Scarlett's Happy Dookers

Ferretry

INFORMATIONAL PACKET

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Hi and welcome to Scarlett's Happy Dookers Ferretry!

Thank you for choosing a Scarlett's Happy Dookers ferret. I hope that you enjoy many happy years with your new family member. When properly trained, these little fuzzies make wonderful pets. Their comical antics, inquisitiveness and "innocent" little faces will steal your heart and give you endless hours of entertainment and enjoyment. This booklet was created to assist you in the care and training of your fur child.

Scarlett's Happy Dookers Ferretry was established in 1993 and is one of the oldest active ferretries in the USA. I am very proud of all my fur kids. Through the years, ferrets I have bred or owned have received over 60 Best of Shows and Best Opposites as well as numerous top 10 placements. SHD's Gisborne's Gold received American Ferret Association's FIRST Ferret of the Year in 2000..back before they split the titles into four categories for Ferret of the Year. As of 2019, I have bred 5 Title AFA Ferret of the Year ferrets and over a dozen AFA Specialty Ferrets of the Year. Many of my hobs and jills are now Gold Level AFA Championship along several others that are soon to become. My kids have placed consistently in championship shows.

*We are also proud to be able to say that we test regularly and are **ADV free**!*

Scarlett's Happy Dooker Ferretry specializes in a variety of colors and patterns. From black sables, black roan mitts and black mitts, sables, points, champagnes, chocolates and albinos. Conformation, disposition and health are always the foremost concerns. Through the years, to provide genetic diversity and hopefully improve the overall health of my "kids" I have added Hungarian, German, Finnish, New Zealand, Swedish, English and Australian bloodlines to the American bloodlines.

We feed a high quality grain-free kibble, in addition to whole prey, raw/cooked meats and freeze dried. I highly recommend the continued mixture of natural whole prey, raw, freeze-dried and, at least, cooked meats with the grain free kibbles. There is information in this packet to assist you in your food selection.

In 1997, I founded Heart of Ohio Ferret Association and Rescue (www.HOFARescue.org). I President of HOFA Rescue (1997-2002, 2015-current), shelter director for HOFA Rescue (1997-2005) and currently the Breeder Chair. I have been Show Coordinator of The Ferret Buckeye Bash since 1999. The Ferret Buckeye Bash is the largest ferret show in the country and was featured in "Ferrets, The Pursuit of Excellence" aired on PBS stations across the country. (www.ferretbuckeyebash.org)

I have been a member of American Ferret Association (AFA) since 1997. In 2002 I became a licensed AFA Judge**.** I have judged at over 80 AFA sanctioned ferret shows in the USA, internationally in Japan over a dozen times and traveled to Russia in December 2013 to judge.

If you have any questions or about your ferret, or just in general, do not hesitate to contact me at ScarlettG@aol.com, text at 614-563-5829, my website www.Scarletts-HappyDookers.com or find me on Facebook.

Again, congratulations on your new family member!

Scarlett

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Ferret Checklist of Items You'll Need:

- □ **Cage**: The cage should be a place where your ferret feels comfortable and secure. This is their "Den". It does not have to be huge if your ferret is going to get out time at least once a day. (About 18"x36" per ferret) Should be where they do not get light for extended periods of time(over 8 hours). If in your living or computer room where you will have lights on, covering the cage is a good idea. Should be in an air conditioned room and allow free airflow (not an aquarium). They can deal with the cold but not the heat. If you think you might get more ferrets in the future, plan ahead with a large enough cage.

- □ **Hammock(s)**: Ferrets have very flexible spines and like to sleep curled up in a hammock. Fleece seems to be their favorite bedding choice. A pocket hammy where they can curl up in the dark is best.

- □ **Other Bedding**: Use fleece blankets, old T-shirts or sweatshirts for ferret blankets. Wash the bedding regularly to help reduce the ferret musk smell. **Do not use wood chips/shavings. Cedar will cause respiratory issues.**

- □ **Food**: Use a high grain free quality ferret food and a mixture of 3 kinds is best as foods can be discontinued or formulas changed. You do not want them to imprint on one kind of food. They should have access to food at all times.

- □ **Food Bowl**: Ferrets are always playing with things. A crock-loc or bowl that attaches to the side of the cage is best or a heavy bowl that will be more difficult for them to move or flip over.

- □ **Water Bottle and/or Water Dish**: Ferrets should have access to water at all times. Although many like to lap water from a bowl, many will also spill the water and play with it. A water bottle will ensure that they always have water available. A drip cup under the water bottle will help with leakage and can have fresh water put into for drinking also.

- □ **Litter Box(es)**: Ferrets should have a litter box in their cage (more than one if the cage size/number of ferrets warrants it). **You will also want litter boxes throughout the rooms your ferret will be playing in**. Puppy piddle pads can work well.

- □ **Litter**: We recommend wood stove pellets or a compressed newspaper pellet litters. Wood fuel pellets can be gotten at Tractor Supply Stores, Menards and at some Lowe's and Home Depots.

- □ **Nail Clippers**: Ferrets need their nails clipped on a regular basis to prevent foot damage and to from them catching on bedding, etc. Monthly is good. Regular people clippers work fine.

- □ **Q-Tips for Ear Cleaning:** Check your ferrets ears regularly. If dirty, clean out with a dampened q-tip. You can use plan water or mineral oil. I find some of the ear cleaning solutions sometimes irate the ear, but you can use them. Some ferrets need their ears cleaned more than others. If the deposits are black and excessive, they may have ear mites and need to be treated.

- □ **Tooth Brush:** A small child's tooth brush and cat or dog toothpaste. Brushing teeth weekly and checking for tartar build up is essential to your ferrets health.

- □ **Harness & Leash**: Use a H harness that goes both around the neck and front legs. Must be snug…you should just barely be able to get your finger under.

- □ **Carrying Cage**: A portable carrier to be used for bringing the ferret to the veterinarian or other outings. Also can serve as a training aid by serving as a "time-out" cage for a misbehaving ferret

- □ **Shampoo:** We do not recommend you bathe your ferret unless it is REALLY dirty. Ferrets should not be bathed more than three to four times a **year**. Any mild shampoo is fine.

- □ **Treats**: Remember that treats are just that - small rewards. They should not be a large part of your ferret's diet. However, they are good for bonding with your ferret and rewarding good behavior, learning tricks, etc. NO sugary treats. I recommend freeze dried meats..such as Stella and Chewys or even a cooked piece of meat.

- □ **Toys**: Ferrets will entertain themselves with anything they can find. Ferret-safe toys should not have parts they could accidentally chew off and swallow. NO soft rubber! Tubes, cardboard boxes, storage box of starch peanuts, plastic Easter Eggs, plastic water bottle caped with bell in it are some suggestions. Always monitor all toys for damage. Accidentally swallowed pieces of things can lead to intestinal blockages and can kill them before you even realize the danger. People are the best toy of all - spend time playing with your ferret!

"What 's My Ferret Doing?"

Let's face it, ferrets are funny little animals. They have all sorts of quirks- no two ferrets are alike. However, there are some behaviors that are common in most ferrets. Below, I have listed some common ferret behaviors and some explanations for them.

Alligator roll- Ferrets generally exhibit this behavior when they are playing with other ferrets. One ferret usually grabs the other ferret by the scruff and "flips" the other ferret over. This action is important in establishing dominance between two ferrets. The "alpha ferret" is the one doing all of the flipping, while the more submissive ferret is the one constantly getting flipped! Sometimes a single ferret will roll around by his or her self while excited during play. Young ferrets and ferrets who have not been nip trained will sometimes try to "scruff" and roll a human by grabbing lose skin on the back of a hand, socks, or feet. This is all done in good fun, however if it is painful the behavior should be discouraged. Ferrets have much tougher skin than humans, so what may feel like a "pinch" to another ferret can feel like a bite to a human.

Backing into a corner- Ferrets do this for different reasons. If your ferret backs up into a corner or wall while hissing and getting all "puffed" up, your ferret is telling you that he or she is frightened. It is important to not try to grab or pick up a frightened ferret. If your ferret is frightened, just speak soft kind words and leave him or her alone. Your ferret will soon recover once he or she feels that the threat or danger is gone. Another reason ferrets back into corners is a more common one. Ferrets will often back up into a corner to use the bathroom! If you see your ferret backing into a corner, and he or she is not frightened, look out. Your ferret is about to use the potty on the floor! It is helpful to quickly place your ferret into the nearest litter box as soon as possible (before the deed is done).

Bottle brush tail- Ferrets will often get a "puffy" tail when they are frightened or excited. If a ferret has a bottle brush tail and is backing away from you and hissing, he or she is frightened and needs to be left alone until calm. However, if your ferret gets a "puffy" tail while exploring a new environment (like going outside for the first time), or during vigorous play, he or she is just very stimulated and excited. Puffy tail can also be a precursor to having a "wired weasel" on your hands! Our ferret Ed often gets a puffy tail when we let him out to play in the morning in our new house. A short time later he is taking off around the house like a rocket!

Chasing- Ferrets LOVE to play chasing games. They will chase one another and they will chase you (and want you to chase them). Ed and Ginger love to chase me when I run around the house dragging a blanket. Many new ferret owners get frightened when their ferret jumps around and "lunges" at them and then starts to run around like a crazed animal. Don't worry. Your ferret is just trying to entice you into a game of chase. If you decide to turn the tables and chase your ferret back, just make sure you have several feet between you and your ferret. Ferrets can stop suddenly and get stepped on!

Dance of Joy- This is one of my favorite aspects of ferret behavior. The "dance of joy" consists of a ferret jumping around from side to side, flipping on the floor, bouncing off of furniture and generally loosing all control! Your ferret may slightly open his or her mouth during the display and make "chirping or dooking" sounds. Basically, your ferret is telling you that he or she is full of energy, incredibly happy and ready for some serious playtime! Many first time ferret owners can be frightened by this display (I have had people write to me thinking that their ferret was attacking them). Don't worry. Your ferret is simply bursting with joy and energy.

Dooking- This term refers to the sound a ferret makes when excited and happy. My husband prefers to call it "chirping." The next time you play with your ferret, listen closely. Sometimes it is hard to hear the soft vocalizations ferrets make when excited. My ferrets "dook" quite loudly when playing with one another and when I take them outside.

Food digging- This is often an "unwanted" ferret behavior, however many ferrets do it. Ferrets are born to dig, and to them a bowl of chow is as good as a pile of dirt when it comes to digging. I have learned to live with this behavior and have not attempted to get my ferrets to stop. Most ferrets will just eat the food that they dig out of the bowl. It is nearly impossible to stop ferrets from exhibiting behaviors that are a part of their nature.

Food and water bowl tipping- This is another unwanted ferret behavior, however many ferrets do it often. Ferrets are playful animals and will play with their food and water if given the chance. Sometimes ferrets will tip over their food and water if they are bored from being caged too long. Your ferret may be trying to tell you that he or she is upset or lonely. Other times, a ferret will knock over the food or water bowl to play in the spilt food or water. Many ferrets love to play in shallow water and to dig in food. A bowl of water is just plain irresistible to a ferret and it can eventually get knocked over during play. Purchasing heavy ceramic food bowls or food bowls that attach to the side of the cage can help in solving this problem. Ferrets do also tend to like to mix a little water in with their food. I discovered my ferrets "scooting" the food and water bowl (they are attached) across the kitchen floor until some of the water splashed into the food side of the bowl. They then drank the water out of the food side of the bowl and ate the food. If your ferret does this, try moving some of the ferret food aside and splashing a little water into the food bowl. This may help in keeping the food and water bowl from getting tipped over

accidentally. Just be aware that moist food spoils quickly, so you should remove any uneaten portions and replace it with fresh food.

Hissing- A hissing ferret can be an unhappy or angry ferret. Always use caution in trying to pick up a ferret who is backing away and hissing. You could get bitten. Ferrets usually hiss to show fear or anger. However, ferrets can sometimes hiss when engaging in play with one another. If your ferret hisses while displaying an arched back and "bristled" fur, just speak softly to your ferret and leave your ferret alone. He or she is not a happy ferret and could bite. Only pick up your ferret after he or she has calmed down.

Litter box digging- Ferrets LOVE to dig, and litter is no exception. To avoid litter box digging, try keeping a small piece of stool in the litter box at all times. A squeaky clean litter box can be a wonderful digging toy to a playful ferret. If your ferret can smell excrement in the box, he or she may see it as a place to do business and not a place to play. You can also purchase some "play sand" or potting soil from a hardware store and make a "sand box" for your ferret to play in. If you give your ferret appropriate places to dig, he or she may leave the litter boxes alone.

Obsession with a particular object- Ferrets can and do become obsessed with particular objects or toys. Your ferret will probably pick his or her favorite toy and hide it in a secret hiding place. If you find the toy and remove it, your ferret could become very anxious, angry or stressed. For example, our ferret Ed is obsessed with his Winnie the Pooh stuffed animal with a built in teething ring/rattle (see picture below). He doesn't chew on it, he just moves it to different places around the house. At any given time of the day, my husband and I can hear the jingling of the rattle as Ed moves it to a new hiding place. If I find his toy and jingle it, he will come running out of any hiding place to get it back. He will then look for a new hiding place to store it. Ferrets can also fight with one another if one tries to take the other's favorite object. Your job is to make sure your ferret becomes attached to a safe item. Ferrets are notorious for stashing things that they like all over the house (even car keys and wallets!).

Object "scooting"- This is another one of my favorite ferret behaviors. Ferrets will sometimes try to move large or awkward objects by grabbing them with their paws, holding them close to their chest and "scooting" backwards. The funny aspect of this behavior (besides the fact that they look funny) is that they often just move around in a circle, not really getting anywhere at all! Ed and Ginger often try to move plastic Easter eggs (and panty hose) in this fashion. It always gives me a good laugh!

Running into things - Believe it or not, ferrets actually have very poor eyesight. They can only see about two feet in front of them. Their peripheral vision (side to side) is better than their frontal vision. This is why a playing ferret may run head on into a wall or piece of furniture while running. Ferrets also have very poor depth perception and may suffer from "high rise syndrome." For this reason, it is not advisable to let your ferret run around on a balcony or high patio. Ferrets have also been known to scratch through window screens and fall to their deaths. Be sure to watch your ferret closely if you have a two story home with an open balcony on the second floor. Many people put Plexiglas barriers around open banisters on the second floor.

Screaming- If your ferret lets out a scream, you can be sure your ferret is not a happy camper. Ferrets can let out a scream when very frightened, injured or unhappy. It is not a sound you want to hear. If your ferret screams due to an injury, you want to get him or her checked out by a vet as soon as possible. Sometimes, ferrets may scream during rough play or dominance wrestling. This is especially true when a new ferret is being introduced into the family. Ferrets do have a pecking order and the submissive ferret may be getting bullied by the "alpha ferret" of the group. If you hear your ferret scream while playing with another ferret, always check out the situation. You want to make sure there are no bites or serious scratches that need medical attention. If no injuries are taking place, continue to let the ferrets "duke it out" for short supervised periods of time. Ferrets will usually sort out their differences on their own. However, if one ferret is injuring another ferret, they should be separated.

Scratching- Ferrets tend to be itchy animals. If your ferret suddenly stops during play and scratches like crazy, don't worry to much about it. Ferrets tend to scratch often. However, always check your ferret over for fleas, skin redness or skin lesions. If you find any lumps or bumps on your ferret's skin, go see a veterinarian. If fleas are present, talk to your vet about topical flea products, or use a ferret specific flea shampoo. Be sure to treat your house for fleas as well. If your ferret's skin looks fine, your ferret is just displaying typical "itchy" behavior.

Sneezing- Ferrets do tend to sneeze a lot. This is usually due to their close proximity to the ground and their habit of smelling everything in sight. If they sniff something that is dusty, they will sneeze. However, if the sneezing is accompanied by a runny nose or lethargy, you may have a sick ferret on your hands. Ferrets can catch human viruses. If your ferret does not improve in a few days, or if he or she starts coughing or has a thick mucus discharge, take your ferret to a veterinarian for a check up.

Tail wagging- This is another adorable ferret behavior. If you are lucky, you may see your ferret wag his or her tail very rapidly when excited. This behavior usually takes place when two ferrets are playing in a tunnel or tube. It just means that

your ferret is very excited and is anticipating something fun. For example, Ed will wag his tail while waiting for Ginger to join him inside their play tunnel (Ferret Freeway). Ginger has no idea that Ed is in the tunnel when she enters it. Ed wags his tail until he sees her and then lunges forward to surprise her! It really is fun to watch.

Toe Nipping- Ferrets will often nip toes and feet when they are young. They are basically treating your foot like another ferret. Ferrets will often nip one another to entice play. They also scruff one another using their mouths during play. Because ferret skin is tougher than human skin, a playful nip can feel like a bite. You should discourage this behavior in young and old ferrets. Wearing socks is usually the best deterrent for foot and toe nipping. Ferrets seem to LOVE stinky feet. So, if your feet stink (or even if they don't), try wearing socks around your ferrets at all times. If this does not stop the behavior, purchase some Bitter Apple and apply it to your feet. It tastes terrible and should deter your ferret from nipping. Say "no" very loudly each time your ferret nips your foot.

