

## **Insulinoma in Ferrets**

Dr. Christine Eckermann-Ross  
Avian and Exotic Animal Care  
3600-104 Creedmoor Rd.  
844-9166

Insulinoma is a common condition of middle-aged to older ferrets. These tumors of the pancreas cause an increase in the secretion of insulin, which leads to severely low blood sugar (hypoglycemia). This condition is seen most commonly in 3-4 year old ferrets, both male and female. Signs of the disease may appear suddenly as an episode of collapse lasting from minutes to hours. During such an episode, the ferret usually appears depressed, recumbent, and unresponsive. In severe cases, seizures may occur. Clinical symptoms appear gradually in many ferrets. Commonly, ferrets with insulinoma experience gradually progressive weakness and lethargy over weeks to months. Excessive salivation, pawing at the mouth, and weakness of the hind limbs are also frequently observed. Signs may be intermittent, with periods of normal activity in between periods of lethargy. Prolonged, severe hypoglycemia can lead to convulsions and even irreversible brain damage and death. Because of the frequency and severity of this disease, it is recommended that all ferrets 3 years old and older have their blood glucose checked every 6 months.

If your ferret has any of the symptoms described above, several measurements of his/her blood glucose level should be made to diagnose the condition. Blood glucose measurements need to be taken after your pet has been fasted for 3-4 hours. Glucose levels consistently lower than 60 mg/dL support the diagnosis of insulinoma. In some cases, it may also be necessary to measure your pet's insulin concentration.

There are several treatments available for this disease. Most ferrets with insulinoma will need to take the steroid prednisolone which helps increase blood glucose concentrations. Unfortunately, this medication does not prevent the continued growth of the tumor. For this reason, regular blood glucose monitoring is essential to help determine if the dose of prednisolone needs to be changed. Depending on the severity of the disease, a second drug called diazoxide may be used in combination with prednisolone. Medical therapy alone is usually effective in controlling signs of the disease for 6 – 18 months.

Surgery is a second option for treatment of insulinoma. The procedure involves removal of a portion of the pancreas, and is usually combined with medical treatment. Typically, there are microscopic metastases throughout the entire pancreas by the time a ferret is showing clinical signs of the disease. Since it is not possible to remove the entire pancreas, surgery is not curative, but rather slows the progression of the disease. Pets treated with a combination of surgery and medical therapy typically remain symptom free for about 1-3 years.

More recently, chemotherapy protocols have been established for treatment of insulinoma. Chemotherapy involves IV administration of the drug doxorubicin. Usually four sessions of chemotherapy are given at 3-week intervals, though the protocol may be altered depending upon the individual ferret. Chemotherapy is usually performed in combination with medical therapy and/or surgery. There is not enough data at this time to predict symptom-free life span for ferrets treated with chemotherapy. This protocol is tolerated very well by our patients, and most are experiencing huge improvements in quality of life.

## *Home Management of Ferrets with Insulinoma*

If your ferret has been diagnosed with insulinoma, there are some simple things you can do at home to help improve your pets' health and quality of life. First, make sure your ferret is eating a premium quality, high protein ferret food. Avoid high carbohydrate and high sugar foods and treats. Your pet should not go for long periods of time without eating. Frequent, small meals are ideal. If your pet experiences a hypoglycemic episode at home, offer a little honey or corn syrup using an oral syringe. If he/she has collapsed, rub honey or corn syrup on the gums, being very careful to avoid being bitten. If your ferret is having seizures, you should not try to put anything in the mouth. Seek veterinary attention immediately.

Routine blood glucose monitoring is an essential part of managing a ferret with insulinoma. You should invest in an over the counter glucometer, like those used by diabetic humans, which should be available at any human pharmacy. Measurements should be taken after your ferret has fasted for 3-4 hours. Follow your veterinarians' recommendations as to how often to measure blood glucose and what to watch for. Always report blood glucose concentrations to your veterinarian, particularly if there are any changes in the value.

Many ferrets with insulinoma live long, happy, symptom-free lives. It is important to monitor these patients closely, and always contact your veterinarian if there are any questions or concerns.