



Ferret Wellness

5201-A Virginia Beach Blvd.

Virginia Beach, VA 23462

Phone: 757-473-0111

Website: www.petcarevb.com

Facebook: PetCareVet



The Standard of
Veterinary Excellence

**Pet Care Veterinary Hospital
5201 Virginia Beach Blvd.
Virginia Beach, VA 23462
(757) 473-0111
Petcare@petcarevb.com**

Caring for Your Pet Ferret



The domestic ferret, *Mustela putorius furo*, is probably a descendent of the European and /or steppe polecat. It is believed that the Greeks first domesticated wild polecats in approximately 400–200 B.C. in order to protect grain stores from vermin. Over the centuries ferrets were further domesticated for their fur and for their ability to aid man in hunting rabbits. Their popularity as pets did not increase until the late 1900s. This resulted in additional physical and behavioral changes as ferrets

were bred for greater docility, decreased odor, and preferred body confirmation and coat color. The last half of the 20th century has also seen the domestic ferret grow in popularity as a laboratory and research animal.

Today's pet ferret tends to be very gentle and playful. As you know by now, your ferret is highly energized. A healthy ferret should be alert, inquisitive and bright eyed. If just awakened ferrets may be slightly lethargic, but should respond to handling in a few minutes. When allowed to roam, the domestic ferret shows fearless exploratory behavior: Box on the floor? Got to see what is in it. Hole in the floorboard by dishwasher? Got to go inside and explore. Cabinet door ajar? Got to open it and explore what's inside. Any open door or unexplored space is open game for ferret scrutiny.

Although adult ferrets may appear perfectly content sleeping in their hammocks twenty hours a day, but this certainly is not mentally and physically stimulating. Free time in a "ferret proof" room is always recommended. Keep in mind that ferrets love human interaction, like to explore new places and objects, have a keen olfactory sense (sense of smell) and enjoy digging. A ferret that jumps back and forth in front of you and nips at your feet is telling you it wants to play. Some easy ways to provide environmental enrichment for your ferret include:

- Fill a box with potting soil, rice, hay, plastic balls or crumpled paper balls and let the ferret fulfill its instinctual digging needs.
- Use old towels to give them a magic carpet ride or just twirl the towel around and over the ferret.
- Use clothes dryer hose to satisfy instinctive tunneling behavior. Some owners like to stretch the hose out, using a beanbag chair to hold one end in place.
- Tie plastic or ping pong balls to a piece of sturdy string and hang from the ceiling to two inches above the ground.

- Put empty paper grocery bags on the floor. Some of the bags can be filled with crumpled paper, Ping-Pong balls or food treats.

Nutrition

Ferrets have a very high metabolic rate and eat multiple small meals throughout the day, much like a cat. Ferrets normally increase food intake approximately 30% in the winter and gain weight by depositing subcutaneous fat. This will reverse as daylight lengthens in the spring and the ferret loses that winter fat. Ferrets are true carnivores and therefore their diet must consist mainly of meat and animal products. They utilize dietary fats for energy versus carbohydrates and their short digestive system cannot adequately handle diets high in fiber or carbohydrates. Commercial ferret diets, formulated to meet the specific nutritional needs of the ferret, are available, and therefore ferrets should not be maintained on kitten or cat food. Zupreem ferret diet, Totally Ferret (Performance Foods) and Ultra Blend ferret diet (8 in 1 Pet Products) are several of the food brands we recommend. As well, many veterinarians advocate feeding a whole prey or balanced raw carnivore diet, which more closely approximates what a ferret would be eating in the wild. It is felt these types of diets may decrease the incidence of inflammatory bowel and pancreas disease as the ferret matures. It is certainly not what many ferret owners want to feed their pets, as appropriate prey animals would include mice, rats or chicks. However distasteful to us, this diet provides all the necessary nutrients in a highly digestible form as well as providing beneficial exercise for the muscles of the neck and jaw and providing material to keep the teeth and gums healthy. For more information on- and sources of alternative diets see the following Internet sites:

www.wysong.net – Producers of Archetype diet and other healthy alternative diets

www.rawmeatybones.com – source of information on raw diets for all animals that eat meat including information from veterinarians

www.petdiets.com – information on natural diets, part of Veterinary Nutritional Consultants who will provide information on appropriate homemade diet

www.gourmetrodent.com –source of healthy humanely killed rodents and chicks

A quality kibble ferret diet should be 32 to 36% crude protein and 20 to 22% fat. When reading the pet food label, the first several items listed should be animal proteins such as chicken or poultry by-products. Most homemade formulations should be avoided as they fail to provide an appropriate vitamin-mineral balance or meet the high protein, high fat and low carbohydrate requirements of the ferret. An improper diet may result in an unhealthy immune system, dry hair coat and an unthrifty appearance.