War dance- This ferret behavior looks a lot like the "dance of joy," however it has a very different meaning. If your ferret is arching his or her back with bristled fur, jumping from side to side, backing away and hissing- look out. Your ferret may be pretty upset. While the general movements of the war dance are similar to the dance of joy, the body language is different. Ferrets can do the war dance when frightened, injured or angry. If your ferret has not been descented, he or she may release a very stinky smell during this display. Your ferret is trying to look big and scary and stinky. He or she is telling you to stay away- and you should listen to your ferret until he or she feels comfortable again.

Wrestling- Ferrets often play with one another in the form of wrestling. One ferret will usually use his or her mouth to "scruff" the other ferret behind the neck. He or she will then try to "alligator roll" the opponent and pin him or her to the floor. This can be done with much dooking and hissing (and sometimes screaming). Ferrets wrestle to establish dominance and to "mock fight" during play. Ferrets are very elaborate and talented wrestlers. Their antics may look dangerous, however more often than not they are just playing rough. However, if you hear a lot of screaming coming from one ferret, be sure to look the ferret over for injuries. Not all ferrets like one another and they really could be fighting!

Written by Mahri
EverythingFerret.com

Kit Training 101

ALL kits are nippy starting anywhere from 6-10 weeks of age. The reason is the same as the nippy phase kittens and puppies go through, they are babies and want to play. Unfortunately for us, ferret skin is VERY thick and tough, so they bite each other hard in play. What you have to do is teach your ferret that nipping is not an acceptable way to play with humans. The good news is that with the proper training methods, your new kit can be trained out of this phase quickly and easily.

First and most important... NEVER hit, bop, nose flick, gag or thump your kit. Doing this generally teaches them that YOU are a threat, an enemy, something to be defended against, and can create a mistrustful, nervous, nipping ferret. The correct methods should be taken in stages, how many stages you must go through depends on your ferret..

Stage 1 - For 4-5 days, when your kit starts to nip, reaches as if nipping, pretends to nip, or is even just looking like she is about to, make a noise in a high pitched, shrill voice of "ooww" or "aaiiyy". This is the noise one ferret makes to another to say "too much, you hurt me, knock it off". If you take good care of, and love your ferret, she is trying to play with you and doesn't wish to hurt you. 90% of kits will stop and look at you with a "Omigosh I HURT you?" look on their face.

IF your kit does not respond to this, ADD TO THAT...

Stage 2 - Pick the kit up by the scruff and stare into her eyes and after the "oww" let out a hiss. Yes, a hiss, just like a cat hiss. Again, this is how a ferret says a stern "NO".

Use Stages 1 and 2 together for another 4-5 days. IF your kit does not respond to this... ADD TO THAT...

Stage 3 - After doing all the above, while still holding the kit by her scruff, VERY LIGHTLY drag her back and forth across the floor about 3-4 times in about a 3 foot area. This is a ferrets strict punishment. Try all this together for about 4-5 days.

A few hints while doing all this.

1. You can always use Bitter Apple either on your skin or clothing.

2. NEVER put down or in cage after nipping/biting. You will be teaching him/her that biting is the way to get put down. Also, when holding, if he/she wiggles a lot and you put down....YOU are being trained.

3. You CAN use a small pet taxi for a "time out" if she is being stubborn. An empty pet taxi for only 2 minutes is a huge punishment for a playful kit.

4. ALWAYS make sure to reward and reinforce good behavior with love, cuddles, petting, kisses, treats, praise etc. This helps show the kit how nice it can be as opposed to getting in trouble.

5. If you say the word "NO" in a calm, quiet yet stern voice at the same time as doing the "oww" noises, your ferret will learn to respond to the word "NO" the same as the "ferret talk".

6. Every time you pick up, try giving a treat or little Ferretone..he/she will soon learn, I get picked up, I get a treat.

7. Raw gizzards, cooked chicken, whole prey, N-bones also are great for giving them something to chew. And NO, raw does not make them meaner.

8. Provide toys and interact with acceptable human play behavior. They love almost anything as a toy, some will like those dog rope bones, the small ones made for toy breeds work excellent. The idea is to teach interaction, play and have fun with you without using nipping as a type of play. Make sure you reward for correct playtime.

9. A kit will be more nippy if they are hungry, make sure your ferret has recently eaten before engaging in play time. Also have treats available to help establish that you are her caretaker and will provide for her.

10. A young ferret is also at their most nippy when first let out, it helps to let them run off a little of the excess energy playing for a while and let her mellow out a bit before interacting.

11. When she is tired from playtime and ready to pass out for a much needed nap, instead of placing her back in her cage right away, hold her on your lap and pet her while she drifts off. This helps teach her that quiet, loving moments and petting is great fun too.

Above all, remember to give your ferret everything she needs, make them as happy and well loved as possible. An unhappy ferret will tend to want to nip to show displeasure, while a happy ferret would never wish to hurt their beloved person.

Ferret Food Chart

Ideal foods are in the green section.

Decent foods are in the blue section, but I'd recommend mixing with a green tier food.

Orange tier foods can be fed to ferrets. I'd recommend mixing with a higher tier food

Red tier foods are NOT ferret suitable and should NOT be fed to ferrets.

The Ingredients:

Meat ingredients are listed in green. Fish/seafood ingredients are listed in blue (smelly poop warning)

Grains/Vegetables/Fruits are written in red.

***Peas are listed in red font with a red background. Peas are suggested to be associated with bladder stones in ferrets as is corn.

We recommend cutting them out altogether or minimize exposure by mixing with a pea free kibble or having peas in the ingredients list no higher than 5th place and be mixed with at least 2 pea free kibbles.

Name	Pea Free	Protein	Fat	Fiber	*1st ingredient*	*2nd ingredient*	*3rd ingredient*	*4th ingredient*	*5th ingredient*	*6th ingredient*
Ferret Epigen 90	Yes	62.0%	18.0%	3.0%	chicken meal	Organic Chicken	meat protein isolate	chicken fat	gelatin	Natural Flavor
Young Again ZERO	Yes	54.0%	26.0%	3.0%	Hydrolyzed Pork	Chicken Meal	Chicken Fat	Chicken Liver Flavor	Guar Gum	Herring Meal
ZIWI Peak Air-Dried Lamb	Yes	35.0%	33.0%	2.0%	Lamb	lamb heart	lamb tripe	lamb liver	lamb kidney	lamb lung
ZIWI Peak Air-Dried Mackerel & Lamb	Yes	43.0%	25.0%	2.0%	Mackerel	lamb	lamb heart	lamb tripe	lamb liver	lamb lung
ZIWI Peak Air-Dried Venison	Yes	45.0%	23.0%	2.0%	Venison	Venison Tripe	Veinison heart	Venison Lung	Venison Liver	Venison Kidney
ZIWI Peak Air-Dried Beef	Yes	38.0%	30.0%	2.0%	Beef	Beef Heart	Beef Tripe	Beef Liver	Beef Lung	New Zealand Green Mussel
ZIWI Peak Air-Dried Free-Range Chicken	Yes	38.0%	30.0%	2.0%	Chicken	Chicken Liver	Chicken Heart	New Zealand Green Mussel	Chicken Bone	Lecithin
Dr Elsey's Clean Protein Chicken Cat	Yes	59.0%	18.0%	4.0%	Chicken	Dried Egg Product	Pork Protein Isolate	Gelatin	Chicken Fat	Flaxseed
Wysong Digestive Support	Yes	60.0%	16.0%	5.0%	Chicken Meal	Organic Chicken	Chicken Fat	Dried Plain Beet Pulp	Meat Protein Isolate	Gelatin
BLUE Carnivora Woodland Blend	Yes	48.0%	20.0%	3.0%	Deboned Chicken	Dried Chicken	Deboned Turkey	Chicken Meal	Chicken Fat	Tapioca Starch
GO! Grain-Free Chicken, Turkey, + Duck (Formerly Go! Fit and Free)	No	46.0%	18.0%	1.5%	Chicken Meal	Deboned Chicken	Deboned Turkey	Duck Meal	Turkey Meal	Salmon Meal
Nutrience SubZero Fraser Valley Cat	No	42.0%	20.0%	3.5%	Deboned Chicken	Deboned Turkey	Chicken Meal	Turkey Meal	Salmon	Chicken Liver
NV Instinct Raw Boost Duck	No	40.0%	23.5%	3.5%	Duck	Turkey Meal	Chicken Meal	Chicken Fat	White Fish Meal	Peas
NV Instinct Rabbit	No	40.5%	22.5%	3.5%	Rabbit	Turkey Meal	Menhaden Fish Meal	Chicken Fat	White Fish Meal	Peas
NV Instinct Duck	No	40.0%	23.0%	3.0%	Duck	Turkey Meal	Chicken Meal	Chicken Fat	White Fish Meal	Peas
Orijen Regional Red	No	40.0%	20.0%	3.0%	Deboned Beef	Deboned Wild Boar	Deboned Goat	deboned lamb	lamb liver	beef liver
Nutrience SubZero Fraser Valley Cat	No	40.0%	20.0%	3.5%	deboned beef	deboned lamb	deboned wild boar	beef liver	lamb liver	wild boar liver
Young Again 50/22 Cat	Yes	50.0%	22.0%	3.0%	Hydrolyzed Pork	Chicken Meal	Chicken Fat	Potato Starch	Chicken Liver Flavor	Herring Meal
Essence Ranch and Meadow	Yes	39.0%	19.0%	4.0%	Boar	Goat	Lamb	Pork	Boar Meal	Lamb Meal
NV Instinct Raw Boost Chicken	No	41.0%	22.0%	3.5%	Chicken	Chicken Meal	Turkey Meal	Menhaden Fish Meal	Peas	Chicken Fat
Wellness CORE Original	No	45.0%	18.0%	3.0%	Deboned Turkey	Deboned Chicken	Turkey Meal	Chicken Meal	Peas	Herring Meal
Wellness CORE Kitten	No	45.0%	18.0%	3.0%	Deboned Turkey	Turkey Meal	Deboned Chicken	Chicken Meal	Peas	Herring Meal
Acana Ranchlands	No	37.0%	20.0%	3.0%	fresh ranch-raised beef	raw grass-fed lamb	Yorkshire pork	beef meat meal	lamb meat meal	pork meat meal

Name	Pea Free	Protein	Fat	Fiber	1st ingredient	2nd ingredient	3rd ingredient	4th ingredient	5th ingredient	6th ingredient
NV Instinct Chicken	No	41.0%	21.0%	3.0%	Chicken	Chicken Meal	Turkey Meal	Menhaden Fish Meal	Peas	Chicken Fat
Orijen Cat and Kitten	No	40.0%	20.0%	3.0%	Deboned Chicken	Deboned Turkey	eggs	Atlantic Flounder	Whole Atlantic Mackerel	chicken liver
Nature's Variety Instinct Kitten	No	42.5%	22.5%	3.0%	Chicken	Turkey Meal	Menhaden Fish Meal	Peas	Chicken Fat	Egg Product
Young Again Ferret	Yes	50.0%	22.0%	5.0%	Hydrolyzed Pork	Chicken Meal	Potato Starch	Poultry Fat	L-lysine	Powdered Chicken
Natural Gold Ferret	Yes	50.0%	22.0%	5.0%	Hydrolyzed Pork	Chicken Meal	Poultry Fat	Potato Starch	Powdered Chicken flavor	L-Lysine
Acana Grasslands	No	37.0%	20.0%	3.0%	lamb	duck	eggs	lamb meat meal	whole herring meal	turkey meal
Farmina N&D Prime Wild Board & Apple (formerly Farmina Naturals Wild Boar)	No	44.0%	20.0%	1.8%	wild boar	dehydrated wild boar	Sweet Potatoes	boneless chicken	dehydrated chicken	chicken fat
Acana Wild Prarie	No	35.0%	17.0%	6.0%	chicken meat	turkey meat	chicken gibblets	chicken meal	turkey meal	whole herring meal
Farmina N&D Prime Chicken & Pomegranate Kitten	No	44.0%	20.0%	1.8%	Boneless Chicken	dehydrated chicken	Sweet Potatoes	chicken fat	dried whole eggs	herring
Farmina N&D Prime Chicken and Pomegranate Adult	No	44.0%	20.0%	1.8%	boneless chicken	dehydrated chicken	Sweet Potatoes	Chicken Fat	dried whole eggs	herring
Chicken Soup for the Soul-Kitten	No	36.0%	20.0%	4.0%	Chicken	Chicken Meal	Turkey Meal	Brown Rice	Barley	Peas
NV Instinct Raw Boost Salmon	No	42.0%	18.5%	3.5%	Salmon	Menhaden Fish Meal	White Fish Meal	Peas	Herring Meal	Canola Oil
Nulo Freestyle Cat & Kitten - Chicken & Cod	No	40.0%	20.0%	4.0%	Deboned Chicken	Chicken Meal	Turkey Meal	Deboned Cod	Whole Peas	Lentils
Nulo Freestyle Cat & Kitten - Turkey & Duck	No	40.0%	20.0%	4.0%	Deboned Turkey	Turkey Meal	Mehaden Fish Meal	Deboned Cod	Yellow Peas	Lentils
Peas	No	40.0%	20.0%	4.0%	Deboned Chicken	Chicken Meal	Turkey Meal	Deboned Cod	Whole Peas	Lentils
NV Instinct Salmon	No	42.0%	18.0%	3.0%	Salmon	Menhaden Fish Meal	White Fish Meal	Peas	Herring Meal	Canola Oil
American Journey Cat Chicken Grain-Free	No	40.0%	15.0%	4.0%	Deboned chicken	Chicken Meal	Tapioca	Turkey Meal	dried whole eggs	Peas
+ Cod	No	42.0%	16.0%	2.5%	deboned salmon	deboned cod	salmon meal	herring meal	peas	lentils
Farmina N&D Prime Lamb & Blueberry	No	42.0%	20.0%	1.8%	lamb	dehydrated lamb	Sweet Potatoes	chicken fat	dried whole eggs	herring
Nature's Variety Ultimate Protein Duck	Yes	47.0%	17.0%	3.0%	Duck	Chicken	Chicken Eggs	Tapioca	Ground Flaxseed	Canola Oil
Wild Boar	No	42.0%	15.0%	2.5%	deboned lamb	deboned salmon	salmon meal	herring meal	lentils	peas
Farmina N&D Prime Chicken & Pomegranate Neutered	No	46.0%	11.0%	5.1%	boneless chicken	dehydrated chicken	Sweet Potatoes	chicken fat	dried whole eggs	Fresh Herring
Kitten Recipe	No	41.0%	17.0%	2.5%	Deboned Chicken	Chicken Meal	Turkey Meal	Dried Potato	Peas	Natural Pork Flavor
Performatrin Ultra Grain Free Kitten	No	40.0%	18.0%	3.0%	Turkey	Chicken Meal	Potato	Duck Meal	Peas	Salmon Meal
Merrick Backcountry Raw Infused Kitten	No	42.0%	15.0%	3.5%	Deboned Chicken	Chicken Meal	Turkey Meal	Potatoes	Peas	Natural Flavor
Kirkland Signature Grain-Free Cat(Costco)	Yes	30.0%	20.0%	3.0%	Chicken	Chicken Meal	Brown Rice	chicken fat	Chicken flavor	Ground Flaxseed
Health Extension Turkey & Salmon	No	33.5%	17.0%	6.0%	Deboned Turkey	deboned salmon	salmon meal	chicken meal	chickpeas	Lentils
Nulo Medalseries Cat & Kitten - Cod & Duck	No	40.0%	16.5%	4.5%	deboned cod	Turkey Meal	Chicken Meal	Green Lentils	Whole peas	Chicken Fat
4Health Whitefish Grain Free		35.0%	18.0%	3.0%	Whitefish	Fish Meal	Salmon Meal	Turkey Meal	Whole Potato	Dried Peas
Rice & Pea Recipe	No	36.0%	20.0%	4.0%	Chicken	Chicken Meal	Turkey Meal	Brown Rice	Cracked Pearl Barley	peas
Canidae Pure Elements Chicken		35.0%	18.0%	3.0%	Chicken	Chicken Meal	Turkey Meal	Potatoes	Peas	Chicken Fat
Kaytee Revolving Menu Ferret Diet with Chicken	No	42.0%	20.0%	5.0%	Chicken Meal	Poultry By-Product Meal	Pea Flour	Poultry Fat	Chicken	Ground Flax Seed
Kaytee Revolving Menu Ferret Diet with Turkey	No	42.0%	20.0%	3.0%	Chicken Meal	Poultry By-Product Meal	Pea Flour	Poultry Fat	Turkey	Ground Flax Seed
Blue Wilderness Kitten	No	40.0%	20.0%	3.5%	Deboned Chicken	Chicken Meal	Pea Protein	Tapioca Starch	Menhaden Fish Meal	Chicken Fat
Path Valley Crunchy	Yes	37.0%	22.0%	1.5%	Chicken Meal	Rice Flour	Egg Product	Chicken Fat	Catfish Meal	Wheat Flour

