of confusion, both drugs are slangily referred to with the same word.)

Generally, vets will prescribe the lowest possible dose to maintain the ferret's blood sugar level and then as time passes and the disease progresses, the dose will need to be increased. So it is very important for ferrents to monitor symptoms, regularly check BG and collaborate with the vet to maintain the optimum dosage. Prednisolone appears to be well tolerated by ferrets. However, some side-effects to watch for are: increased thirst and urination, weight gain, especially "pot-belly", thin skin, and muscle loss. Cataracts can develop (especially if concurrent with FAD). Routine CBC/chemistry should be checked regularly (with any senior ferret, bloodwork at least twice a year is advised; with insulinomic ferrets on meds, more frequently may be better, depending on

the ferret and your budget.). Prednisolone may be compounded in a liquid suspension; it is also available in two strengths as Pedia Pred (15mg/3ml and 1 mg/ml). This human pediatric med is available from human pharmacies.

**Diazoxide (Proglycem)** is another medication that may be used in conjunction with prednisolone for their synergistic effect on the BG. Using diazoxide in addition to prednisolone allows for a lower dose of prednisolone to be used. It has been reported that some ferrets are able to maintain normal BG (at least initially) on diazoxide alone. However, it is expensive, and a liquid form is only available compounded, so it is most commonly used as an adjunct treatment when the ferret has maxed out on his prednisolone dose. Especially at higher doses, diazoxide may cause gastrointestinal effects, like vomiting, loose stools/diarrhea, and lack of appetite. This can be mitigated by increasing the dose slowly and giving it with a meal.

Both prednisolone and diazoxide can be tough on the stomach, so your veterinarian may decide to add in a tummy-soothing medicine such as Carafate (also known as sucralfate). Carafate works to prevent stomach ulcers by coating the stomach lining. It helps prevent and heal ulcers, which can be a common occurrence in ferrets when on long-term prednisolone. Carafate should be given on an empty stomach, at least 20 minutes before other medications and food, to allow for it to coat the stomach thoroughly, and not inhibit absorption of other meds. Ideally it is given every 8 hours but every 12 hours is most practical for ferrents with outside careers. It is not absorbed by the body; an average ferret dose is 1 ml. It is slightly sweet but a little chalky: some ferrets hate it while others seem to enjoy it. The liquid suspension is readily available in human pharmacies. It's a little pricey but the cheaper generic tablets do not dissolve well in water and dosing accurately is difficult.

Your veterinarian will likely discuss a regimen or schedule of medications and meals that will best help your ferret. An example: might involve administering the Carafate, waiting 20 minutes, feeding a high protein meal, waiting 15 more minutes, then giving the prednisone +/- diazoxide. check with your veterinarian for their preferred protocol. I give the meds separately, at least ten minutes apart as two tiny meals mixed in soup. (Giving together seemed to cause stomach upset.)

Prednisolone is usually given twice a day, but may be given (adjust dose accordingly) up to four times a day. Diazoxide is also usually given twice a day but may be given once a day. Your vet will decide on the appropriate schedule that works best for your ferret's particular needs.

Lastly, **dietary management is a critical part of caring for insulinomic ferrets**. Since ferrets are obligate carnivores, their diet must be high in protein: at least 40% crude protein if feeding a dry kibble diet. But due to its high carbohydrate content, decreasing the amount of kibble in your ferret's diet in favor of dehydrated raw and wet food is how to help manage the disease through diet. Most ferrents with insulinomic ferrets offer their ferret a "soup" recipe of easily digestible, meat-based wet food. However, when using this regularly for meals, it's important to balance the meals appropriately. Most homemade "soup" recipes are deficient in calcium and other minerals. You can try canned cat food that is high in meat protein (canned food with a moisture content of 70% should have a protein content around 12-15% or greater) or a balanced, home-prepared raw meat blend if you are informed on the principles of raw feeding. You may have to experiment, especially if your ferret was not exposed to a wide variety of foods when young. Meat only baby foods like chicken or turkey, while not suitable as sole food source, are highly palatable and usually quickly accepted–especially if slightly warmed in the microwave. Hill's A/D, Oxbow's Critical Care for Carnivores, and The Pampered Ferret Dook Soup offer nutritionally balanced options suitable for ferrets.

Ferrets have short digestive tracts, and normal digestion is rapid. Feeding the appropriate diet on a regular schedule can make a big difference in symptoms and quality of life. Adherence to a schedule helps prevent blood sugar spikes with subsequent crashes. Also, treats as well as regular meals containing carbohydrates should be avoided. Remember that sugars can hide under many names in an ingredient list. Meat treats, either raw or cooked are encouraged. You can offer treats intended for dogs and cats, but *read the ingredient list first*. To assist in administering medications, you may find it helpful to offer treats of oils such as salmon, fish, emu, or extra-virgin olive oil. Most ferrets find these oils highly palatable and it can make a nice "chaser" if your ferret does not like taking medications. Alternatively, both prednisolone and diazoxide can and should be given with food, so one at a time, I put my ferret's meds into a tiny bowl of his soup. He has no idea he's even getting meds. If you do this however, you must ensure your ferret finishes the whole serving so he gets his full dose of meds.