Ferrets exposed to only one brand of food between the first 60 to 90 days of age may be opposed to dietary changes later in life. It is therefore recommended that young kits (juvenile ferrets) be offered a variety of foods during their first six months of life in order to prevent dietary selectivity also known as olfactory imprinting. Ferrets may enjoy certain fruits and other commercial treats but realize these in many cases are high in carbohydrates and really inappropriate for the ferret. These should be fed in

extreme moderation as excess consumption may result in diarrhea and create finicky eaters. Occasional pieces of cooked, boneless meat make better treats. Water bottles are preferred to water bowls, as they are less messy and more sanitary.

Housing

Provide the largest cage that space and budget will allow. Ferrets especially enjoy climbing in multilevel cages. More than one litter box is ideal. If your ferret seems to prefer a certain corner to eliminate in, place the litter box there. Buy a ferret-friendly litter box with one low side and a guard on the higher sides to prevent the ferret from backing up far enough to miss the box. If the ferret continually moves the litter box; try punching holes in the box and wiring it to the cage walls so that it can't be tipped over. When outside the cage, provide litter boxes in the corners of rooms ferrets are allowed to explore. Acceptable substrates for the litter box include recycled paper products and regular clay, non-clumping cat litter. Clumping litters have a tendency to stick to the ferret's nose and can cause irritation, and cedar or pine shavings may cause respiratory distress; therefore neither should be used for litter material.

Elective Surgeries

Most ferrets are descented (had their anal sacs removed) and neutered or spayed at a very young age before they are adopted. Although these surgeries will decrease the ferret's odor, it will not totally eliminate the characteristic musky smell.

If you own a ferret that has not been surgically altered, it is strongly recommended to do so as a way keep your ferret physically healthy and better behaved. Unspayed female ferrets may stay "in heat" for prolonged periods when they reach sexual maturity and may develop a fatal anemia as a result of estrogen toxicity. As well, neutered ferrets tend to be more docile. Although most ferrets from pet stores are neutered before puberty, if given the choice, some feel it is better to perform the surgery after the onset of puberty at 6 to 9 months of age. This may delay the onset of adrenal disease, a problem commonly seen in older ferrets that has been associated with neutering.

Preventative Medicine

All juvenile ferrets should be initially vaccinated against canine distemper between 8 to 10 weeks of age. This vaccine should be boosted at 12 to 14 weeks of age and then annually. Ferrets should also be vaccinated against rabies at 12 weeks of age and then yearly. Both of these viral diseases are fatal to the ferret so your ferret needs to be protected. In addition, rabies carries a public health risk. Vaccine reactions are not uncommon in the ferret, and as a precaution, your veterinarian may request a 20-minute post-vaccination observation period within the hospital.

Intestinal parasites (worms, protozoa) are uncommon in ferrets. However, all ferrets should have a fecal exam for intestinal parasites performed during their initial physical

exam and if the ferret develops diarrhea. Ferrets are susceptible to heartworm; therefore, should be placed on a monthly preventative as in dogs and cats. Ferret's with heartworm disease can show coughing, labored breathing or sudden death.

Ferrets can get heartworms too! This heart was taken from a ferret that presented with a sudden onset of labored breathing and coughing. Unfortunately he died soon after being hospitalized—it takes only one or two heartworms to cause severe disease in the ferret. Giving a once a month preventative medicine similar to that suggested for your dog or cat can prevent ferret heartworm.

All new ferrets going to homes with pre-existing ferrets should be quarantined and carefully observed for two weeks before being introduced to other ferrets. A quarantine period may help prevent the spread of respiratory viral diseases or Epizootic Catarrhal Enteritis (ECE), a contagious intestinal virus that causes mucousy, green diarrhea and overall debilitation.

Ferrets, like cats, can get hairballs. But unlike cats, ferrets do not typically vomit up hairballs. Instead, the hairball remains in the stomach where it can cause a lack of appetite with eventual diarrhea, weight loss and debilitation. Administering a feline hairball remedy several times each week may help prevent this.

A yearly physical exam is a must for all ferrets. Once they reach the age of four, blood-work should be performed every 6 to 12 months to detect early signs of disease. Ferrets over the age of three may need a yearly dental exam and scaling and cleaning where needed to prevent periodontal disease. Daily brushing with a feline toothbrush and enzymatic toothpaste goes a long way in controlling oral bacteria and subsequent plaque and tartar.

Gastrointestinal Problems

Do ferret-proof your house! Block off tiny spaces such as the bottom of stove and refrigerator. Ferrets love to hide in small spaces so you may wish to attach a bell to his/her collar in order to know where your friend is exploring. Caution must be taken to check bags, laundry, and other items before emptying them. Ferrets are curious animals and will get into anything and everything. They will also hide their food; so watch them carefully to make sure they are not eating stale food, which may cause gastrointestinal disorders. Don't let your ferret run out of your house unsupervised or without a leash. As a result of predators and temperature extremes a ferret will have a difficult time of surviving on its own out in the world.