Name	Pea Free	Protein	Fat	Fiber	1st ingredient	2nd ingredient	3rd ingredient	4th ingredient	5th ingredient	6th ingredient
Earthborn Primitive Feline	No	40.0%	18.0%	3.0%	Turkey Meal	Chicken Meal	Peas	Chicken Fat	Pea Starch	Pea Protein
Classic Adult Cat Dry Food - Chicken & Brown Rice Recipe	No	34.0%	20.0%	3.0%	Chicken	Chicken Meal	Turkey meal	brown rice	peas	faba beans
Zupreem Original		40.0%	20.0%	2.0%	Chicken Meal	Wheat Flour	Chicken Fat	Potato Protein	Chicken	Dried Egg Product
Higgin In Tune Complete & Balanced Grain Free	Yes	40.0%	20.0%	4.0%	Chicken Meal	Dried Egg Product	Tapioca	Chicken Fat	Potatoes	Pollock/Turkey Meal
Blue Wilderness Rocky Moutain Red Meat		36.0%	16.0%	5.0%	Deboned Beef	Chicken Meal	Turkey Meal	Peas	Tapioca Starch	Pea Protein
Blue Wilderness Rocky Moutain Rabbit		36.0%	16.0%	5.0%	Rabbit	Chicken Meal	Turkey Meal	Tapioca Starch	Peas	Pea Protein
Nature's Variety Ultimate Protein Chicken	Yes	47.0%	17.0%	3.0%	Chicken	Tapioca	Chicken Fat	Ground Flaxseed	Natural Flavor	Dried Tomato Pomace
Fromm Kitten Gold		34.0%	20.0%	3.5%	Duck	Chicken Meal	Pearled Barley	White Rice	Salmon Meal	Chicken Fat
4Health All Life Stages Grain Free		34.0%	18.0%	3.0%	Chicken	Chicken Meal	Egg Product	Barley	Ground Rice	Chicken Fat
Earthborn Wild Sea Feline	No	44.0%	20.0%	3.0%	Salmon Meal	Pacific Whiting Meal	Peas	Pea Protein	Pea Starch	Canola Oil
Triple F Farms		38.0%	22.0%	1.5%	Chicken Meal	Rice Flour	Egg Product	Chicken Fat	Wheat Flour	Dried Beet Pulp
Totally Ferret Turkey/Venison/Lamb		35.0%	20.0%	1.8%	Turkey Meal	Dried Egg Product	Brown Rice	Poultry Fat	Catfish Meal	Rice Flour
Stella & Chewy's Raw Blend	No	39.0%	15.5%	5.0%	Chicken	chicken meal	lentils	peas	Chicken Fat	turkey
Wellness CORE Indoor		38.0%	12.0%	4.0%	Deboned Chicken	Chicken Meal	Turkey Meal	Peas	Potatoes	Potato Protein
Browns Encore Premium		45.0%	18.0%	3.5%	Poultry Meal	Potato Starch	Fish Meal	Chicken Fat	Dehydrated Alfalfa Meal	Fish Oil
Zupreem Grain Free		40.0%	20.0%	3.0%	Chicken Meal	Sweet Potatoes	Chicken By-Product Meal	Chicken Fat	Potato Protein	Potatoes
Wellness Core Air-Dried Duck		34.0%	24.0%	2.0%	Deboned Turkey	Deboned Chicken	Chickpeas	Gelatin	Natural Flavor	Glycerin
Simply Nourish Kitten		38.0%	18.0%	3.0%	Chicken	Chicken Meal	Rice Flour	Canola Oil	Natural Flavor	Tomato Pomace
Stella & Chewy's Raw Coated Kibble Cage-Free Chicken	No	38.0%	16.0%	5.0%	Chicken	chicken meal	lentils	peas	Chicken Fat	chicken liver
Totally Ferret Active		36.0%	22.0%	1.5%	Chicken Meal	Rice Flour	Dried Egg Product	Chicken Fat	Wheat Flour	Ground Corn Meal
Performatrin Ultra Grain Free		35.0%	18.0%	3.0%	Chicken	Chicken Meal	Potato	Peas	Dried Egg Product	Chicken Fat
Blue Wilderness Adult	No	40.0%	18.0%	4.0%	Deboned Chicken	Chicken Meal	Pea Protein	Tapioca Starch	Peas	Mehaden Fish Meal
Marshall Original Premium	Yes	38.0%	18.0%	3.5%	Chicken By-Products	Chicken	Chicken By-Product Meal	Corn Meal	Dried Beet Pulp	Brewers Dried Yeast
Health Extension Chicken & Brown Rice	Yes	36.0%	16.0%	6.0%	Chicken	Chicken Meal	Brown Rice	Oatmeal	Dried Egg Product	chicken fat
Iams ProActive Health Kitten		33.0%	21.0%	3.0%	Chicken	Chicken By-Product Meal	Corn Meal	Chicken Fat	Dried Beet Pulp	Ground Whole Grain Sorghum
Marshalls Select Chicken Formula	Yes	36.0%	18.0%	4.0%	Chicken	Chicken By-Products	Chicken By-Product Meal	Corn Meal	Dried Beet Pulp	Brewers Dried Yeast
Wysong Ferret Archetypal-2		38.0%	18.0%	5.0%	Organic Chicken	Chicken Meal	Potato Protein	Brown Rice	Oat Groats	Chicken Fat
Fromm Four Star Chicken		32.0%	19.0%	3.5%	Chicken	Chicken Meal	Pearled Barley	White Rice	Chicken Broth	Sweet Potatoes
Wysong Anergen 2		40.0%	16.0%	4.0%	Rabbit	Rabbit Meal	Peas	Potato Protein	Soybean Oil	Flaxseeds
All Living Things Ferret Diet		34.0%	20.0%	3.0%	Chicken	Chicken Meal	Brewers Rice	Corn Protein Concentrate	Poultry Fat	Ground Corn

Name	Pea Free	Protein	Fat	Fiber	1st ingredient	2nd ingredient	3rd ingredient	4th ingredient	5th ingredient	6th ingredient
Nature's Logic Turkey Cat		38.0%	16.0%	5.0%	Turkey Meal	Millet	Chicken Fat	Pumpkin Seed	Yeast Culture	Spray Dried Pork Liver
Marshall Carnivore Plus	No	40.0%	17.0%	4.5%	Chicken By-Products	Pea Flour	chicken	Menhaden Fish Meal	Dried Beet Pulp	Brewers Dried Yeast
Wellness Core Turkey/Duck		38.0%	18.0%	6.0%	Deboned Turkey	Turkey Meal	Peas	Potato Protein	Potatoes	Canola Oil
Purina ONE Kitten		40.0%	18.0%	250.0%	Chicken	Chicken By-Product Meal	Corn Gluten Meal	Brewers Rice	Soybean Meal	Animal Fat
Holistic Select Adult and Kitten		32.0%	20.0%	2.8%	Chicken Meal	Ground Brown Rice	Chicken Fat	Oatmeal	Anchovy and Sardine Meal	Flaxseed
Taste of the Wild Rocky Mountain		42.0%	18.0%	3.0%	Chicken Meal	Peas	Sweet Potatoes	Chicken Fat	Pea Protein	Potato Protein
Shepperd and Green Ferret		35.0%	20.0%	2.0%	Chicken Meal	Ground Rice	Corn Gluten Meal	Chicken Fat	Ground Corn	Dried Whole Egg
Marshalls Premium Ferret - Senior	Yes	34.0%	17.0%	3.0%	Chicken By-Products	chicken	corn meal	chicken by-product meal	Dried Beet Pulp	oatmeal
Mazuri Ferret		38.0%	20.5%	4.0%	Poultry By-Product Meal	Ground Brown Rice	Dehulled Soybean Meal	Porcine Animal Fat	Spray Dried Animal Blood	Poultry Fat
Kaytee FortiDiet ProHealth	Yes	35.0%	20.0%	3.0%	Poultry Meal	Poultry By-Product Meal	Brewers Rice	Poultry Fat	Dehulled Soybean Meal	Ground Wheat
4Health Indoor Grain Free		32.0%	13.0%	8.0%	Chicken	Chicken Meal	Garbanzo Beans	Peas	Turkey Meal	Powdered Cellulose
Path Valley Premium		34.0%	20.0%	3.5%	Poultry Meal	Poultry Fat	Cooked Corn	Soy Meal	Porcine Blood Meal	Wheat Middlings
Gather Free Acres Organic Free-Run Chicken Dry Cat Food	No	30.0%	16.0%	4.5%	Organic Chicken	organic dehydrated chicken	organic peas	lentils	chicken fat	organic flaxseed
Kaytee Fiesta Ferret	Yes	34.0%	19.0%	3.0%	Poultry Meal	Poultry By-Product Meal	Brewers Rice	Ground Wheat	Dried Egg Product	Poultry Fat
Science Diet Healthy Development Kitten		33.0%	22.0%	3.5%	Chicken	Whole Grain Wheat	Corn Gluten Meal	Animal Fat	Wheat Gluten	Chicken Liver Flavor
Sunscription VitaPrima Ferret		38.0%	15.0%	5.0%	Chicken By-Product Meal	Porcine Meat and Bone Meal	Brewers Rice	Corn Gluten Meal	Ground Wheat	Poultry Fat
Purina Naturals Original		38.0%	13.0%	12.0%	Chicken Meal	Corn Gluten Meal	Soybean Meal	Brewers Rice	Animal Fat	Corn Meal
Purina Kitten Chow Nurture		40.0%	12.5%	4.0%	Chicken By-Product Meal	Corn Gluten Meal	Brewers Rice	Soy Flour	Animal Fat	Wheat Flour
Wild Harvest		30.0%	15.0%	3.0%	Chicken Meal	Ground Rice	Papaya	Pineapple	Chicken Digest	Raisin Juice
Meow Mix Kitten LiL Nibbles		36.0%	15.0%	4.5%	Chicken By-Product Meal	Brewers Rice	Corn Gluten Meal	Ground Yellow Corn	Soybean Meal	Beef Tallow
Royal Canin Kitten		34.0%	16.0%	4.0%	Brewers Rice	Chicken By-Product Meal	Corn Gluten Meal	Wheat Gluten	Chicken Fat	Corn
Caught Salmon	No	35.0%	14.0%	5.0%	Salmon	ocean fish meal	lentils	chickpeas	peas	sunflower oil
Meow Mix Original Choice		31.0%	11.0%	4.0%	Ground Yellow Corn	Corn Gluten Meal	Chicken By-Product Meal	Soybean Meal	Beef Tallow	Animal Digest
Wild Harvest Daily Blend		30.0%	8.0%	4.0%	Poultry By-Product Meal	Brewers Rice	Ground Yellow Corn	Corn Gluten Meal	Chicken Fat	Brewers Dried Yeast
DuMor Ferret Diet		32.0%	10.0%	3.0%	Ground Corn	Poultry Meal	Corn Gluten Meal	Dehulled Soybean Meal	Whole Wheat	Brewers Rice
Hartz Bonanza Ferret		29.0%	9.0%	4.0%	Ground Corn	Poultry Meal	Dehulled Soybean Meal	Corn Gluten Meal	Whole Wheat	Brewers Rice

Rethinking The Ferret Diet

By Susan Brown, DVM

A nutritious and balanced diet is the foundation of good health for all creatures including ferrets. Ferrets have been kept in captivity since 300 BC, but it is only in the last 40 years that we have changed their diet from raw foods to commercially processed foods. We have made the change primarily because we, the public, have demanded a uniformly easy to feed and hopefully nutritious food that allows us to successfully keep ferrets in our homes. I think everyone would agree that it is easier to pour little bits of food out of a bag than to go out and find whole prey items to feed. But the question is are we really providing a healthy ferret diet using processed foods? Is it really possible to take raw food, grind it up, heat it to high temperatures, add ingredients that are not part of the normal diet, add back nutrients altered or destroyed during processing, press it into amusing shapes and have this be the equivalent of the natural diet"? I liken it to the Wonder Bread that I ate as a child. It was highly processed and stripped of many nutrients, then the nutrients were put back in chemically and it was put in an eye-catching package announcing its nutritional value. And didn't we love that package with the little colorful balloons telling us we were buying a healthy product? And don't we love the ferret food packages with cute pictures of ferrets everywhere? The food must be good if it has a ferret picture on it…shouldn't that be the case?

I have been an exotic animal veterinarian for the past 25 years and I have seen the damage that has been done in a number of species when we moved away from a raw, more natural diet, to processed diets. Two glaring examples are pet rabbits and pet birds. We have seen over the years that feeding a diet that is completely processed has caused innumerable ailments and premature death in both of these groups. When we returned them to foods that are more in tune with their physiology we saw a tremendous reduction in the incidence of specific diseases and we conversely have not seen any new diseases as a result of this change. There are a growing number of animal health professionals as well as pet owners that believe that processed dog and cat diets create disease as well. Changing these pets over to a balanced raw diet has shown incredible benefits. I have fed my own four dogs ranging in size from 200 pounds to 5 pounds an all raw diet for the past two years and I will never go back to processed. In my own case there were several problems that were cleared up in the "pack" with diet change alone including anal gland disease, skin problems, ear problems, obesity and gastrointestinal disease. I personally know a number of people who have made the same switch with both dogs and cats and the results are truly remarkable. Most animals experience a dramatic increase in energy level and a reduction in excess body weight. Some pets have been able to stop or reduce medication intake. Of course diet is not a miracle cure for all diseases, but it makes sense that if the body is nourished properly it can cope with disease and utilize needed medications more effectively.

I do not want to spend time in this article examining the pet food industry. I don't believe it is inherently "evil" as some would like to have us believe. There are of course people whose sole purpose is monetary gain at the expense of our pet's health but there are also involved and dedicated individuals and companies who sincerely want to produce a healthy and easy to use product. And who can fault them for this noble goal? My concern is whether we can, in reality, achieve this goal going the completely cooked, processed food route. I believe we should be rethinking our idea of what is appropriate pet food. There are even now a small number of pet food companies who are already going down the more natural pet food path. The bottom line is that the pet food companies are going to respond to what the consumers demand and it will ultimately be up to us to force the appropriate changes.

So what should a ferret be eating? Let's look at ferret gastrointestinal (GI) physiology to find out. **Ferrets are strict carnivores, meaning they are designed to eat whole prey items, which includes all parts of the killed animal**. The only nonmeat items they might encounter in their diet would be in the stomach and intestinal tract of their prey, where it is partially digested. This might include small amounts of grains, fruits and vegetables. Ferrets have a very short GI tract and the flora (the organisms living in the GI tract) are very simple, unlike animals that eat more vegetation. It takes about 3 to 4 hours for food to go from one end to the other and thus they absorb food rather inefficiently. Ferrets tend to eat several smaller meals and carry any excess to their dens to eat later. Did you ever have a ferret that took food and tucked it away in the corner of the cage, or a chair?

Because of the short GI tract and the poor absorption of nutrients, ferrets require a diet that is highly concentrated with FAT as the main source of calories (energy) and highly digestible MEAT-BASED PROTEIN. This would match the basic composition of a prey animal not excluding the essential vitamins and minerals it also contains. Ferrets should never be fed carbohydrates (such as vegetable, fruit or grains) as the main source of energy in the diet. Ferrets cannot digest fiber, as is found in some vegetable and fruit sources. If there is a significant amount of fiber in the diet it serves to lower the nutritional value of the food. As mentioned, ferrets need a highly digestible meat-based protein in the diet. Vegetable protein is poorly utilized. In the presence of excess vegetable protein the ferret can suffer from such diseases as bladder stones, poor coat and skin quality, eosinophilic gastroenteritis (wasting, diarrhea, ulcerations of the skin and ear tips and swollen feet) poor growth of kits and decreased reproduction. Dog food and vegetarian-type pet foods are completely inappropriate for use in ferrets

because of the high level of vegetable protein and fiber. **The bottom line is that ferrets use fat for energy not carbohydrates and they need a highly digestible meat-based protein not vegetable protein.**

Another concern regarding the feeding of high carbohydrate foods to ferrets is the stress that may be created in the beta cells of the pancreas. Unfortunately, insulinoma, which is a cancer of the beta cells, is extremely common in ferrets over two years of age in the U.S. The main function of the beta cell is to respond to increases in glucose in the blood stream by producing insulin to control it. If normal beta cells are bombarded with higher than normal levels of glucose (which comes from carbohydrates) they can become hypertrophied (overactive) trying to keep up with insulin demand. If the high carbohydrate diet continues, the result may be a complete burnout of the cells, which is what happens when a pet or a person develops diet-induced diabetes. However, another possibility is that instead of the cells burning out, they go from hypertrophy to neoplasia (cancer). Neoplasia is an abnormal growth of cells and can be preceded by a hyperplastic condition. I would like to stress that this exact mechanism has not been scientifically proven in ferrets to date, but the scenario is entirely within the realm of possibility. It has been disturbing to note that over the years in countries where ferrets were fed a raw carnivore-type diet insulinoma was a rare occurrence but now in these same countries where processed diets are becoming popular, cases of insulinoma are on the rise. Regardless, do we need to be feeding our ferrets diets laced with inappropriate materials?

Now comes the question of what is the most appropriate diet for a ferret? Many of you will cringe when I say (and I have been saying for years) **that a whole prey diet is the most balanced diet for a ferret**. We would like to believe that we have a pet that doesn't touch such "nasty" stuff, but they are carnivorous predators and no amount of packaging or advertising can change that fact. Personally I think we should appreciate them for just those predator qualities that make them the special pets they are and stop trying to make them into something they can never be!