**While not fully researched or understood, the role of diet cannot be underestimated**. Insulinoma is less prevalent in other parts of the world where husbandry practices are different and diets vary. For instance, in Europe, ferrets are often fed a diet of small prey and/or raw meats. Since ferrets are obligate carnivores, such diets may help explain the lower incidence of insulinoma than in countries such as the U.S., where kibble is more relied upon. Kibble contains more of the carbohydrates and fillers that it is theorized may contribute to insulinoma. In addition to the issues with many kibbles, even those treats labeled for ferrets such as FerretVite, Nutrical, Bandits and others can cause

a spike in blood sugar leading to increased insulin production. Over time, this increase in insulin production may lead to the development of the abnormal cells in the pancreas that cause insulinoma.

One of the most important aspects of caring for a ferret with insulinoma irrespective of the treatment regimen you and your vet agree upon, is the consistent and careful monitoring of the ferret's symptoms and behavior. Learn how and become comfortable with checking your ferret's blood sugar regularly. Prepare for the unforeseen emergency (aren't they all?!):

**Locate an emergency clinic** that treats ferrets to which you can take the ferret should an emergency occur outside the hours of your regular vet. Murphy's Law of ferrets states that most emergencies occur after your regular vet has closed for the day–especially on weekends and holidays!

**Learn to recognize the warning signs** of a ferret whose blood sugar is dropping: Staring into space ("stargazing"), pawing at the mouth, profuse drooling, sluggish response to stimulus, glassy-eyed–these all warrant grabbing the glucometer and doing a quick BG check. If the BG is low, feed a high protein snack and contact your vet to discuss if increasing meds dose is warranted.

**If the ferret is unresponsive or begins to seizure**, you will alert the vet but also begin treatment immediately at home. Ferrents with ferrets suffering from insulinoma should keep Nutrical, Karo (corn syrup) or honey on hand for such emergencies. Maple syrup, cane syrup or even supermarket pancake syrup will do. (Agave is not recommended due to its purported low glycemic index.) Artificial sweeteners or herbal products like Stevia or monkfruit are absolutely not appropriate.

If your ferret appears to be having a seizure, or is acting dazed or is non-responsive, you should:
1) Grab your glucometer and check the BG write down time and result!

2) Administer honey or corn syrup–rub on gums, place a drop in the cheek pocket with an oral syringe. They may be drooling so much the sugar doesn't stay in the mouth–in this case you can use your fingertip to rub on the gums. It may take a long minute for your ferret to start to come around and regain normal mentation. Take a breath and be patient. You can give more syrup on the gums or in cheek pocket but be mindful that an unconscious patient is at risk of choking or aspirating on something in the mouth.

3) When he is responsive, immediately offer a small high protein meal like meat baby food or Carnivore Care. Recheck a BG about ½ hour after that, and then each hour for the next couple of hours to make sure they've stabilized. Offer additional small high protein meals for the next few hours because the rescue sugar you gave can cause rebound hypoglycemia. Make sure to record the times of each BG taken, the result, and the meals given. Call your vet's office as soon as possible to discuss adjustment of meds.

Regardless of the treatment plan for your ferret, more frequent visits to the vet and more frequent testing are important to maintain the ferret's health. We recommend that all senior ferrets (over age four) see their vet twice a year for a wellness check and basic blood work. For ferrets with diagnosed insulinoma that is well-managed, this schedule may work, but if your ferret is not yet stabilized on medications and/or diet therapy, you will likely need to schedule more frequent follow-up exams with your veterinarian in order to better monitor your ferret's condition. It's a good idea to keep a log or journal from day to day, noting the ferret's behavior, with times of medication administration and current doses as well as what and when the ferret has eaten. This will enable you to more effectively communicate with the vet and provide greater stability for your ferret. (It can also prove critical for your ferret's health should something happen to you).

Always remember, your ferret's vet plays a critical role in his health and wellbeing. Maintaining good communication and effective collaboration is a must for keeping your little companion healthy. Most of all, make sure your ferret is comfortable, happy, and well-loved. Illnesses such as insulinoma can be managed with thought and dedication, so try to live in the moment with your fuzzy friend, and continue to make lasting memories together– they deserve it!

*The American Ferret Association Education Committee and Health Affairs Committee jointly wrote this article from the experiences of longtime ferret owners. The information it contains is not intended to be used to diagnose or treat a sick ferret. It should not substitute for the advice of your veterinarian.*

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