Ferrets love to chew on soft rubber products so please ferret proof your home and make sure there is no access to such objects as door stops, pillow foam, sneaker insoles or flip-flop shoes, furniture protectors, and other tasty looking objects.

Keep rubber toys, foam pillows, doorstops, or other rubber items away from your ferret as they may be chewed and swallowed which may result in an intestinal blockage. Signs

of an intestinal blockage include a lack of appetite, vomiting, grinding of the teeth as the result of intestinal pain, and lethargy. Ferrets are also prone to developing hairballs in their stomachs. Ferrets with hairballs will be anorexic, have dark, tarry stools and be lethargic. Feline hairball remedies can be used in ferrets to prevent hairball formation.

Adrenal Disease

Lastly, older ferrets are very prone to adrenal gland disease where the adrenal gland is overactive and produces excessive sex hormones. These ferrets present with varying degrees of hair loss, itchy skin and behavior changes. Newer research has shown that giving an injectable drug called Lupron® once yearly during the ferret's natural breeding season (end of December through February) may prevent the onset of adrenal disease as the ferret matures. Ongoing research will determine if this common disease can be effectively prevented.

Adrenal Disease in Ferrets

Adrenal disease is a common syndrome, usually affecting middle aged to older ferrets (three to seven years old). In the healthy ferret the adrenal gland produces a number of different hormones that control a variety of body functions from water to electrolyte balance. In the diseased or overactive ferret adrenal gland there is typically an overproduction of sex hormones. The most common cause is hyperplasia (excessive growth) of the adrenal gland(s), but tumors, both malignant and benign may also be seen. Metastasis (spread outside of the immediate area) of adrenal tumors is uncommon, however, some adrenal tumors can be very invasive locally, and may grow into the blood vessels or internal organs near the tumor's origin.

Research has shown that adrenal disease occurs as a result of neutering (spay or castration). The exact reason for this is somewhat complex but in simple terms; when the ferret is neutered it no longer produces sex hormones and consequently there is no sex hormone negative feedback to stop production of other hormones in the brain, specifically luteinizing hormone (LH). This excess LH continuously stimulates the adrenal gland and with time results in the cell changes (hyperplasia or tumor cells) associated with ferret adrenal disease. You might ask, "Then why are ferrets neutered?" Ferrets are neutered in order to prevent other serious health problems and because it makes them better, friendlier pets.

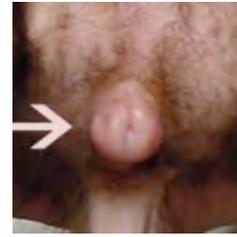
The most common symptom of adrenal disease is a symmetrical hair loss, usually starting at or near the base of the tail and progressing toward the head. If left untreated, affected ferrets can look nearly bald, and may have very dry, itchy skin. Despite being neutered or spayed, affected ferrets may return to sexual behaviors typical of an animal that is intact, and may develop aggression toward other ferrets or people. In some cases this behavioral change may be the only sign of adrenal disease. Females with adrenal disease may appear to be in heat, with an enlarged vulva. Male ferrets may have difficulty urinating or develop repeated urinary tract infections due to prostatic enlargement and inflammation. Some ferrets may lose muscle tone and become weak and lethargic. An increased odor and yellowing of the fur coat may also be noticed.



Loss of hair



Intense itchiness resulting in skin lesions



Swollen vulva in females

Diagnosis of adrenal disease is often based on medical history and the classic signs of illness. Routine blood tests are typically normal although anemia (decreased red blood cells) may develop in some ferrets. To definitively diagnose adrenal disease the University of Tennessee provides a blood assay that measures the circulating levels of several hormones produced by the adrenal glands. Elevated hormone levels support the clinical diagnosis of adrenal disease. Ultrasound is also a helpful diagnostic tool used to identify an abnormally enlarged adrenal gland. Monitoring the affected ferret for several months via ultrasound has the added benefit of determining which adrenal gland is growing and thereby most likely to be causing the clinical signs.

The preferred treatment for adrenal gland tumors or hyperplasia is the surgical removal of the affected gland(s). This is the only treatment that offers a cure for the disease. Blood work should be done prior to surgery to evaluate the ferret's overall health. Chest x-rays are often recommended, and if there is any concern about the heart, an echocardiogram (ultrasound of the heart) should be done. There are several surgical methods used to remove the abnormal adrenal gland or glands. In addition to conventional resection, cryosurgery, the freezing of tissue with liquid nitrogen, has been advocated as another method of destroying abnormal adrenal tissue. The right adrenal gland lies very close to a major blood vessel (vena cava), which makes typical surgical removal challenging. Since adrenal glands are important in regulating a number of vital body functions, ferrets that have *both* adrenal glands removed because of disease may require medication following surgery. Blood tests performed several days after surgery can help determine if supplementation is necessary.