Available prey animals of appropriate size would include mice, rats or chicks. 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. The stool volume is greatly reduced because most of the nutrients are utilized and not excreted. In addition there is valuable mental stimulation when eating a diet that takes effort and has a variety of textures and tastes as opposed to a uniformly sized pellet. This is the diet that has been fed for centuries to pet ferrets before processed foods came along. This is the diet I fed my last group of ferrets years ago. I have never seen ferrets more excited by their food and or efficient at cleaning up every scrap!

There are several concerns about feeding a raw diet that need to be addressed, however. One is whether feeding a raw diet will make a ferret more aggressive towards humans?

The answer to that is an emphatic NO. There is no connection between feeding a diet that is natural to a ferret and aggression towards humans. I can tell you this from my own personal experience and the experience of others both in present times and historically. The second concern is about passing diseases from the prey animal to the ferret. This is an excellent question and indeed there are some diseases that could be transmitted, however currently there are many clean sources of prey food available so this need not be a concern. It does mean, though, that you need to be careful about where you obtain the prey food and that you won't be feeding, say the mouse you trapped in our house. I have listed two sources of prey animals at the end of the article, but there are many more available. Most companies can deliver frozen rats, mice or chicks to your door! We have these sources of prey animals due to an increasing interest in carnivorous reptiles that must eat these animals to survive, because there is no alternate processed food choice. The final concern is whether to feed the prey animal to the ferrets dead or alive. I think we do not need to feed live prey and a reputable source of prey animals will kill them humanely solving the problem for us.

Most Americans will not feed a whole prey diet to their pets primarily for aesthetic reasons. I do understand that there are emotional issues to deal with. However, we need to remember that when we feed any processed food to a ferret we are still essentially feeding the body parts of some animal that was killed for that urpose. The only difference is that we didn't have to look at the cow or chicken when we feed it, like we have to look at a cute little mouse. Even if you are not going to feed this sort of diet all the time, you still might consider an occasional mouse "treat" for your ferret from time to time.

The next best choice to feeding a whole prey diet is to feed a balanced raw carnivore diet. There are more and more of these diets available in either freeze-dried or frozen form as pet food companies realize that heat processing the food and making little baked kibbles may not be the answer. Several of these diets have been successfully used in ferrets. One of my current favorites is the *Archetype Diet* by Wysong. It is cold-processed, contains beef, lamb and chicken meat products, is well accepted and comes in small chunks so it is easy to feed. You should look for diets that they are made from meat suitable for human consumption (preferably organic) containing all

the parts of the animal (organ meat, muscle, fat and bone), a high level of fat with no grain or grain products, sweeteners or chemical preservatives. Do not use diets designed for dogs that contain vegetables and grains. I have listed Internet sources at the end of the article that will lead you to a whole host of companies where you can research your options. I believe that the production of raw, balanced, organic pet foods is the path of the future for pet food companies. It can give us a "sanitized" alternative to the whole prey diet.

Now we come to dry, processed ferret diets, the very diet most veterinarians, myself included, have used for years. Although there have been tremendous strides made in the quality of these diets in the 25 years I have been in practice, I have yet to see one that I believe is completely appropriate for ferrets. Let's take a look at the composition of these diets and compare that to what we know of ferret nutrition. We have discussed that ferrets are carnivores and need a high protein, high fat diet with minimal carbohydrates. To use numbers, a dry ferret diet should contain at least 30 – 40 % crude protein and 15 –20% fat. The protein should be of animal origin and highly digestible**. Unfortunately, pet food labels do not indicate digestibility of the components and the protein percent you read may contain both animal and plant sources of protein**. In addition, grains, such as corn wheat or rice, are used not only to increase protein but as a "filler" and as a means of binding the final product together. Ingredients on a pet food label are given in order of their amount in the diet, starting with the largest. For ferrets, the first three ingredients should be meat-based. In a survey I did of 12 processed dry ferret foods currently on the market, only one had the first three ingredients as meat-based but it was quickly followed by corn, more corn and sweeteners. Some of the foods had a grain as the second ingredient, and they all had grain as a significant part of the composition. The majority of the foods had a sweetener of some kind such as molasses, dextrose, raisin juice or corn syrup. Remember what I said about the pancreas? What do you think this sugar, no matter how small, might be doing to those beta cells? Processed dry foods are heated during production and in the process nutrients can be destroyed or altered and then have to be replaced artificially. In addition, other additives may be used to keep the food from spoiling. To add insult to injury, several of the diets had dried fruits and vegetables in them. Ferrets do not need these items and in addition the dried form can make them nearly impossible to process. We have already had one case of a ferret that needed emergency surgery to remove a piece of dried carrot blocking his intestine that he consumed in a "ferret diet". Clearly, these diets are packaged to appeal to human consumers and may have little to do with appropriate ferret nutrition.

The worst examples of processed diets are the ferret treat foods. **Nine out of ten ferret-specific treat foods I examined had no meat products whatsoever and were comprised entirely of sweeteners and grains, with some fruits and vegetables thrown in. This is not only not healthy it is dangerous**. In addition, people who use treats often use too many because it is emotionally appealing to watch a ferret enjoy a snack. So if the pet enjoys one treat why not give him five or six? In an animal with such a small body size, five or six treats might make up a good portion of his food for the day. Of course ferrets love the treats because they are attracted to sweets, but that does not mean it is good for them? I like chocolate, but if I ate chocolate as 25% of my diet, I would have some serious health problems including diabetes! Again, the packaging is for the human and as long as we keep buying it, companies will keep making it.

Ferrets do not need supplements if they are on a balanced raw or whole prey diet. Overuse of fatty acid supplements can lead to obesity. What should we then feed as treat foods? First of all humans, not ferrets, have an emotional need for treat foods, so it is not necessary to feed ferrets treats. But if you must give a treat, how about a nice piece of raw liver or heart, a bit of raw muscle meat, raw egg or maybe a mouse?

If you decide to make a change, you may find that adult ferrets can be very particular and will resist change. I do not believe that it is necessary to "wean" a ferret off of a less digestible and gradually introduce him to a more digestible diet. I just change "cold turkey". If you keep offering the old diet, there may never be a change. It will probably be necessary to let your pet get hungry before he makes a change. Temporarily coating a new food with a fatty acid supplement as an enticement may help. Only ferrets that have insulinomas should not be fasted for more than 6 hours. If your ferret is currently being treated for any illness, consult your veterinarian first

If you finish this article and do nothing more than start reading labels and shopping more effectively, I will have accomplished an important goal. If I have caused you to rethink how we should be feeding our ferrets entirely, that is even better, but I am well aware that change takes considerable time. Feeding a healthier diet will probably cost you a little more and it will take more effort to get the items you need, but if it saves you money spent on veterinary bills and prolongs the live of your pet, isn't it worth it? Pet food manufacturers are not going to stop marketing inappropriate foods until we stop buying them. We have the technology to come up with reasonable alternatives to the natural diet, we just have to demand it as the consumer. Be an informed consumer and decide for yourself what is best for your pet.

INTERNET SITES FOR MORE INFORMATION ON ALTERNATIVE PET DIETS

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

www.barfdiet.com – excellent site about raw diets for dogs and other pets and a full page with links to 25 commercial pet food sites offering raw diets

www.rawmeatybones.com – source of information on raw diets for dogs 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.belfield.com – article about raw diets by veterinarian

www.miceonice.com – source of healthy, humanely killed rodents

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

www.Rodentpro.com - source of healthy humanely killed rodents and chicks

www.Hare-today.com - source of whole raw, ground and whole prey

The sites highlighted are who I use. I can't vouch for the others. Scarlett

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ALL ABOUT BLADDER STONES IN FERRETS

An inappropriate diet is one factor that causes bladder stones in ferrets.

Written by Dr. Jerry Murray

Can ferrets get bladder stones? Yes, they can — just like cats, dogs and people do. Ferrets are actually at risk for three different types of bladder stones, so let's go over what bladder stones are, what causes them, how to recognize them, how to treat them and how to prevent them.

What Are Bladder Stones?

Bladder stones form in the urinary bladder when minerals such as magnesium, ammonium, phosphorus and calcium precipitate out of the urine. These minerals form crystals. The crystals then join together and form stones. The stones can be very small like tiny pebbles or quite large like a golf ball. In some cases only one stone forms, but in others numerous small stones develop. One unusual type of bladder stone develops from cystine, an amino acid.

What Causes Bladder Stones?

Three different types of bladder stones are known to occur in ferrets, and each has a different cause. The most common type by far is the struvite stone; the second most common type is the calcium oxalate stone; the uncommon type is the cystine stone.

Struvite Stones

Three main factors cause struvite stones: diet, urinary pH and bacterial infections of the bladder.

The two main components of the diet involved in struvite stone occurrence are the source of the protein and the level of magnesium. The source of the protein is important because this affects the pH of the urine. Animal-based protein such as chicken, turkey, pork, egg and fish have the amino acids methionine and cystine in them. These two amino acids contain sulfur. When these two sulfur-containing amino acids are metabolized, they produce sulfuric acid. When sulfuric acid is excreted into the urine, it lowers the pH of the urine. On the other hand plant-based protein like corn gluten, wheat gluten, soy protein isolates and soybean meal do not have those two sulfur-containing amino acids. Thus plant-based protein does not acidify the urine, and the pH of the urine raises higher than normal (above 6.4). Struvites are unlikely to form when the pH of the urine is acidic (below 6.4).

Struvites are composed of three things: magnesium, ammonium and phosphate; therefore, avoid excessive amounts of these three things in the ferret's diet. Magnesium is the most important one to limit.

As previously mentioned, urinary pH is an important factor in struvite formation. When a ferret eats a diet with mainly plant-based protein, the pH of the urine rises above the normal range. A pH above 6.4 can cause struvite crystals and stones to form. This is why it is so important to feed a high-quality, meat-based ferret food or kitten food instead of a low-quality, plant-based non-ferret food.

Bacterial bladder infections from Staphylococcus or Proteus species can raise the urine pH to 8 or above. Struvite stones can form in less than one day when the pH is that high. Bladder infections are most common in unneutered jills during the breeding season and during pregnancy, and in ferrets with adrenal gland disease. Thus, it is important to use an appropriate antibiotic as soon as possible if a ferret has a bladder infection.

Calcium Oxalate Stones

Calcium oxalate stones are very different than struvite stones. The two main factors that lead to oxalate stones are diet and pH of the urine. These stones are formed from calcium and oxalate, so a ferret should avoid a diet with excessive calcium and oxalate. Other items to avoid include treats like milk, cheese and dairy products. Also, avoid supplements that contain excess calcium.

Oxalate is formed from the metabolism of plant-based protein, which contains the amino acids glycine and serine. It can also be formed from the metabolism of vitamin C. Increases in urine oxalate levels promote calcium oxalate stones more so than increases in calcium. This is another great reason to avoid plant-based protein! Calcium oxalate stones are more likely to develop in acidic urine, but they can form in

alkaline urine too. [Although meat-based protein makes the urine acidic, it doesn't cause oxalate to form, so calcium oxalate stones shouldn't form when a ferret is fed a meat-based diet. – Eds.]

Cystine Stones

Cystine stones are uncommon and uniquely different. These stones are a result of a genetic defect in the kidneys. The kidneys do not reabsorb the amino acid cystine. The kidneys may also have a problem reabsorbing three other amino acids: ornithine, lysine and arginine. Because cystine is the least soluble amino acid, the stone is composed almost entirely of cystine. Cystine solubility depends on urine pH, and cystine stones are more likely to form in acidic urine.

Recognizing A Bladder Stone

The signs of a bladder stone in ferrets can include straining to urinate, vocalizing in pain when urinating, urinating small amounts frequently, dribbling urine, wet fur around the prepuce or vulva, and discoloration of the urine. Occasionally the ferret will be totally unable to urinate and rapidly becomes lethargic and depressed.

Most of the time the bladder stone can be palpated by a veterinarian, but a radiograph (X-ray) should be done to confirm the presence of a stone or stones, to visualize the location of the stone or stones, and to look for other urinary problems such as a prostate problem in males.

Treatment For Bladder Stones

Once a bladder stone has been found, surgery is recommended to remove it. The surgery is usually a relatively simple procedure in ferrets unless the stone is located in the urethra. Intravenous or subcutaneous fluids should be used to produce and dilute the urine. This helps to flush out the bladder. An antibiotic is also used to clear up any bladder infection.

After surgery, the bladder stone should be analyzed to determine exactly what type of stone it is. The Minnesota Urolith Center through the College of Veterinary Medicine at the University of Minnesota provides stone analysis at no cost. Once the stone has been analyzed, an appropriate diet change can be made to prevent future stone formation.

If the stone is a struvite stone, then two things need to be adjusted. The protein source of the diet needs to be changed to a high-quality meat-based protein, and the pH of the urine needs to be lowered. If the diet change does not lower the urinary pH, then a urinary acidifier like dl-methionine can be added to the diet.

An antibiotic such as amoxicillin (Amoxi-drops or Clavamox drops), cefadroxil (Cefa drops), cefovecin (Convenia), trimethoprim-sulfa (Tribrissen), enrofloxacin (Baytril), or marbofloxacin (Zeniquin) can be used to eliminate a bacterial infection in the bladder.

If the stone is a calcium oxalate stone, then the protein in the diet needs to be changed to a high-quality meat-based protein. Plant-based protein must be eliminated to prevent oxalate from being excreted into the urine. In some cases, potassium citrate may be needed to raise the pH of the urine.

If the stone is a cystine stone, then a reduction in protein is needed to reduce the amount of cystine in the diet and in the urine.

After proper treatment, a ferret with a bladder stone will soon be back to its usual Jumping-Jack-Flash self and should enjoy a normal life span.

Dr. Jerry Murray publishes a number of veterinary articles at: https://www.petcha.com/

Please visit HOFA at:

http://www.hofarescue.org

https://www.facebook.com/groups/heartofohioferret/

The information on this handout is meant to be an informative guide only, not intended as medical advice. If you see any unusual signs or symptoms of health or behavior in your ferret, **consult your veterinarian immediately.**

INSULINOMAS IN FERRETS

What is insulinoma?

An insulinoma is a tumor that involves the beta cells of the pancreas. Beta cells are the cells that produce the hormone insulin. Insulinomas are surprisingly common in ferrets. An insulinoma may be an insulin-producing adenoma or an insulin-producing adenocarcinoma. By definition, an adenoma is benign, while an adenocarcinoma is malignant.

Insulin regulates blood sugar levels by reducing the amount of glucose in the blood. Glucose is an important energy source for the body. The excess insulin that is produced by an Insulinoma results in dangerously low levels of glucose in the blood.

The average age for a ferret to develop an insulinoma is 5 years old, but it may be seen as early as 2 years of age.

What are the signs of an insulinoma?

Clinical signs may include pawing at the mouth, "stargazing", weakness (often seen in the hind end), weight loss, tremors, collapse, abnormal behavior, depression, lethargy, and confusion. The symptoms can progress to include seizures and hypoglycemic (low blood sugar) coma. The adrenal gland reacts to dramatic reductions in blood glucose by producing adrenaline; increased levels of adrenaline cause a rapid heart rate, tremors, and irritability.

Some ferrets with tumors of the pancreas show no obvious clinical signs or may show only intermittent signs. If a ferret has intermittent episodes of hypoglycemia, the disease may go undetected for a prolonged time because the symptoms are not observed by the pet owner. The severity of clinical signs depends on how low the blood glucose gets and will often be better if the ferret has just eaten.

A consultation with a veterinarian familiar with ferrets is necessary. During the consultation, the owner will be asked to report their observations of the pet and its behavior in its home environment, and the veterinarian will conduct a physical examination and collect blood samples for diagnostic testing. Your veterinarian will recommend a complete blood count and clinical chemistry tests. Your veterinarian may recommend insulin testing as an additional test.

A measurement of the blood insulin level would seem to be the obvious test, but all too often ferrets with insulinomas have normal insulin levels at the time of sampling, due to the episodic nature of this condition. Therefore, it is often necessary to take several separate samples to recheck the blood glucose level over time.

How is insulinoma treated?

Treatment of insulinomas may be medical or surgical, depending on the severity of the disease and the age of the ferret. Medical therapy involves use of a corticosteroid like prednisone and/or a drug like diazoxide to increase blood glucose levels. These medicines do not stop the progression of the tumor, but will minimize the clinical signs. Surgery is an option, which involves removing any visible pancreatic tumor nodules. It is important to recognize that while it is easy to remove visible nodules, this disease often has multiple microscopic lesions and surgery is not curative as new insulinomas continue to grow post-surgery.

Diet must also be managed. Ferrets tend to be "grazers" or nibblers when they eat. Therefore, it is preferable to provide 4-6 small meals daily to provide a more consistent food intake, which helps level out the blood glucose levels.

If a ferret experiences a sudden collapse or a hypoglycemic coma, emergency treatment is critical for its survival. Immediately rub honey or corn syrup onto the gums (be careful if the ferret is experiencing a seizure, as there is a danger of being bitten.) If this occurs, DO NOT DELAY! Rush your ferret to the veterinarian for further supportive care and diagnostics.

What is the prognosis?

Many ferrets respond well to medical therapy and dietary management. Depending upon the severity of the disease, ferrets that are managed medically can live for several months up to several years.

Please visit HOFA at:

http://www.hofarescue.org

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The information on this handout is from experienced ferret owners, not a veterinarian. It is meant to be an informative guide only, not intended as medical advice. If you see any unusual signs or symptoms of health or behavior in your ferret, **consult your veterinarian immediately.**

THE FERRET RESPIRATORY SYSTEM

Unlock the mysteries of what the ferret respiratory system does and what can go wrong with it.

Written by Dr. Jerry Murray

Diseases of The Respiratory System

Ferrets are susceptible to many viruses that can cause infections in the respiratory system. The human influenza virus is the most common virus involved in ferret respiratory infections.

Ferrets are quite susceptible to most **human influenza viruses**, including the seasonal type A, the new 2009 H1N1 flu (swine) and the avian flu. Because ferrets can get the human flu and their lungs are similar to humans, ferrets are frequently used in human flu research. Ferrets can get the flu from people who have the flu or from other ferrets that have the flu. In a very recent case, a pet ferret in the Portland, Oregon, area got the swine flu from its owner. Thus, it is very important to avoid playing with or handling your ferret if you have the flu.

Most seasonal type A flu cases are mild in adult ferrets, but type A flu may cause more serious illness in young or old ferrets. H1N1 (swine) flu and avian flu can cause mild to fatal disease in ferrets regardless of age.

Ferrets with the flu usually have a fever, sneeze or cough, are lethargic, have a discharge from the nose and eyes, and eat less than normal. Treatment of the flu can include anti-influenza medications such as Tamiflu, along with an antibiotic for secondary bacterial infections, fluid therapy and supportive care.

The **canine distemper virus** is another virus that ferrets are very susceptible to. Signs of distemper start in the respiratory system, with fever, anorexia and a discharge from the nose. With time, skin rashes and neurological problems develop. Because distemper is almost always fatal in ferrets, vaccinate your ferret to protect against this fatal disease.

Aleutian disease is a parvovirus infection that can cause serious to fatal respiratory disease in very young ferrets (kits). In young kits, the parvovirus causes damage directly to the lungs, which can cause the kit to develop a fatal case of pneumonia. In adult ferrets, it can cause a chronic cough that does not respond to cough suppressants or antibiotics. Unfortunately, there is no vaccine for Aleutian disease.

The **coronavirus** is another viral disease that can cause serious to fatal respiratory disease in young ferrets. Most of the time, the coronavirus causes just a mild illness of the gastrointestinal tract; however, some ferrets develop a coronavirus infection that spreads through the blood to other organs. This systemic coronavirus infection can go to the lungs and cause pneumonia and death. Treatment can include drugs to suppress the immune response, antibiotics for secondary bacterial infections, fluid therapy and supportive care.

Ferrets can also have **bacterial infections** of the respiratory system. Bacteria can infect the nose (causing rhinitis), nasal cavity (causing sinusitis) and lungs (causing pneumonia), but most cases of bacterial infections of the respiratory system are secondary to a viral infection. Viral infections such as influenza and distemper can cause damage to the respiratory system and immune system, which allow bacteria to infect the respiratory system. Strep, E. coli, Klebsiella, Pseudomonas and Bordetella have all been reported in cases of bacterial pneumonia. Bacterial infections can be treated with antibiotics, fluid therapy and supportive care.

Fungal infections of the respiratory system are possible, but they are rare in pet ferrets that are kept indoors. Fungal infections may be more common in ferrets that are kept outdoors or are working ferrets that are exposed to the fungal spores in the soil.

Another cause of pneumonia is aspiration of food or liquids. **Aspiration pneumonia** is most commonly seen in sick ferrets that are being force-fed. Ferrets with megaesophagus are also prone to aspiration pneumonia. Treatment of aspiration pneumonia includes antibiotics, fluid therapy and supportive care.

Cancer can also invade the respiratory system. Lymphoma is the most common type of cancer in the respiratory system. By the time lymphoma spreads to the lungs, the ferret is usually in bad shape and may need to be euthanized.

One last problem in the ferret respiratory system is **trauma**. Ferrets are at risk for traumatic injuries from dog bite wounds, rocking chair injuries, falls and damage from falling objects. Trauma can cause injuries to the lungs and even death, so be careful when your ferret is out of its cage.

The ferret's respiratory system is very similar to the human respiratory system with the two main differences being the number of tracheal rings and the number of lobes in the right lung. Ferrets are also susceptible to a lot of viral and bacterial infections, with the human influenza virus being the most common problem. Fortunately most respiratory infections are treatable or preventable.

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Adrenal Gland Disease

Adrenal Gland Disease is becoming more common with the larger "ferret farms" shipping kits to pet stores. It is a complex disease with symptoms that are frequently evident by just looking at the ferret. That's not to say that every ferret displaying some of the symptoms have this disease, but it is a possibility. If you see anything out of the ordinary happening with your ferret, **go see your vet.** The information on this handout is from experienced ferret owners, not a vet. It is meant to be an informative guide only.

The adrenals are a complicated pair of small glands lying on both sides of the chest. The left gland is the gland that is most commonly affected by this disease and it is also the easier of the two to remove. The right gland lies very close to a blood vessel, the vena cava. If nicked or cut during the surgery, it can lead to the ferret bleeding to death. It is becoming more common (and safer) to see the gland(s) tissue being frozen rather than actually removed. The process of freezing the tissue causes the gland to shrivel up and die and the body reabsorbs the tissue.

Some of the most frequent signs of Adrenal Gland Disease are: fur loss, a decrease in appetite, extreme itching, decreased energy, mounting and sexual aggression, prostate problems (in males), or swollen vulva (in females). A common myth is that fur loss starts on the tail first. As the gland(s) enlarge and begin to secrete too many hormones, the ferret becomes increasingly bald. It can start anywhere but is can be seen as thinning between the shoulder blades, the top of the head, and between the toes, and of course, the tail as stated previously. However, a bald tail can also be the result of blackheads (look for little black dots on the tail) and can easily be treated by washing the tail daily for a week or so with Phisoderm. When in doubt, check with your vet.

The glands control many things, one of the most prevalent being the control of a number of hormones. They secrete steroids that are responsible for the "fight or flight" response, regulate mineral balances and sex hormones. When the adrenal(s) become enlarged, the ferret's system kicks into overdrive. This is not a disease that will just go away. One of the most deadly problems with adrenal lies with the male's prostate. It can become enlarged, so much so that the ferret cannot urinate. This then becomes an emergency situation. If left untreated, the effects of the increase in estrogen can result in the urinary complications as mentioned above, muscle wasting, hind end weakness and anemia.

There is a blood test that can be run called the Tennessee Panel, that measures the level of several things. However, it is very expensive and currently several weeks to complete. Usually, the diagnosis of Adrenal is reached by what symptoms are seen. If your ferret is generally healthy, surgery is a relatively safe procedure. Generally, Adrenal Gland Disease is seen in pet-store ferrets starting around the age of four or five, however no ferret is immune to it. There is an alternative to surgery for ferrets that are in fragile health or too old or thin to survive surgery. Lupron is a synthetic hormone (it is given by injection) that only masks the symptoms. There is also a chance that the tumor may be malignant. However, the percentage of the adrenal tumor metastasizing (spreading) to other organs is small and the prognosis is considered to be the same as if it were benign.

No one really knows why the gland(s) enlarge although there is speculation that because people are keeping ferrets in the house, nature's light/dark cycles are unnatural for them and their bodies are adjusting to their human's schedule. Other factors may include nutrition, genetics, early spay/neutering, environmental factors or a combination of these things. Whatever the reason, Adrenal Gland Disease is a common and treatable disease in ferrets.

. 2008 Jul 15;70(2):161-7. Epub 2008 Apr 25.

Use of a gonadotropin releasing hormone agonist implant as an alternative for surgical castration in male ferrets (Mustela putorius furo).

Schoemaker NJ, van Deijk R, Muijlaert B, Kik MJ, Kuijten AM, de Jong FH, Trigg TE, Kruitwagen CL, Mol JA.
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Abstract
Surgical castration in ferrets has been implicated as an etiological factor in the development of hyperadrenocorticism in this species due to a castration-related increase in plasma gonadotropins. In search for a suitable alternative, the effect of treatment with the depot GnRH-agonist implant, deslorelin, on plasma testosterone concentrations and concurrent testes size, spermatogenesis, and the typical musky odor of intact male ferrets was investigated. Twenty-one male ferrets [age 1-2 years-old], equally divided into three groups, were either surgically castrated, received a slow release deslorelin implant or received a placebo implant. Plasma FSH and testosterone concentrations, testis size and spermatogenesis were all suppressed after the use of the deslorelin implant. The musky odor in the ferrets which had received a deslorelin implant was less compared to the ferrets which were either surgically castrated or had received a placebo implant. These results indicate that the deslorelin implant effectively prevents reproduction and the musky odor of intact male ferrets and is therefore considered a suitable alternative for surgical castration in these animals.

Vet Rec. 2010 Jan 16;166(3):74-8.

Comparison of four treatments to suppress ovarian activity in ferrets (Mustela putorius furo).

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Abstract
Twenty-five ferret jills were randomly allocated to five groups of five animals; they were treated either before the breeding season with 15 mg medroxyprogesterone acetate (MPA), with 40 mg proligestone or with a slow-releasing device containing 4.7 mg of the gonadotropin-releasing hormone (GnRH) agonist deslorelin acetate (srGnRH), or at spring oestrus with 100 iu human chorionic gonadotropin (hCG), or were left untreated and mated. All the ferrets were assessed for signs of oestrus and their ovarian response was monitored by individual faecal progesterone metabolite (P4-met) profiles. The mean (sd) durations of treatment-induced ovarian quiescence were 94 (18), 99 (40), 53 (9) and 698 (122) days in the group treated with MPA, proligestone, hCG and srGnRH, respectively ($P<0.001$). Treatment with hCG and srGnRH proved to be the safest, while MPA treatment was associated with most side effects. Both MPA and proligestone treatments caused alopecia in one ferret per group, and after the first return to oestrus and mating an MPA-treated jill had a premature delivery and developed a purulent vaginal discharge. At the first post-treatment mating, the fertility (expressed as the percentage of ferrets mated in the group that produced a litter) was 75 per cent in the MPA-treated group, 60 per cent in the proligestone-treated group, 75 per cent in the hCG-treated group and 0 per cent in the srGnRH-treated group; in the control group, fertility was 100 per cent at mating in spring and 60 per cent at mating in summer. Three srGnRH-treated jills conceived at the second post-treatment oestrus.

About SUPRELORIN F (deslorelin acetate) Implant

Help ferrets pursue a healthier life.

Short of complete removal of both adrenal glands from a ferret with adrenal disease, which can be a risky procedure, there is no true cure for the condition. But now that the SUPRELORIN® F Implant is available in the US, ferret owners, like you, have a simple, convenient, medical alternative for controlling the clinical signs of the disease in your pet ferret.

Real-world experience

SUPRELORIN F Implant has been demonstrated effective.1–3

Results from published studies have shown that the most common signs of adrenal disease are all reduced quickly after implantation with SUPRELORIN F Implant and resolve for up to 1 year.1–4 Studies demonstrated that the 4.7 mg deslorelin acetate implant was effective.1–4

Health benefits with SUPRELORIN® F Implant

Clinical signs	Time to initial effects	Time to return to normalcy
Hair loss (in the trunk area)	40%–8% regrowth at 6 weeks	90%–100% hair growth at 8 weeks
Vulvar swelling	Decreased within 10–14 days	6 weeks
Skin disorders/itching		2 weeks
Unusual sexual behavior/ aggression		2 weeks
Lack of energy	Increased alertness and activity within 14 days	

Use of 4.7 mg SUPRELORIN F Implant was also shown to dramatically suppress key hormones (estradiol, hydroxyprogesterone, and androstenedione) within the treatment period.2 And that's good news for you and your ferret. The result is a healthier ferret. Now there's an option that could save your beloved ferret from suffering the effects of adrenal disease or the frequent visits to the veterinarian to receive injections.

Safety

SUPRELORIN F Implant has been shown to be safe for use in ferrets .1–3

In the US, SUPRELORIN F Implant is available as an implant containing 4.7 mg of deslorelin acetate. Published studies have found the SUPRELORIN F Implant safe for use in ferrets with appropriate clinical monitoring. It is possible that treated ferrets will show some soreness and swelling at the implantation site, which should resolve over 1 to 2 weeks.3 Other reported side effects include: weight gain, lethargy, and failure to respond to therapy. Blood tests were shown to be within the normal range after treatment.2 This safety profile, coupled with the effectiveness of SUPRELORIN F Implant, should offer you peace of mind.

Dosing and Administration

The SUPRELORIN F Implant is easy for veterinarians to implant—and requires a single implant. Appropriate endocrine testing and clinical monitoring should be used to assess your ferret's response to therapy. Your veterinarian will likely schedule follow-up visits after implantation.

Convenience: One implant is inserted subcutaneously (under the skin) between the shoulder blades of the ferret. In the majority of reports, the treatment lasted 12 months.1 As implant efficacy declines, the implant itself dissolves, requiring no removal.

Importance of reimplantation: Because medical therapies are not cures, a relapse of clinical signs is likely once the effects of the SUPRELORIN F Implant wear off. The timing of reimplantation will be based on your ferret's individual health status and when clinical signs begin to return and should be determined by your veterinarian.

If you are a veterinarian seeking further information on the effectiveness, safety, and administration of SUPRELORIN F Implant… https://us.virbac.com/

Melatonin

By Jerry Murray, DVM

Adrenal gland disease ranks as one of the most common problems seen in pet ferrets. It's the top ferret problem seen in my practice. Most ferret owners are all too familiar with the clinical signs of adrenal gland disease such as hair loss, itchy skin, an increase in the musky body odor, an enlarged prostate in males, and a swollen vulva in females. Surgery remains the recommended treatment for otherwise healthy adrenal ferrets. Medical treatment may be required in geriatric ferrets, those with concurrent illnesses that would make anesthesia and surgery too risky, cases where the owner declines surgery due to cost, and cases where the entire adrenal gland cannot be removed surgically. Melatonin is the newest medical treatment option for adrenal gland disease.

Drugs To Avoid

Mitotane, such as Lysodren, is the primary medicine used to treat adrenal gland problems in dogs. However adrenal gland problems in dogs (Cushing's syndrome) are quite different than adrenal gland disease in ferrets. Dogs with adrenal problems overproduce cortisol. Ferrets overproduce the sex hormones and androgens. In dogs ACTH is stimulating the adrenal glands. In ferrets LH stimulates the adrenal glands. Lysodren will destroy the cortisol-producing cells in the adrenal glands. This product does not work well in ferrets, and it can cause serious low blood-glucose problems in ferrets with concurrent insulinomas.

Ketoconazole, such as Nizoral, is another medicine used in adrenal dogs. It is an enzyme blocker that lowers cortisol and androgens. This product does not work well in ferrets.

Trilostane, such as Vetoryl, is a new medicine that is used in adrenal dogs. Unfortunately this product increases 17-hydroxyprogesterone levels in dogs. This is one of the common hormones that is elevated in ferrets with adrenal gland disease. It will likely raise this hormone in ferrets, too, and make the adrenal problem even worse. Preliminary work with Vetoryl in the Netherlands has shown this to be the case.

Tamoxifen, such as Nolvadex, is a common anti-estrogen used in human medicine. This product works by blocking estrogen receptors. Unfortunately a study in ferrets showed Nolvadex to have estrogenlike effects in ferrets, which would make estrogen-induced anemia, thrombocytopenia and mammary gland hyperplasia even worse.

What Is Melatonin?

Melatonin is the main hormone that the pineal gland produces. In an intact (unneutered) ferret, melatonin is directly and indirectly involved in activating (in the spring/summer) and in terminating (in the fall/winter) the ferret's natural breeding season. As daylight increases in the spring, lower levels of melatonin are produced. The low levels of melatonin start the breeding season, cause the ferret to shed and put on its summer coat, and lose weight. As the daylight decreases in the fall, higher levels of melatonin are released during the nighttime hours. The high levels of melatonin end the breeding season, cause the ferret to put on its winter coat and its extra winter weight.

How Does It Work?

To understand how melatonin works in adrenal ferrets, let's review what causes adrenal gland disease. Two major factors cause the adrenal glands to go wild and overproduce the sex hormones and androgens. The main factor is neonatal spaying and neutering. Most ferret breeders spay or neuter the kits at 4 to 6 weeks of age. Without ovaries or testicles, the adrenal glands begin to behave like the ovaries or testicles. The adrenal glands then respond to the same hormone, luteinizing hormone (LH), that stimulates the ovaries and testicles to produce the sex hormones and androgens. Spaying and neutering also raises the LH level. [The exact cause of adrenal gland disease is still under debate. Some studies seem to confirm that neonatal spay/neuter might be a cause, but others do not. -- Editors.]