There are a variety of medical treatments available for ferrets that are not good surgical candidates, or for those clients that would prefer a medical approach to treatment. Medical therapies will often completely eliminate the clinical signs we associate with ferret adrenal disease, such as the hair loss and dermatitis, but they will not cure the disease itself. Their effectiveness varies with the level and type of hormones being produced by the diseased adrenal gland. As well, it must be kept in mind that medical therapies are limited in suppressing continued adrenal growth and tumor development, which may lead to problems later in life. The most commonly used and a very effective drug treatment option is Lupron® (leuprolide acetate) which is given by injection once monthly until clinical signs resolve (usually this occurs within 3 months) and is repeated if and when signs recur. Another approach is to administer monthly Lupron treatments for the rest of the ferret's life. Many veterinarians with a special interest in ferrets feel monthly Lupron® administration is the best way to suppress the hormones we associate with adrenal disease and thereby prevent recurrence of clinical signs.

Another drug used to treat the clinical signs associated with adrenal disease is deslorelin acetate. Like Lupron, deslorelin reduces the production of sex hormones by the affected adrenal gland. Deslorelin is provided in a slow-release pellet about the size of a grain of rice, which is injected under the skin and slowly releases a hormone-suppressing drug to the point where the clinical signs we associate with adrenal disease resolve. This implant, known as Suprelorin®, does take 4 to 6 weeks to reach its maximum effect, but on the plus side its ability to suppress adrenal-associated hormones can last anywhere from 8 – 20 months with one implant treatment. As a result, it is becoming a popular medical option. Due to the size of the needle associated with the Suprelorin® implant the ferret may need to be briefly anesthetized when it is given.

Can adrenal disease be prevented? Newer research has shown that annual insertion of deslorelin (Suprelorin-F) implants in November or December may delay or prevent the onset of adrenal disease as the ferret matures. The implant suppresses the surge of sex hormones that occurs with the ferret's natural breeding season.

Dental Disease in Ferrets

Maintaining good dental health is very important in the pet ferret. Lack of good oral hygiene leads to plaque and subsequent tartar, which can trap bacteria resulting in gingivitis (gum inflammation) and with time infection of the tooth roots and loss of teeth. Additionally, bacteria from an infected mouth may enter the bloodstream, leading to disease in other body organs such as the kidneys, heart valves and lungs.

Outward signs of dental disease may not be obvious and many times tartar and gingivitis are first noted during the routine veterinary physical exam. If more severe dental disease develops look for the following clinical signs; difficulty chewing food or dropping food while eating, weight loss, pawing at the mouth or facial swelling and/or pain. Similar clinical signs may occur with other ferret health problems such as oral tumors or insulinoma, therefore if seen, a visit to us is warranted.

Veterinarians are well trained in dental care and routinely examine the ferret's mouth for an assessment of overall oral health during the annual physical exam. If plaque and tartar have built up, a routine cleaning and polishing of the teeth may be recommended. This procedure is performed under general anesthesia so that a complete oral health assessment and dental cleaning can be thoroughly and safely performed. The soft tissues of the mouth including tongue, gums and the mouth lining are examined for evidence of infection or ulceration. A dental probe is used to examine all teeth for evidence of gingivitis and periodontal disease where pockets of infection exist between the tooth and gum. The teeth are examined for evidence of odor, pain, fractures, discoloration and root exposure. All healthy teeth are then scaled and polished. Fluoride treatment is available to help strengthen enamel and reduce any pain associated with unhealthy teeth. Many veterinarians now offer full mouth dental radiographs (dental x-rays) in order to assess the roots and surrounding bone for abnormalities.

In the event of a more serious dental problem, such as a tooth crown fractures or tooth infections and abscesses your veterinarian may recommend procedures such as surgical

extractions, bonded sealants or root canals. Another not uncommon dental malady in ferrets involves malpositioned canine teeth. This is where one of the long, sharp canine teeth is crooked and subsequently puts pressure on the opposite lip, leading to ulceration and pain. Filing down the affected tooth and applying a bonded sealant will help stop the ulceration while preserving tooth vitality.



This ferret had fractured off the tip of its right upper canine tooth resulting in bacterial invasion and loss of tooth vitality as seen by its dark discoloration. The tooth had abscessed and was painful.



Tooth extraction was recommended followed by suturing a flap of gum tissue over the tooth socket to reduce pain and stimulate healing.

As a ferret owner you can play a key roll in preventing bacterial numbers in the mouth and subsequent dental disease. Studies performed by veterinary dental specialists have shown that nothing beats daily brushing in eliminating and controlling oral bacteria. A soft child's toothbrush or finger brush (available from your veterinarian) and an animal-approved toothpaste work best. To get your ferret used to the idea of oral health maintenance try using a gauze square and your fingertip to gently rub along the tooth and gum margin. Starting at a young age is always ideal, but it is never too late to think of your ferret's dental care and subsequent health benefits.

Ferrets with Appetite Loss and Diarrhea

Ferrets with appetite loss and diarrhea can become weak, dehydrated and lose a significant amount of body weight in a short period of time. Stools can vary in character and may be "seedy" (soft with a granular appearance), liquid or mucousy. The color may range from brownish yellow to green to black and tarry. Black and tarry stools usually indicate upper intestinal tract bleeding, many times as the result of stomach ulcers that ferrets are prone to. Ferrets with these signs may also have abdominal pain and be hunched up and/or grind their teeth.

The leading causes for the above clinical signs include:

1. A stomach hairball or ingested foreign body (typically a rubber object)
2. *Helicobacter mustelidae* – a bacterial infection resulting in stomach inflammation
3. Inflammatory Bowel Disease – aka IBD
4. Epizootic Catarrhal Enteritis – caused by a Corona virus
5. Lymphoma – a cancer of the lymph nodes, spleen and other organs, including the intestines

How does the veterinarian distinguish between the above disease syndromes and make a diagnosis? First we start with a history of your pet's condition and perform a thorough physical exam. If your ferret has recently been exposed to other ferrets, or you have brought a new ferret into the household and now your ferret has diarrhea, possibly green and mucousy– we think of ECE as it is caused by a contagious virus. If the stools are dark and tarry and your ferret is grinding its teeth as a result of abdominal pain– we think of a gastrointestinal foreign body or hairball. If your ferret has had off and on diarrhea ("seedy" or brown and mucousy) with weight loss over several weeks to months then Inflammatory Bowel Disease (IBD) comes to mind. Ferrets with *Helicobacter* infection can show all of the above signs with stools of varying color and consistency; from green to black to brown with some blood. Finally ferrets with lymphoma will show weakness, weight loss and possibly enlargement of lymph nodes, spleen or other abdominal organs.

To make a more precise diagnosis and to differentiate between these diseases your veterinarian may recommend a number of diagnostic tests including a fecal parasite analysis, CBC (Complete Blood Count), blood chemistry profile, and/or radiographs (X-rays). If enlarged lymph nodes or spleen are found, a fine needle aspirate to analyze cells for disease will be recommended. These tests will help narrow the list of potential causes or give us the exact answer. Sometimes surgery is needed to take biopsy samples of stomach, intestines, lymph nodes, liver or spleen. These biopsy samples are sent to the pathologist for diagnosis.

Treatment of the above maladies varies with cause. In many cases affected ferrets are dehydrated and nutritionally depleted so treatment starts with fluid therapy and nutritional support. Specific therapy for ECE involves: fluids to combat dehydration, antibiotics to prevent infection and medicines to control diarrhea. For hairballs and foreign bodies: surgical removal of the offending body will be the first step to cure, along with supportive care to fight dehydration and malnutrition. IBD is treated with dietary management and immunosuppressive drugs such as azothioprine or prednisolone. *Helicobacter* is treated with a combination of antibiotic (Amoxicillin), Antacid (Pepcid), and diarrhea medicine (Metronidazole). Lymphoma requires chemotherapy and the prognosis varies with progression of the disease when diagnosed, the age of the ferret at diagnosis and other factors.

Certainly the prognosis of the ferret with chronic diarrhea, weight loss, dehydration and weakness varies with the condition of the ferret at time of diagnosis, any concurrent diseases, and which of the above diagnoses is made. In many cases, with appropriate

treatment as well as fluid and nutritional support, these sick ferrets can go on to recover and lead healthy, full lives.

Gastrointestinal Obstruction in Ferrets

When allowed to free roam outside its cage the naturally curious ferret may swallow small objects that attract its attention. These foreign objects have the potential to become lodged (stuck) in the stomach or small intestines, creating an obstruction. Vigilant “ferret proofing” of the home is a must, especially with rubber and foam objects that ferrets are particularly fond of. Some of the reported foreign objects swallowed by ferrets include rubber bands, pieces of doorstops, rubber furniture protectors, erasers, pieces of rubber ball, and foam from pillows, sneaker insoles or rubber sandals.

Hairballs are another potential cause of gastrointestinal obstruction. Hairballs are compacted wads of the ferret’s fur, which may develop over time as a ferret grooms itself and subsequently swallows some of its hair coat with each grooming. Unlike cats, most ferrets will not vomit up hairballs, and these felts of compacted fur will eventually cause gastrointestinal upset.

Clinical signs of gastrointestinal obstruction vary with where the blockage occurs within the stomach or intestines. Foreign bodies in the stomach may just sit within the stomach, causing irritation, or may completely obstruct outflow to the small intestine. Due to the narrow diameter of the small intestine, many foreign bodies in this location cause a complete obstruction.

When a complete obstruction occurs, the ferret will become acutely ill. Severe listlessness, lack of appetite, vomiting, absence of stools or dark, tarry stools may all be seen. The ferret may have abdominal pain and nausea demonstrated by increased salivation, grinding of the teeth, pawing at the mouth, or remaining in a hunched position. With a partial obstruction the clinical signs may be more subtle and prolonged. The ferret with a partial obstruction may show any of the clinical signs described above, or may demonstrate only intermittent teeth grinding, dark, tarry stools, and a decreased appetite and level of activity. Obvious weight loss and dehydration may occur within several days to a week.