The second factor is long day photoperiods. Photoperiod refers to the amount of light exposure during a 24-hour period. Under natural light conditions, long day photoperiods during the spring and early summer start the breeding season. It would also raise the LH

level and stimulate the adrenal glands in altered ferrets. Unfortunately most pet ferrets live indoors under long day photoperiods due to artificial lights, which stimulates the adrenal glands year-round.
Chronic overstimulation of the adrenal glands will eventually cause them to become hyperplastic or neoplastic (cancerous). It is believed that melatonin will lower the LH levels, just like it does when it ends the breeding season. This stops the stimulation of the adrenal glands. Melatonin will also help your ferret grow a thick winter coat, and increase its appetite so it can gain its winter weight.

Forms of Melatonin

Melatonin comes in three basic forms: tablets, liquid suspension and injectable implants. However, the tablets and liquid version are not FDA approved. They are classified as nutritional supplements and are not monitored by any government agency. All three forms are inexpensive.

Tablets are available over-the-counter in most drug stores, health stores and supermarkets. They normally come in either a 1-milligram or a 3-milligram size. The suggested dose is 1 to 3 milligrams once a day. These will need to be used daily.

Liquid versions are also available over-the-counter in most drug stores, health stores and supermarkets. The concentration varies from a quarter of a milligram all the way up to 21Ú2 milligrams per milliliter. Read the label to see how many milligrams per milliliter are in it. The suggested dose is 1 to 3 milligrams once a day. These will need to be used daily.

Implants are now available for use in ferrets. They are called ferretonin and are injected under the skin over the shoulder blades. They are a constant-release product that will last for three to four months. This is the easiest way to give melatonin to your ferret and may work even better than daily oral melatonin.

Melatonin Research In Ferrets

Many studies with ferrets and melatonin exist. Several studies were done in the 1930s using artificial light to induce estrus (heat) cycles. During the 1950s the neuropathways of light-induced estrus were studied. During the 1960s, ’70s and ’80s, the hormones and neuropathways involved in reproduction and endocrinology in ferrets were studied. All of this preliminary work proved that melatonin was the hormone that responded to changes in the light cycle, and directly and indirectly controlled the seasonal breeding season, seasonal coat changes and seasonal weight changes.

Recently melatonin has been studied as a treatment option for adrenal gland disease. Researchers at the college of veterinary medicine at the University of Wisconsin gave 10 adrenal ferrets just 0.5 milligram of melatonin in a liquid suspension orally once a day. These ferrets were rechecked every four months for one full year. In addition to the clinical signs, hormone levels and ultrasound measurements of the adrenal glands were done.

Nine of the 10 ferrets experienced improvement in their clinical signs, including hair growth, reduction in vulva swelling and reduction in the size of the prostate. No change occurred in the size of the adrenal glands. Hormone levels decreased after four months of treatment, but increased at eight and twelve months.

Likewise, good clinical results with melatonin tablets have also been seen at Texas A&M’s College of Veterinary Medicine and at my practice. The suggested dose for oral melatonin is 1 to 3 milligrams once a day, ideally given at seven to nine hours after sunrise. This simulates the fall/winter photoperiod. The main problem with the liquid and tablets was the difficulty ferret owners had in giving it every day, especially at seven to nine hours after sunrise. Thus the search continued for an easier way to give melatonin.

Melatonin also comes in injectable implants approved by the FDA for use in mink. Numerous studies were done in mink and even one study in ferrets in order to get the FDA to approve the implants. In a safety study, 8- to 10-week-old mink kits were

treated with 80 to 124 milligrams per kilogram. No signs of toxicity were noted in the bloodwork, gross pathology or histopathology of the organs. This very high dose did not lower the blood-glucose level either. Adult minks treated with 100 milligrams of melatonin also exhibited a complete lack of toxicity when tested. However, the treated mink did gain more weight when compared to the control group.

Other Treatment Options

Several human medicines are currently used to treat adrenal gland disease and to treat the secondary prostate enlargement and estrogen-induced anemia, thrombocytopenia and mammary gland hyperplasia. These medicines work well, but they are expensive.

Leuprolide acetate, such as Lupron depot, is an injectable product that stops LH production, which stops the stimulation to the adrenal glands. Lupron comes in three different versions -- once a month, once every three months and once every four months. The recommended dose is 100 to 500 micrograms per kilogram on a monthly basis.

Finasteride, such as Propecia or Proscar, is a tablet that can be used to treat an enlarged prostate in male adrenal ferrets. This product is an enzyme inhibitor that stops the formation of DHT. DHT is the main hormone that causes the prostate to enlarge. After the DHT level is reduced, the prostate will shrink with time. The suggested dose is 1 milligram once a day for the first 30 days. After the first 30 days, the dose can usually be reduced to just one tenth of a milligram once a day.

Bicalutamide, such as Casodex, is another tablet that can be used to treat an enlarged prostate in male adrenal ferrets. This product blocks the androgen (DHT) receptors on the prostate. After the receptors are blocked, the prostate will shrink with time; however, this product does not actually reduce the DHT levels. The suggested dose is 5 milligrams once a day.

Anastrozole, such as Arimidex, is a tablet that can be used to treat estrogen-induced anemia, thrombocytopenia and mammary gland hyperplasia. This product is an enzyme inhibitor that stops the formation of estrogen. After the estrogen level is lowered, the bone marrow can start making red blood cells and platelets again. The suggested dose is one tenth of a milligram per kilogram once a day.

Epoetin alfa, such as Epogen or Procrit, is an injectable product that can be used with Arimidex to treat estrogen-induced anemia. After the estrogen level has been reduced by Arimidex and/or Lupron, Epogen can be used to stimulate the bone marrow to produce red blood cells again. The suggested dose is 100 to 200 units per kilogram three times a week to start with, then taper off as the packed cell volume normalizes.

This prompted James Johnson, DVM, MS, DACZM, from Texas A&M's College of Veterinary Medicine and me to try the male mink melatonin implants in adrenal ferrets in the spring of 2002. In our initial pilot study, 70 adrenal ferrets were implanted, and their clinical signs were monitored. This initial group was composed of 38 males and 32 females. Swollen vulvas returned to normal in one to two weeks. Thick "winter coats" grew in six to eight weeks. Several owners said this was their ferret's "best coat ever." Itchy skin usually resolved in one to three weeks. Most of the ferrets became more active, had an increase in appetite and gained weight.

One of these original ferrets was my pet ferret, Barney. Barney had his left adrenal gland previously removed. He had been on Lupron depot for roughly two and a half years. Despite this treatment, he was still itchy and had a thin hair coat on his tail. The scratching stopped shortly after the implant was administered. His appetite increased, which also helped in the treatment of his insulinoma. His hair coat improved and his tail filled in too. Only one ferret in this initial group of 70 did not respond well to the mink melatonin implants. She had a large right adrenal gland carcinoma. She also had another serious cancer, lymphoma.

I have used more than 200 melatonin implants. I have used these after surgery to regrow the hair coat faster, and to increase the appetite and put weight back on. It is safe to use in combination with other adrenal medicines such as leuprolide acetate (Lupron depot), finasteride (Propecia or Proscar) and anastrozole (Arimidex). It is even safe to use with ferrets that have insulinomas in addition to adrenal gland disease. The only side effect seen is lethargy for the first three to five days, and increased weight gain. Several ferrets have even developed large fat pads on the sides of their neck.

Melatonin implants may also be helpful to actually prevent adrenal gland disease. This is an exciting possibility. My two young males will be monitored over their entire life span to see if they develop adrenal gland disease. Likewise, several

owners have started to use the implants in their young ferrets to see if the implants will prevent adrenal gland disease. Surprisingly, ferrets as young as 15 weeks of age respond to changes in the photoperiod, so melatonin may need to be started when the ferret is very young to work as a preventive.

The manufacturer of the mink melatonin implants is now making implants for use in pet ferrets. These are called ferretonin. The ferretonin implant contains the same amount of melatonin as the male mink implant, and they come in a ready-to-use, sterilized implanter. It is administered by simply injecting the implant under the skin over the shoulder blades. Most ferrets can be distracted with their favorite treat while the injection is done. The implants will last for three to four months. Most pet ferret owners will likely have a veterinarian perform the implant.

Melatonin Research In People

Melatonin has also been studied for use in humans with breast cancer, prostate cancer and other cancers. Melatonin has repeatedly been shown to prevent the growth of human breast cancer cells. Studies have shown that melatonin has some direct anti-estrogen properties. Breast cancer cells thrive on a fat called linoleic acid, and melatonin can interfere with linoleic acid uptake by the cancer cells. In addition there are also melatonin receptors on the cancer cells. These receptors can prevent the growth of the cancer cells. Melatonin can also inhibit other estrogen pathways inside the cancer cell. These four actions prevent the breast cancer cells from growing. Therefore melatonin may help ferrets with secondary mammary gland hyperplasia or neoplasia.

Melatonin has also been shown to prevent the growth of human prostate cancer cells because there are melatonin receptors on the human prostate. In a mice study when melatonin was given for 10 days before inoculation of human prostate cancer cells, half of the mice did not develop a tumor. Melatonin caused a significantly smaller tumor in the half that did form a tumor when compared to the control group.

Melatonin has also been shown to reduce the growth of benign prostate cells. It is likely that melatonin works in this same way in ferrets too. Remember a reduction in the size of the ferret's prostate was documented in the University of Wisconsin study with oral melatonin.

Your Ferret

As a new treatment option for ferrets with adrenal gland disease, melatonin is both safe and inexpensive. It can be used by itself, or it can be safely combined with other adrenal medications such as Lupron depot, Propecia and Arimidex. It may even be useful in preventing adrenal gland disease. In addition, melatonin is also a potent antioxidant, so talk to your ferret's veterinarian about using this hormone.

Jerry Murray, DVM, practices at the Animal Clinic of Farmers Branch in Dallas, Texas. He is currently owned by three ferrets (Mr. Pebbles, Bam-Bam and Mr. Slate) and one dog (Whitney).

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American Ferret Association, Inc. March 7, 2005

Committee On Health Affairs

SPECIAL MEDICAL ALERT

DISSEMINATED IDIOPATHIC MYOSITIS (DIM) IN FERRETS

DIM appears to be a "new" disease in ferrets. The cause is unknown. DIM was first described in 2003 independently by Drs. Katrina Ramsell and Mark Burgess (Southwest Animal Hospital, Beaverton, OR), Dr. Michael Garner (NW Zoopath, WA), and others. Usually it results in a fatal inflammatory condition of muscles: "myosistis." Approximately 40 cases have been described to date, most occurring in young ferrets between 3 and 18 months of age. It is unknown if the condition is contagious, although many cases lived with other ferrets who have remained unaffected.

PHYSICAL SIGNS: Fever (> 104^{o} F), tiredness, weakness, reluctance to move, pain on handling (over the back or hips), decreased appetite, increased respiratory and heart rates, clear nasal discharge, enlarged single or multiple external lymph nodes on leg(s) or neck area.

LABORATORY SIGNS: White Blood Count initially may be normal, but within 7-10 days typically mature neutrophils can rise to 12 – 100 K (cells per µl blood) and neutrophils are frequently toxic; mild to moderate anemia (initially nonregenerative, new red blood cells seen later); Serum Chemistry tests: Glucose is frequently elevated. Creatinine kinase (CK) and aspartate aminotransferase (AST) (both enzymes detect muscle damage) are usually normal. Alanine aminotransferase (ALT) (a liver-specific enzyme) has been elevated in a few ferrets. Bilirubin is unremarkable.

PATHOLOGY: Biopsy: Lymph node - suppurative ("produces pus") to granulomatous inflammation. Postmortem: widespread suppurative inflammation affecting skeletal, cardiac and smooth muscles (esophagus frequently severely affected). Non-muscular organs such as brain, liver, lung, and spleen have also been affected (e.g. bronchopneumonia in the lungs and extramedullary hematopoiesis in the spleen). Testing has been negative for infectious organisms (cultures, special stains, electron microscopy, and viral isolation studies for bacteria, parasites, and viruses).

ETIOLOGY/ TRANSMISSION: DIM appears to be an immune-mediated disease. Vaccines (or vaccine adjuvants), genetic predisposition, viral infections, and diets are currently being investigated as potential causes or triggers to this condition. Despite the suppurative inflammation, there are no current data to support a bacterial cause for this disease.

DIAGNOSIS AND TREATMENT: Presumptive: based on physical and laboratory signs (see above); Definitive: biopsy/necropsy of external skeletal muscle (e.g. leg) or esophagus. Supportive treatment: hand feeding, IV fluids if the patient is very ill; broad-spectrum antibiotics such as enrofloxacin (Baytril®) and amoxicillin may minimize secondary infections. One ferret appears to be responding to a combination of cyclosporin and ketoconazole (5 mg/kg for each drug orally once a day). (Note: Physical symptoms are consistent with DIM and histopathology indicated strong suspicion for DIM in this ferret, although the small tissue sample prevented a definitive diagnosis). One ferret initially made a transient recovery following administration of Interferon-alpha (IFN-a) (orally 600 I.U./day x 2 months) with WBCs and behavior returning to normal. After several weeks in remission, this animal relapsed, WBC's again reaching 40.0 (per µl). Similar results have not been observed in other ferrets. [NB: oral IFN-a is not approved in either animals or humans for any indication.] ***Following drugs have not shown efficacy:*** corticosteroids, non-steroidal anti-inflammatories, erythropoietin, cyclophosphamide, antibiotic combinations (penicillins, cephalosporins, tetracyclines, quinolones (such as Baytril®), clarityromycin, metronidazole, or chloramphenicol.) Brief improvement on antibiotics might be due to treating a secondary bacterial infection.

COURSE/OUTCOME: Severe, rapid onset, or progressive over several weeks; most cases to date have been fatal. Mean survival following diagnosis is unknown.

RECOMMENDATIONS: ***This Alert is for informational purposes only and should NOT be construed as veterinary advice. This alert is intended to assist practitioners and pathologists in recognizing the condition. In order to develop a better understanding of this condition, your assistance is needed in collecting information about each new case.***

VETERINARIANS:

1. **Accurate Diagnosis**: Conduct appropriate diagnostic evaluations (biopsy/necropsy; blood tests, cultures for bacteria and other micro-organisms). Proper collection of tissues is paramount. Cultures for micro-organisms should be collected **prior to starting antibiotics**, using appropriate sterile collection techniques. Fresh tissues (or pieces of whole unfrozen tissues in saline) should be saved and immediately submitted to a microbiology lab for both aerobic & anaerobic cultures. Surgical biopsies should be bisected and several touch imprints of the cut surface prepared and air-dried for cytologic examination and gram staining: Half of the tissue placed in formalin and the other half immediately frozen for bacteriological examination. Untreated animals presenting for necropsy should have the widest range of tissues collected, including esophagus, skeletal muscle, viscera, brain, and bone marrow. Again, equal tissue samples should be formalin-fixed and frozen. Screening of cytologic preps and formalin-fixed tissues will be performed to determine whether further investigation (bacteriology, virology, etc.) is warranted.

Pathology samples are requested by: Dr. Michael Garner at NW Zoopath (zoopath@aol.com) tel. 360-794-0630. or Dr. Bruce Williams, AFIP 202-782-2392 williamsb@afip.osd.mil]

2. **Supportive Treatment is warranted (**rehydration; feeding). Administration of a combination of cyclosporin and ketoconazole is strongly recommended, and administration of antiviral drugs, such as IFN-a may also be beneficial.

3. For each presumptive case, PLEASE complete the AFA DIM Case Report Form (see attachment or the AFA website: www.ferret.org)

4. VETERINARIANS ONLY: For questions regarding the above, contact Dr. Ramsell at exoticpetvet@hotmail.com or Southwest Animal Hospital at burgess@swanimalhospital.com (tel.: 503-643-2137). Clients should work through their veterinarians and not call directly.

FERRET OWNERS: If you suspect your ferret has DIM, contact your veterinarian as soon as possible.
For up to date information, please visit the AFA website: http://www.ferret.org.

An Emerging Ferret Disease: Ferret-FIP

A disease resembling feline infectious peritonitis is one of the latest diseases of concern in ferret medicine.

By Katrina Ramsell, Ph.D., DVM

A disease resembling feline infectious peritonitis has been recognized recently in ferrets and will be referred to here as Ferret-FIP. Most cases of Ferret-FIP have been identified within the last three years, with the count approaching approximately 50 cases. Similar to FIP in cats, this disease in ferrets is associated with a coronavirus, and it may be an immune-mediated disease. It has been hypothesized that the ferret enteric coronavirus (epizootic catarrhal enteritis virus) may be mutating within ferrets to result in Ferret-FIP – the disease state associated with the spread of virus within the body, inflammation and nodule formation. An alternative hypothesis is that there is a separate strain of coronavirus affecting ferrets and causing the disease. Cases are being documented and research is underway to further define and understand the clinical aspects and disease process of Ferret-FIP.

What Ferrets Are Affected With Ferret-FIP?

Ferret-FIP appears to affect young ferrets, with most being less than 18 months of age. Ferrets diagnosed with Ferret-FIP have been from various breeders and been on various diets. Many ferrets diagnosed with this disease lived with other ferrets and/or other pets. At this point, we do not know if or how contagious Ferret-FIP is to other ferrets.

What Signs Are Associated With Ferret-FIP?