Any ferret with signs of gastrointestinal distress should see a veterinarian. The veterinarian will start with a thorough history and physical examination. Hairballs and foreign bodies may or may not be palpable (felt) upon abdominal exam. Radiographs (x-rays) may or may not show a foreign body depending on its size and physical makeup (rubber unfortunately does not show up on an x-ray). A Barium series may be recommended to outline the intestinal tract and aid in identification of a blockage or foreign body. If a gastrointestinal foreign body with suspected obstruction is diagnosed, surgical removal is advised. Once the foreign body or hairball has become lodged and causes illness, few ferrets are able to pass the object on their own. Delaying treatment in the hopes that the ferret will pass the obstruction can increase the risk of death.

For hairball prevention, feline hairball remedy has been recommended two to three times weekly. Brush the fur coat regularly and change bedding frequently to decrease the amount of loose hair in the environment. To prevent accidental foreign body ingestion: monitor playtime and offer only “ferret safe” toys. Ferret proof the house by keeping soft rubber household items out of the naturally curious ferrets reach.

Insulinomas

Insulinomas are tumors within the pancreas that produce excess insulin and are one of the most common neoplastic diseases affecting ferrets. Other names for insulinoma found in the literature include functional islet cell tumor and pancreatic beta cell tumor. In the normal ferret, as in other mammals (including humans), the beta cells in the pancreas are responsible for producing a hormone known as insulin. Insulin is responsible for keeping the body’s sugar (glucose) levels in balance. Most of us are familiar with diabetes; where not enough insulin is produced and the diabetic patient has a very high blood glucose level. Well, think of insulinoma as the opposite of diabetes – excess insulin produced by tumor cells in the pancreas results in a low blood sugar (hypoglycemia).



This ferret is very weak and lethargic because of a very low blood sugar (hypoglycemia), which can be caused by an insulinoma, also known as a Beta cell tumor. This is where tumor cells in the pancreas over produce insulin causing the blood sugar to plummet.

Insulinoma may affect ferrets between the ages of 2 and 3 years, but is most commonly diagnosed in ferrets 4 to 5 years of age. The severity of clinical signs shown by the affected ferret varies with how fast these tumors develop and how long they have been present. Some ferrets develop a sudden onset of severe hypoglycemia, and the resulting low blood sugar causes the ferret to collapse into a weakened non-responsive state. In other ferrets, the onset of hypoglycemia is more gradual and the ferret will demonstrate intermittent signs of disease varying from periodic inactivity, depression and rear limb weakness to hyper salivation and pawing at the mouth. If the blood sugar drops very rapidly, the ferret with insulinoma may have tremors, seizures or go into a coma due to lack of glucose in the brain.

Diagnosis of insulinoma is usually made by associating the above clinical signs with a low blood glucose that can be measured by your veterinarian. Most veterinarians agree that a fasting blood glucose level less than 60 mg/dl is very suggestive of insulinoma. Your veterinarian will want to rule out other causes of hypoglycemia, which include: anorexia/starvation, severe vomiting and diarrhea, a critical bacterial infection and liver disease. Measurement of the ferret’s serum insulin level may also be recommended to help with the diagnosis, but results are not always conclusive.

If the ferret is showing signs of severe hypoglycemia (weakness, collapse) at home owners can rub honey or corn syrup onto the gums. Once the ferret has improved, feed some of its regular diet and schedule an appointment with your veterinarian. Long-term treatment recommendations for insulinoma include surgery, medical therapy and dietary

modification. The choice of therapy depends on severity of clinical signs, the age and overall health of the ferret and owner preference. Medical therapy involves the daily administration of drugs that will help the body produce more glucose and use it more efficiently. Most veterinarians start with twice daily diazoxide (Proglycem), and adjust the dose in response to the ferret's blood glucose levels, as well as how the ferret is doing clinically. If control is poor another medication, prednisolone, can be added to the regimen. In addition, ferrets with insulinoma should be fed many small meals throughout the day. A diet containing high quality protein and moderate levels of fat is preferred. Food with processed sugar or high levels of simple carbohydrates (such as fruit, semi moist cat food, cookies, etc.) should be avoided. Lastly, surgery can be performed where the tumor producing cells in the pancreas are removed. Many times the insulin-producing tumor is throughout the pancreas, therefore if obvious tumor nodules are not found, a partial resection of the pancreas is performed.

Keep in mind that with any of the treatment options discussed above, ferrets with insulinoma are not cured, but rather controlled, and that blood glucose concentrations will need to be checked periodically. When treatment regimens are followed, many ferrets will continue with a good quality of life for one or more years.