Initial signs of a ferret with Ferret-FIP often include lethargy and a generalized (often hind end) weakness. Several owners have mentioned that their ill ferret had never been as active as other normal, young ferrets. Many owners report sudden weight loss, and most of the ferrets with Ferret-FIP become very thin over the course of the disease. Anorexia has been reported as an initial sign in some ferrets, but several ferrets have had a fairly normal appetite initially that has gradually declined throughout the progression of the disease. Sneezing (especially fits) and progressively labored breathing have been reported in several cases. Mild fever, dehydration, tooth grinding, vomiting, abnormal stools, seizures and neurologic signs (e.g. paddling) have also been reported. Some ferret owners have seen very greenish urine.

What Diagnostic Results May Indicate Ferret-FIP?

On physical examination, many ferrets with Ferret-FIP have had one or more abdominal masses. Moderate to severe emaciation, an enlarged spleen and kidneys, and heart murmurs are commonly observed. Enlarged peripheral lymph nodes have also been reported. X-rays have shown an enlarged spleen and abdominal masses in several cases.

Ferrets with Ferret-FIP consistently have increased blood globulin (above 6.0 g/dl; normal is < 3.0 g/dl) and total protein levels. All ferrets that were tested for Aleutian Disease Virus (ADV) were negative (via CEP test). Some ferrets had a mildly increased white blood cell count and/or mild to moderate decreased red blood cell count.

Ferrets with this disease often have abdominal masses, an enlarged spleen, nodules in abdominal organs and sometimes the lungs, and enlarged lymph nodes. To confirm the diagnosis of Ferret-FIP, coronavirus must be identified from a granuloma (nodule) or fluid from the chest or abdomen. Testing is currently being done to find viral ribonucleic acid (RNA) in frozen tissues at Michigan State University. Research at MSU has determined that Ferret-FIP is caused by a coronavirus that is different from the one that causes FIP in cats. Further research is needed to investigate the disease process in ferrets and to determine whether Ferret-FIP is associated with a mutation in the ECE virus or with a different strain of coronavirus.

What Is The Treatment And Prognosis For Ferrets With Ferret-FIP?

Ferrets with Ferret-FIP, like cats with FIP, have an extremely poor prognosis and usually die. Two ferrets diagnosed with the disease are still living, but the other confirmed cases have died. Several drugs and supplements have been used in cats in an effort to improve quality of life and slow the progression of the disease, but there is currently no cure for FIP in cats. There is also currently no cure for Ferret-FIP, and owners of ferrets with the disease generally have seen little or no improvement to the medications tried thus far.

Recommendations If Ferret-FIP Is Suspected

Ferrets suspected to have Ferret-FIP should undergo a comprehensive physical examination and thorough diagnostic tests. A young ferret with a high globulin level that is ADV negative should be suspected to have the disease. Unless fluid can be obtained and used to confirm the diagnosis of Ferret-FIP, an exploratory surgery with biopsies and histopathology may be necessary to get a definitive diagnosis. One must also consider whether the ferret's condition is too compromised for the ferret to survive an invasive procedure such as surgery.

Because many ferrets are already carriers of the ferret enteric coronavirus (ECE), and Ferret-FIP is a poorly understood disease, quarantine recommendations are difficult. Ferrets suspected or confirmed to have Ferret-FIP should not be exposed to any new ferrets, but separating them from current cagemates may be detrimental to the mental health of the ill ferret and to the cagemates. If Ferret-FIP is an immune-mediated disease similar to FIP in cats, treatment should be aimed at controlling the immune response to the virus. Immune-suppressive and anti-inflammatory drugs, rest, minimizing stress, and providing a high quality diet may help slow progression of the disease and help ferrets with mild clinical signs.

If a living ferret is definitively diagnosed to have Ferret-FIP, supportive care may be helpful for a period of time, but humane euthanasia should be considered when the ferret's quality of life is in question. If a ferret suspected to have Ferret-FIP dies or is euthanized, a thorough necropsy should be performed and tissues should be collected for histopathology. Confirmed cases should be reported to document and contribute to further research on this disease. Veterinarians can contact me (exoticpetvet@hotmail.com) if they confirm a case of Ferret-FIP.

Dr. Ramsell is an exotic animal veterinarian in Oregon. She is the president and shelter veterinarian for the Cascade Ferret Network, and she is the on the Health Affairs Committee for the American Ferret Association.

ALEUTIAN MINK DISEASE
A Hidden Danger to Your Ferret

What is Aleutian Mink Disease Virus?

Aleutian Mink Disease Virus, or ADV, is a parvo virus that infects mink, ferrets, raccoons, skunks, and possibly other Mustilidae. Currently, there is no evidence that it can infect other mammals outside the Mustilidae family.

Because it is a parvovirus, it is very hardy and can live outside the body of a host for a long time. To kill the virus, you must use a parvocide or a 10% bleach solution. Because it is a virus, ADV can mutate. Currently it is known that there are at least five strains of ADV that can infect mink. It is believed that there are also multiple strains of ADV that can affect ferrets. Like different strains of the flu in humans, some strains of ADV may be more contagious and more deadly.

Why is ADV a danger to my ferret?

The greatest danger of ADV is that an animal can have the disease and be spreading it without showing any symptoms. Also there has not been a lot of research done on how the disease acts in ferrets. Therefore, at this time, it is unknown what the incubation period is (how long after exposure before symptoms develop) or what the shedding period is (when the infected animal can spread the disease). ADV can be either active (symptoms are apparent) or non-active (the animal tests positive for ADV, but appears clinically healthy).

How is ADV spread?

ADV is passed via saliva, feces, urine, and in the placenta. Some studies in Europe have indicated that the virus may also be airborne. The most likely means of spread of the disease is by contact with contaminated surfaces. One study of ADV in mink had mink that tested positive for ADV housed in cages near the cages of mink that tested negative for ADV. The virus was not transmitted to the mink that had tested negative. In another study in the US, three ferrets that tested positive for ADV were housed in a cage with a ferret that tested negative. After four months, the one ferret still tested negative.

What are the symptoms of ADV?

In ferrets, the symptoms of ADV can mimic many other ailments. Symptoms can include a chronic progressive wasting, progressive hind end paralysis, muscle wasting, tremors, urinary incontinence, lethargy, pallor, enlarged spleen, tarry feces, and death. Active ADV causes massive disfunction of the immune system, with the accumulation of plasma cells in the various organs, and the presence of massive amounts of antibodies in the bloodstream, which cause vascular degeneration and inhibit clotting. Over time these changes will become more serious, and usually begin to affection the function of the liver and kidneys. Most ferrets with active ADV die of liver or kidney failure at the end of the disease.

How do I know if my ferret has ADV?

Currently there are two ways to test for the presence of antibodies to ADV. Both methods are fast, easy and relatively inexpensive. The most widely used test is the Counterimmunoelectrophoresis, or CEP test.. A blood test by United Vaccines, Inc. in Madison, WI. which requires a small blood sample that can actually be obtained and sent in by the ferret owner. The other is the ELSIA test which requires a small amount of saliva. This test is offered by Avecon Diagnostics, Inc. and can also be obtained and sent in by the ferret owner.

It should be noted that none of these tests can predict whether or not your ferret will actually become sick with ADV or if it will even spread the disease. The tests only show the presence of antibodies to ADV. Antibodies are what the immune system builds to fight a virus, so a positive test only shows exposure to the disease. In fact, studies have shown that only a small percentage of ferrets that have tested positive for ADV will actually become clinically sick from the disease.

How can I avoid exposing my ferrets to ADV?
ADV is not a new disease. It has been around for over 50 years. In the past, there have been sporadic increases in the active cases reported which are usually followed by several years of ferret owners taking extra precautions to avoid spread of the disease. Recently, there has again been an increase of active ADV cases, and so it is wise for ferret owners to be more careful.

To help avoid exposure of your animals, you mostly need to use common sense. Do not turn your ferrets loose around the other ferrets you do not know are negative for ADV. Do not allow strangers to handle your ferrets and do not handle stranger's ferrets. At your vet's office, keep your ferrets in their carrier except in the examination room. When attending ferret shows or frolics with your ferrets, make sure the organizers are following sensible sanitation procedures. When getting a new ferret, find out if it has been tested for ADV. Since it may take several months for the antibodies to show up in kits, when getting a kit find out if the parents have been tested and are negative. Breeders should test all their breeding stock before the beginning of the breeding season. If you get a new ferret and are not able to determine ahead of time if it has come from and ADV free environment, keep it separate from you other ferrets until you can have it tested. By taking a few precautions, you can eliminate problems down the road.

Why is more research needed, and what can I do to help?
The test for ADV that are currently available were developed primarily for use in ranch mink. The owners of ranch mink usually only have a financial interest in the animals. Any animals that test positive for ADV can be euthanized and pelted. The resulting pelts may not be as high a quality as they would be had the animal matured, but there is still a financial gain.

With pet ferrets, this is not an acceptable solution. Our ferrets are companion animals, and most of us would not have them put down simply because they might develop a disease.; Additional research is needed to try to develop a better test that will predict whether or not the animal will actually get sick. Research is also needed so we can learn when the infected ferret is actually spreading the disease.

Currently there is no treatment, vaccine, or cure known for ADV. The hope is that with additional research some or all of these might be found.

CONTACT INFORMATION:

Blue Cross Animal Hospital
ATTENTION: Dr Blau - CEP TESTS
401 N Miller Ave
Burley, ID 83318
(208) 678-5553

Heart of Ohio Ferret Assoc. & Rescue
P.O. Box 298206
Columbus, OH 43229
HOFARescue.org

WEBSITES: Also see links at www.HOFARescue.org and AFA's www.FERRET.org sites

SHD's VACCINE PROTOCALS

Vaccines are extremely important for your ferret. Veterinaring protocal is administered on the following schedule: Canine Distemper kit series starts at 8 weeks, repeated at 11-12 weeks and then at 14-16 weeks; thereafter they should receive any annual shot. The rabies shot should be administered at 12-13 weeks of age (5-7 days before/after the distemper, but never at the same time) and then given annually as well. There are only two canine distemper vaccines that can be used, Purevax-D (only USDA approved shots) or **Novibac Puppy DPv(off label for vets).**

There are concerns on over vaccinating and many breeders have gone to a 2-shot protocol for distemper. I use Nobibac Puppy and give the first at 12 weeks (after mother's immunity has left them) and second at 15 weeks. Then continue with an 18 month booster protocol. I do at least 2 boosters and then no more for the life of the ferret. Please note that this is not a vet approved protocol.

Distemper is an airborne virus that your ferrets can get even though they never go outside. If you have a pet that goes outsite, they can bring it in and you can bring it in on your clothes, shoes, skin, etc. The only way you can protect and safeguard against this is to vaccinate. There is no cure, and is 100% fatal.

There is only one approved rabies vaccine which is IMRAB-3, and though it might not be legally required by law in some areas it is required in Franklin County/Columbus, Ohio. This is one shot that could save your ferrets life in case of a ferret bite or scratch that gets reported. My protocol is give the first rabies vaccine at 12-16 weeks and then unless going to a show where it is required yearly, a booster at 1-2 years old and then no more for the life of the ferret. IMRAB-3 is a 3 year vaccine for other animals. Ferrets are required to have annually per the 2008 Compendium of Animal Rabies Control. Again, please note that this is not a vet approved protocol and you will need to check the county/city/state regulations in your area.

Unfortunately, there are still a large number of states that will decapitate the ferrets head for testing first, then ask questions later, despite the ***"2008 Compendium of Animal Rabies Control"*** (**http://www.ferretuniverse.com/health/resources/2008_rabies.pdf**) by the National Association of State Public Health Veterinarians, Inc. (NASPHV), stating the animal should be quarantined for 10 days. It should also be noted that the number of cases of a ferret contracting, passing, or carrying rabies is just about non-existent.

Unfortunately, the most common serious/life threatening reaction your ferret can experience from vaccines is anaphylactic shock, and this generally occurs more frequently with the distemper and rabies vaccines. Due to the severity of this reaction if it occurs, it is vital to the ferrets life to remain at your vets office for at least 30-60 minutes as immediate attention could be necessary. If no reaction occurs, it is equally important to keep a close eye on them for at least the next 24 hours, as a delayed

reaction is still possible. You should also ensure that your vet is available at all hours or have a back-up if you need to quickly bring your ferret in for emergency treatment.

IT CANNOT BE STATED ENOUGH THE IMPORTANCE OF REMAINING AT YOUR VETS OFFICE FOR AT *LEAST* 30 - 60 MINUTES AFTER INJECTION, IN CASE YOUR FERRET HAS A REACTION

Anaphylactic shock will generally begin with your ferret gagging, have difficulty breathing, and their tongue and skin could turn blue. They can also throw up, experience loss of bowel movement, pass blood in their urine and feces, go totally limp and unfortunately lapse into a coma and die. All of these signs and symptoms can occur within minutes and even seconds, and your veterinarian will need to administer emergency care immediately, which is why it is vital to remain at the vets office and keep a close eye on them. Your veterinarian will generally very quickly administer injectable benedryl, epinephrine (which literally will jump start their heart/body) and supply them with oxygen. This procedure will generally repeat until your ferret begins responding and stabilizes. Once your ferret is stabilized and released to go home, it is equally important to keep a very close eye on the ferret to ensure there are no repeat episodes and don't slip into a coma. They will be very lethargic due to all the emergency care and injections they have received.

Depending on the severity of reaction your ferret might experience, there are options/alternatives that you can consider. First, in the event your ferret was NOT pre-treated with injectable benedryl, this should definitely be a must going forward. If your ferret suffered a reaction to one vaccine, you should try using the other. If the reaction was extremely severe/life threatening with either or all vaccines, you need to seriously discuss your future options with your veterinarian, as future vaccines might not be recommended as the chance of survival at the next reaction could be greatly reduced.

Caring for a Sick Ferret

A ferret's normal temperature should be between 101 and 102 degrees. If your ferret feels abnormally warm to the touch, is acting lethargic or has very warm foot pads, he or she may have a temperature. Make sure your ferret takes in plenty of water or Pedialyte and take he or she to a veterinarian as soon as possible.

Tips to use in caring for a sick ferret:

- Keep your ferret warm, comfortable and separated from any other ferrets until the illness has passed.
- Keep your ferret hydrated.
- Make sure your ferret is eating enough to maintain weight.
- Give your ferret lots of love and attention.

Caring for a sick ferret can be a scary, challenging, and rewarding experience. Whether it is a cold or a life threatening illness, ferrets really benefit from constant attention and love. It is imperative that you contact or take your ferret to a veterinarian any time it is sick. What may start out as a simple cold or flu could turn into pneumonia or dehydration.

Be sure to check with your veterinarian before administering any "over the counter" pet store or human medications. For example, aspirin and other human pain medications can be lethal to a ferret. Human cough or cold medications can also kill or make your ferret very sick if they contain certain ingredients or are given in incorrect dosages. Your veterinarian can tell you which medications are safe and the correct dosages to give. Don't put your ferret's life in jeopardy to save time or money. Below I have listed some tips I have used in caring for ferrets who were recovering from an illness. I am assuming that your ferret has already been to the veterinarian for diagnosis.

- Keep your ferret warm, comfortable and caged separately from any other ferrets. If your ferret has a contagious virus, any other ferrets you own could catch it as well. Wash all communal toys and bedding to avoid spreading the virus. You should always have an extra cage available in case separation is needed. Ferrets who are recovering from surgery should also be caged separately to avoid ripping or snagging the stitches during play. Most ferrets want quiet time when they are ill (except for your pampering). Keeping them caged during an illness makes keeping an eye on them a lot easier as well. A sick ferret may curl up under a piece of furniture or under a cabinet for privacy, making it very hard to find them. Make sure your ferret has something warm to snuggle up in as well. Do not place your ferret on a heating pad.
- Make sure your ferret stays hydrated. You can tell if your ferret is dehydrated by pulling up the skin on the "scruff" area of the neck and letting the skin fall. If the skin doesn't snap back into place, or takes a long time to snap back, you ferret is probably dehydrated (older ferrets tend to have skin that may naturally snap back slowly. Get to know the normal skin behavior of your ferret.). You can also feel your ferret's tongue and gums to see if they are lacking moisture. Often, ferrets will act disoriented and lethargic if dehydrated. If you suspect your ferret is dehydrated, please take it to a veterinarian. Once a ferret is very dehydrated he or she can not drink enough water to solve the problem. Intravenous or under the skin fluid injections are often needed. Just a few bouts of vomiting or diarrhea can cause dehydration.

To prevent dehydration, give your ferret a mixture of Pedialyte and water to drink (half Pedialyte and half water) following an initial bout of diarrhea, vomiting or not drinking due to malaise. You should give them fluids that are at room temperature. Very cold, refrigerated fluids can cause your ferret stomach upset. You can also use Gatorade and water, however you must dilute it more (three parts water, one part Gatorade) due to the high sugar content. I would recommend using Pedialyte first and then trying Gatorade only if your ferret refuses to drink the Pedialyte.