Training Tips for Ferrets

- Remove all items that ferrets can harm or that can harm them. Don't waste time teaching them to leave something interesting alone when it is easier to remove the object (or secure it so that the object cannot be disturbed).
- Be consistent. Always correct using the same methods. Always correct unacceptable behavior immediately.
- Remember – ferrets are small. Be firm but gentle. Never, ever hurt your ferret!
- All training requires patience. Ferrets are extremely curious and persistent.
- Use redirection whenever possible. Show the ferret something they can do or have.
- Use repetition. Pick the ferret up, gently shake by the scruff and say “no! no! no!” in a firm voice and put them back down. Repeat, repeat, repeat.
- Use treats and praise to reward good behavior. Praise lavishly, give treats sparingly.

These methods will work well for most training needs; however, if you have a ferret who nips you may need to be a little firmer. Ferrets who nip usually do so out of playfulness, habit or fear more often than true aggression. Whatever the reason, ferrets can easily be taught not to nip at any age.

Try these tips for nippers:

- Pick the ferret up by the scruff, gently shake and loudly say “no!” each time he/she tries to nip.
- Do not give up and do not be afraid of your ferret!

- Do not quit giving a nipping ferret attention. Just like a difficult child, they need more attention, not less. Spend as much time as possible with him/her.
- Cover your feet. Even well behaved ferrets find it difficult to ignore toes! Do not wear gloves. They are not necessary and can frighten your ferret while only making you clumsy. The ferret may even think they are a toy.
- Cuddle the ferret even if it means holding by the scruff. Talk constantly in a gentle, soothing voice. Show your ferret that hands give treats, back scratches, and toys.
- Never play using your hands. Always play using a toy. For example: drag a toy around for the ferret to chase.
- Make movements calmly and slowly

Vaccine Reactions in Ferrets

Routine veterinary care for pet ferrets includes yearly vaccinations. It is currently recommended that all ferrets be vaccinated against two deadly and life-threatening diseases: canine distemper and rabies. The vaccine products available are specific for ferrets and have undergone extensive laboratory testing to determine that they are effective in preventing both diseases. Unfortunately, some ferrets may have adverse reactions to either vaccine.

Canine Distemper

Distemper is caused by a virus, and affects dogs, ferrets, raccoons and a number of other species. In ferrets, distemper causes a variety of symptoms, usually starting with fever, appetite loss, clear nasal discharge and a rash on the chin. The virus progresses and infected ferrets typically develop severe eye inflammation (conjunctivitis) and dermatitis with red blotchy skin and thickened footpads. Within several weeks the virus causes inflammation of the nervous system resulting in incoordination, convulsions, coma and death.

Unfortunately, ferrets with canine distemper almost always die of the disease. Ferrets can acquire canine distemper from other animals sick with the disease. Since the virus can live for a short time in the environment or on clothing, ferret owners can potentially pick up the virus from infected animals and bring it home to their ferrets. Once exposed, unvaccinated ferrets typically begin showing signs of the disease within 7-10 days. Ferrets vaccinated against canine distemper with an approved vaccine are usually well protected against the virus.

Rabies

Rabies is also caused by a virus, and is transmitted to ferrets through the bite of an infected animal. Rabies in ferrets is rare, as most ferrets are kept indoors where exposure to rabid animals is uncommon. However, accidental exposure may occur, and given that rabies is a serious cause of human illness and death, it is highly recommended that ferrets be protected against the virus.

In fact, many communities require rabies vaccination of pet ferrets, along with dogs and cats. If an unvaccinated ferret bites a human, the health department is called in to make a determination of likely rabies involvement and in some cases may require that the ferret be killed and tested for rabies.

Vaccine Reactions

Vaccination is the process of injecting a small amount of killed or inactivated virus into the animal in order to stimulate the immune system. The resulting immune response can provide protection if some point in the future the animal is exposed to the live virus. Since vaccination involves the injection of a foreign substance into the animal (killed or inactivated virus plus carrier substances), the possibility of a strong immune system overreaction exists, resulting in a vaccine reaction. Vaccine reactions typically occur within one to thirty minutes of vaccine administration.

The signs of vaccine reaction are variable. The ferret initially becomes depressed and quiet with a glassy-eyed appearance. Within a short period panting, quivering, vomiting and/or diarrhea, with eventual collapse may follow. Without appropriate therapy the signs may progress to seizures, coma and death.



Vaccine reactions are not uncommon in ferrets. We give all ferrets Benadryl prior to vaccine and ask that you wait in our office for 15 minutes post-vaccination in case a reaction occurs. A ferret with a vaccine reaction will become suddenly very quiet and may soon have bloody diarrhea. This needs to be treated immediately!

Treating/preventing vaccine reactions

Many veterinarians pre-medicate ferrets with an injection of diphenhydramine (Benadryl®) just prior to vaccination in order to prevent or lessen the symptoms associated with a reaction. Your veterinarian may also recommend that you remain in the veterinary clinic for a 15-30 minute post-vaccination observation period. This will ensure that in the event of a vaccine reaction, your ferret will receive prompt medical attention. Treatment involves fluid therapy and various medications to help restore blood pressure, combat shock and control symptoms.

It is uncertain why some ferrets react adversely to vaccination. Vaccine products for any species, including humans, may cause reactions in a small number of those receiving the vaccine. The majority of vaccinated ferrets do not react unfavorably. Therefore, it is highly recommended that all ferrets receive annual vaccinations to prevent these two deadly diseases, despite the potentially small risk of a vaccine reaction.

Eosinophilic Gastroenteritis in the Ferret

Eosinophilic Gastroenteritis is a disease of the stomach and intestines where the normal cell architecture of these organs is disrupted and replaced by an increased number of white blood cells, known as the eosinophils.

The exact cause of Eosinophilic Gastroenteritis is unknown, but parasites, immune disease and allergies to certain food items are all potential causes. Affected ferrets are young to middle aged, and gender does not appear to play a role in the disease.

Signs of Eosinophilic Gastroenteritis include vomiting, diarrhea, lack of appetite, dark, tarry stools, bloody, mucousy stools, lethargy, and weight loss. Dermatological lesions have also been reported in several cases. These may include swollen, red foot pads, crusty inflamed ears or generalized skin sores.

Any ferret with signs of gastrointestinal distress should see a veterinarian. The veterinarian will start with a thorough history and physical examination. Blood work may be helpful in diagnosing this disease. A definitive diagnosis requires abdominal surgery and subsequent biopsy of the stomach, small intestine and the lymph nodes draining these organs.

Treatment recommendations are based on biopsy results and may involve dietary changes and/or medical therapy. An anti-inflammatory drug, prednisolone, is the most common medication used to treat this disease. Signs may recur and medication is usually needed for life. A diet change to a hypoallergenic diet has been used with some success in these patients. If a diagnosis of Eosinophilic Gastroenteritis is made, it is important to maintain your ferret on a strict diet, as treats and dietary changes can lead to a recurrence of clinical signs.

Common Pet Ferret Toxins

Pesticides – these are a common source of intoxication for domestic pets and exotic pets alike. If your pet spends time outside, it is at risk for exposure to pesticides placed not only in your yard, but from run-off from adjacent yards or farmland. Herbivorous grazers and reptiles that eat insects from outdoors can ingest the toxins, but sometimes animals may become intoxicated from skin exposure alone. Always be aware of what your house and yard are treated with, as well as that of your neighbors. **DO NOT** allow your pet to graze or hunt if the safety of the food source is in question. If you are treating your pet for any external parasites (such as snake mites) with any of these products, **DO NOT** use them in conjunction with each other, especially products within the same class of chemical. Organophosphates, pyrethrins and metaldehydes are all examples of pesticides.

Always check with us before you use/put any type of pesticides near/or around your ferret.

Rodenticides are rarely ingested by exotic animals. There are three main classes: vitamin K1 blockers, bromethalin, and vitamin D3 amplifiers. It is important to differentiate between these three types for treatment, so if you suspect that your pet has eaten one of these compounds, please make every effort to bring in the box, or otherwise identify the compound.

Fipronil – this compound is the main ingredient of “Frontline”, “Parastar”, “Certifect”, and “PetArmor” flea and tick preventative product lines. While it is safe for most companion pet animals, it is highly toxic to rabbits, fringe-toed lizards (*Uma* spp.), fish, and aquatic invertebrates. Clinical signs include muscle twitching, tremors, convulsions +/- excitement, or lethargy and ataxia. Sudden death may occur as well. Onset is usually quick (< 7 hours), and if caught and diagnosed in time, this may be treated with supportive care and anti-seizure medications, such as diazepam or midazolam. Muscle relaxants may help as well.

Always check with us before you put any kind of flea and tick preventative on your pet.

Toxic Plants – many household and garden plants can be toxic to animals if eaten in large quantities. While a complete list would be too large for this handout, look up or ask about plants that you purchase for your yard or house, limit pet exposure to unknown plants, and monitor pets while in the back yard. Please note that the seeds of several fruits (apples, apricots, cherries, peaches, plums, and jetberries) contain cyanide, and may be toxic. These should be removed before offering the safe parts of the fruits to your pet. Other toxic plants in the wild may include (but are not limited to) azaleas, rhododendrons, laurel, yew, castor bean plants, sago palms, holly, mistletoe, poinsettia, oleander, foxglove, lily of the valley, any calcium oxalate plant, ivy, tobacco, oak, and marijuana.

Medications – as Paracelsus stated long ago, “Dosage differentiates the poison from the remedy.” Many commonly used medications, including antibiotic, anti-fungal, and anti-parasitic drugs, can be toxic to your pets if given at improper dosage ranges. In addition, individual animals may have allergic reactions to specific classes of medication (these reactions are impossible to predict). Always store medications where all of your pets (and children) cannot reach them. Always give the amount of medication directed by your veterinarian, and call your veterinarian if you have any questions or concerns about a medication, a pet’s reaction to a medication, or a dosing regimen.