Try putting the drink mixture in your ferret's water dish, keeping the water in the water bottle pure. If your ferret refuses to drink the Pedialyte mixture, you want to always have plain water available. If your ferret is not taking in any fluids, or is refusing to drink the mixture, you may have to syringe feed the fluids. You must be very careful while doing this, for they can aspirate the fluid and develop an infection. Fill a syringe with Pedialyte and water, scruff your ferret and slowly inject the fluid into the side of their mouth, one small drop at a time. They will usually resist at first, so it may be a long process. Try to angle the syringe tip towards the front of your ferret's mouth, rather than the back. This gives your ferret a chance to swallow the fluid on his or her own. You should try to get your ferret to drink about fifteen milliliters of the solution every three to four hours (if your ferret is not drinking any fluid on his/her own). Check with your veterinarian to find out exactly how much of the fluid mixture you should syringe feed your ferret per day in order to prevent dehydration.

- Make sure your ferret is taking in food. If your ferret is recovering from an intestinal virus, low blood sugar, surgery or other disease, he or she may not be eating enough to maintain body weight. If your ferret is refusing to eat on it's own, you may need to hand feed prescription diet canned food or a suitable replacement.

When my ferret became ill with a terrible intestinal virus (possibly ECE) and low blood sugar due to an insulinoma, I used a method suggested by Dr. Bruce H. Williams, DVM (a veterinarian who owns and works with many ferrets and has his own ferret pathology web site- see Favorite Links) to keep her nourished after her hospital stay. This technique involves hand feeding your ferret Gerber Chicken Baby Food (with the blue label) every three to four hours. The baby food contains easily digestible protein, calories and fat. It is gentle on irritated intestines and is easily absorbed. You can supplement this diet by mixing some softened, ground ferret chow, canned prescription diet or Ferretvite to the baby food. I used the baby food by

itself and then fed her a little Ferretvite separately to ensure she was getting enough taurine and other vitamins. You should always warm the baby food in the microwave or on the stove to slightly above room temperature after refrigeration (don't warm it in the glass jar- use a bowl). Always stick your finger in the center of the food to make sure it is not hot.

Feeding Your Sick Ferret

Ferrets will not generally take to a new food right away, so I had to scruff my ferret and rub a little of the baby food around her mouth and gums to let her taste it. When she didn't seem interested in eating any (in other words she squirmed out of my hands and wiped her mouth all over the carpet), I opened her mouth and placed a very small dab of the food on the roof of her mouth, keeping towards the front of her mouth (do this very carefully, you don't want your ferret to aspirate the baby food). Continue to feed your ferret in this manner until he or she has eaten about one tablespoon (or as much as your ferret will tolerate) of the food per feeding. You should try to feed your ferret every three to four hours, during the day and over night. After a few such feedings, my ferret was licking the baby food off of my fingers. I let her eat as much as she wanted per feeding. It really helped her recover and gain weight. You should always make some dry food available in your ferret's cage as well.

As your ferret's health and appetite improves, start mixing crushed dry ferret food or canned ferret food with the baby food. Finally, when your ferret is feeling better and has gained weight, encourage your ferret to return to his or her normal food by hand feeding small quantities. Moistening the chow with some water and warming it will also encourage your ferret to eat. Continue feeding the baby food as a supplement until your ferret is eating mostly dry food. Eventually, your ferret will begin eating on his or her own again. Hand feeding your ferret during an illness is an excellent way to earn your ferret's trust and administer some much needed attention.

- Give your sick ferret kind words, attention and a song or two. You may feel silly singing to your ferret, but giving your ferret lots of soothing attention goes a long way. A sick ferret may feel depressed or stressed after being alone in his or her cage for extended periods of time. Hold your ferret often, and dish out lots of praise, petting and soft words. When one of my ferrets was critically ill after an intestinal virus and surgery, I would sing her upbeat songs and insert her name into the lyrics. Every time she heard me singing "her song," she would pop her head out from underneath her blanket to see what was going on. It was a great way to connect with her while cooking dinner or doing other things. Moving your ferret's cage to a more localized and less isolated location in the house can help as well. Ferrets are social animals and need to feel connected with the activities of others in their social group (you and your family).

ECE & ULCERS

ECE (Epizootic Catarrhal Enteritis) is a virus that is also known as "The Green Slime Disease" and is a highly contagious disease for which there is no vaccine or medication. It first appeared around 1993 and has been spreading across the USA. Symptoms can range from diarrhea, to vomiting, dehydration and starvation. This is not a necessarily fatal disease for a healthy ferret, as long as steps are taken to intervene. The information provided here is simply a guide and is not meant to replace your vet, if you notice a problem, take the ferret in to the vet for an exam.

This disease is primarily transmitted through contact with bodily fluids or just by simply holding an infected ferret and then touching another. It is difficult to not cross-contaminate in a multi-ferret household, but constant washing of the hands, using a parvocide when cleaning cages, and not washing the infected ferret's bedding along with the others, may help to lessen the exposure. A good rule of thumb is not to handle the kits in the pet store (no matter how cute they are) or to handle ferrets of people you do not know.

One of the most obvious symptoms of the disease, as mentioned above, is diarrhea. Not all ferrets who have diarrhea or a green stool have ECE. Green stools simply indicate intestinal distress and seeing an occasional green stool is not a red flag but it does become serious if a series of trips to the litterbox yields a lot of green poo. A normal stool is usually brown in color, firm and smooth. As disgusting as it may seem, keep an eye on their litterbox; your ferret's poo tells you when something is wrong when it comes out looking abnormal. Along with the loose (sometimes projectile) green stool, you may notice stringy mucous, a "birdseed-like" appearance, and can be a bit foamy. One of the worst parts of this nasty disease is the dehydration caused by the diarrhea. Your ferret will die of dehydration long before it dies of starvation. You **must** make sure your ferret is hydrated. If it is not, it will not want to eat, causing even greater problems. You can check your ferret for dehydration by gently pinching the scruff of their neck. If it springs back, it is hydrated. If it stays up, you have a serious problem, which you must take care of immediately. Pedialyte is a good electrolyte replacement and plain water will work as well. Some advocate the use of Immodium AD to help control the diarrhea.

Another problem ECE causes is ulcers. Just as in humans, ulcers make eating very unpleasant. It has been widely reported that the use of Pepcid A/C and Carafate a half hour before feeding helps to lessen the acid produced by the intestinal upset. Again, you must make sure your ferret is eating. If it is not eating solid food, Gerber's Chicken or Turkey Babyfood, slightly warmed is a good alternative until it is eating kibble again. Some people can get their ferrets to eat Hill's Prescription Diet a/d, although most ferrets won't. Another alternative to kibble is a "duck soup". Even grinding their kibble (a coffee bean grinder works great) and adding heavy whipping cream or vanilla/ plain yogurt is good alternative.

Ferrets can be very stubborn. You **MUST** make your ferret drink and eat. If you do not win this battle, your ferret will not win either. You can get a needle-less syringe (check with your local shelter, pharmacy or vet) and force feed/water your ferret. This is done by gently scruffing your ferret and placing the syringe in the side of the mouth and gently squeezing the food/water into it's mouth. Be very careful as the liquid must go down the throat, not the windpipe. You must feed your ferret **at least** 20cc three times a day, four is preferred or more if it is eating small amounts.

Carafate can be obtained from your vet; Pepcid A/C and Immodium AD can be bought over the counter at your local pharmacy. Pepcid A/ C comes tablet form and the suspension is one tablet dissolved in 10cc of water. The dosage is .5cc twice a day for the Pepcid and for the Immodium (liquid) it is .1cc twice a day for two days, then skip a day and then one to two more days at the same dosage. **Please note**: Tylenol, ibuprofen and aspirin are **toxic** to ferrets. **Read the labels of all medications before giving them to your ferrets.**

Last, your ferret needs to be kept warm. A ferret that is cold has a slow metabolism and will lose its interest in eating. You can buy a heating pad made especially for pets. Just like their human owners, ferrets need support and comfort when they are sick and a little TLC and understanding goes a long way to make them feel better.

HOFA members are available to answer any questions you may have, please feel free to contact a board member via our website.

Please visit HOFA on the web at: www.hofarescue.org

Basic "Duck Soup"

1-lb dark chicken cooked in water until falls off bone
1-cup kibble

Xtras - if you wish:
Chicken/turkey babyfood
Uncle Jim's Duck Soup
Carnivore Care
Ferretone/Salmon Oil
Bene-Bac Probiodic powder
Plain or Vanilla yogurt
Plain cooked canned pumpkin

Separate the bones from the meat, add the kibble to the meat and broth. Let the it sit till the kibble soaks up broth and softens. You don't need to blend in blender but some will eat better that way.

* The Carivore Care can be feed by self or mixed in.
* Babyfood...can be mixed into batch or a tablesoon or so at each feeding.
* The pumpkin and yogurt can be added at each feeding - a tablespoon per 1/4ish cup.
* Bene-bac-per directions on container
* Ferretone/Salmon oil..might make them eat it better if not had before.

GASTROINTESTINAL DISEASES IN FERRETS

Gastrointestinal Foreign Bodies

Ferrets are very inquisitive and love to chew just about anything. They may swallow rubber, foam or plastic objects. This is especially a problem in young inquisitive ferrets. In older animals, gastric (stomach) or intestinal obstructions are more often caused by hairballs or, rarely, by tumors. Blockages can occur in the esophagus (throat) but are more common in the stomach and intestines. The key symptoms of a gastrointestinal foreign body are severe lethargy, anorexia (reduced appetite) with or without vomiting, reduced volume of feces, and diarrhea that is often dark green or black in color. Although one would expect vomiting to be the main sign, in many cases it is not. Foreign objects in the small intestine often cause pain and often your veterinarian can palpate or feel them relatively easily if your ferret is relaxed. Objects in the stomach cause less pain and are more challenging to feel by means of abdominal palpation. Due to the narrow diameter of the intestines, ferrets can, but rarely do, pass such foreign bodies.

Gastrointestinal foreign bodies may be difficult to diagnose without further testing. Plain or "survey" x-rays will usually be taken initially, but not all foreign bodies can be seen on plain x-rays. Often a "contrast" series will be recommended, in which your veterinarian will administer oral barium to your ferret, and then take x-rays at specific timed intervals after its administration. Barium will often show the site of obstruction from a foreign body, even though the object is not visible on x-ray. Exploratory surgery of the abdomen is often necessary to both diagnose and treat the problem, especially if caused by hairballs or a tumor. If diagnosed and treated early most ferrets recover from an intestinal foreign body obstruction and corrective surgery. Prevention is obviously preferred, and ferrets must not have access to objects that can be chewed and swallowed. Make sure to ferret proof your home!

Parasites

Gastrointestinal parasites are rarely seen in ferrets, but any ferret with diarrhea should have a microscopic fecal examination. While gastrointestinal worms are very rarely seen but protozoa such as Giardia or Coccidia may occur. These protozoa can cause persistent diarrhea, and rectal prolapse (protrusion of anal or rectal tissue) can be a problem associated with such diarrhea in young animals.

Diarrhea

Diarrhea is not a disease per se, but rather a sign of a gastrointestinal problem. Diarrhea is liquid feces. In the ferret, there may be dark colored, green, mucoid, slimy, granular, profuse or scanty liquid feces, depending on the cause. Ferrets with diarrhea may not appear to be visibly sick at all, or may show anorexia, vomiting, weight loss, depression, lethargy and/or dehydration. In ferrets, several conditions can result in diarrhea. Internal parasites such as Coccidia and Giardia can be a cause of diarrhea, as can viruses such as rotavirus (seen in young ferrets in North America), Epizootic Catarrhal Enteritis (ECE is becoming more common in ferrets, typically in either very young or old ferrets) and, sometimes, human influenza or canine distemper (fatal in ferrets). Some bacteria such as Helicobacter musteli (a spirochete-type of bacteria), Salmonella, Campylobacter (proliferative colitis) and Clostridia can cause diarrhea in ferrets. Salmonella and Campylobacter are important zoonotic (can spread to humans) diseases.

Supportive veterinary care is essential in any case of diarrhea in these small mammals, since fluid loss can be fatal. Three other diseases, gastritis, proliferative bowel disease and eosinophilic gastritis are also characterized by diarrhea and are covered in more depth below.

Helicobacter Mustelidae

A high percentage of ferrets are likely colonized with Helicobacter m. With Helicobacter gastritis, gastric ulceration and hemorrhage may cause either the vomitus or the stool to contain denatured blood. These ferrets are generally very painful upon gastric palpation. Bruxism, ptyalism, and aversion to food are common. The prevalence of Helicobacter m. enteritis seems to be rising, though that impression may be skewed by an increased awareness of its existence, (partially due to research on the pathophysiology of the same bacterial genus in gastric ulcers of people) and an increase in histopathology submissions. Affected ferrets are often adults, although the syndrome is also reported in juveniles. Often the stress of a

concurrent syndrome, such as an insulinoma or adrenal disease, may precipitate the clinical manifestation of an infection. These ferrets seem to be in considerable distress, and may exhibit facial and ear "twitching" and pawing at the mouth. Antibiotic combinations may be prescribed.

Inflammatory Bowel Disease

The inflammation seen in IBD may result from multiple causes including food allergies, hypersensitivities to certain bacteria, or chronic viral infections. Some veterinarians feel that IBD may actually be a chronic reaction to an infection with the coronavirus that causes epizootic catarrhal enteritis. Infection with Helicobacter mustelae may cause signs similar to IBD.

With IBD, a ferret can lose up to 90% of the absorptive area of his intestine. This results in only partially digested food passing through his digestive system and diarrhea. Birdseed/grainy stool is seen when a ferret cannot absorb the nutrients from his food, and seeing this stool regularly means that your ferret is well on the way to serious malnourishment.

Treatment can have three parts - immunosuppression, dietary changes, and antibiotics.

E.C.E. (Epizootic catarrhal enteritis, Corona viral enteritis, or Green Slime Disease)

This diarrheal disease is likely that the cause is a corona virus but no vaccination is currently available for this disease. An apparent latent carrier state is established in many recovered ferrets that persists for an indefinite period of time. Recurrences of the disease in the same ferret have been documented. Clinical signs generally include severe, fluorescent, watery, light green diarrhea, generally after recent exposure to a newly introduced but asymptomatic ferret. In young, healthy ferrets, very little treatment other than supportive care is required. Older ferrets with concurrent problems are the ones at risk for complications, including severe dehydration, emaciation, and death. The incubation period is extremely short, and the disease is highly contagious.

Intestinal Lymphoma

Lymphomas are the most common tumor seen in ferrets. Lymphomas can affect the lymph nodes, liver, spleen, respiratory system, bone marrow, gastrointestinal tract, eyes, skin, nervous system, heart and kidneys. The clinical signs depend on the type of tumor, organ involved and the stage of the disease. Ferrets may be show no symptoms for years. In young ferrets, lymphomas may appear suddenly and progress rapidly. In adult ferrets lymphomas tend to be more chronic (long term) and survival times are often longer. There is NO documentation of a genetic base for these tumors. The sex of the animal is significant.

A ferret with lymphoma may present with any number of signs including poor or absent appetite, lethargy, weight loss, vomiting, diarrhea, blood in the feces, abdominal distention, bulges or visible masses, palpable masses (masses that can be felt by an experienced veterinarian), problems breathing, coughing and hind limb weakness. This diversity of signs can make diagnosis difficult as most of the symptoms are not specific.

Treatment is indicated for ferrets showing clinical signs. In hospital supportive care should be initiated for debilitated patients. For a dedicated owner with a compliant patient, treatment with chemotherapy is an option. Surgery can be beneficial to remove solitary masses. Adjunctive or supportive treatment with proper nutritional support, antioxidants and immune stimulating supplements may improve the outcome. Treatment is not often curative and relapse occurs. Remission may last 3 months to 5 years.

Please visit HOFA at:

http://www.hofarescue.org

https://www.facebook.com/groups/heartofohioferret/

The information on this handout is from experienced ferret owners, not a veterinarian. It is meant to be an informative guide only, not intended as medical advice. If you see any unusual signs or symptoms of health or behavior in your ferret, **consult your veterinarian immediately.**

An Enigma Wrapped in a Mystery – Inflammatory Bowel Disease

Bruce Williams, DVM, DACVP
(Reprinted courtesy of Ferrets Magazine)

It's a mystery to confound Hercule Poirot or Sherlock Holmes, or both. More than that, it's one that might send them off together to plan a career switch, or at least a long change of scenery.

IBD – inflammatory bowel disease – is a syndrome that has engendered far more questions than answers. It's not new in veterinary or human medicine, but has been recently recognized in ferrets, and its impact on ferret health may be far more widespread than we know. The only thing we know for certain about this disease is that our knowledge is sorely lacking. Today, most of our knowledge of IBD comes from human research, and a little (but not much) from other animal species such as dogs, cats, horses, and some species of rodents and monkeys.

The alias

"Monsieur Poirot, every killer leaves a signature – it is their very nature." Holmes bent down for a closer look. "Here it is," he exclaimed triumphantly. "The killer's name is Hilfiger – Tommy Hilfiger."

Like any master criminal, this syndrome travels under an assumed name. Even the name - inflammatory bowel disease – demonstrates our almost total ignorance about this disease. *Bowel* is another name for the GI tract, and that's about as specific as it gets. While we call it a *disease*, it is likely simply the end point of a number of different diseases, which all result in a similar picture – diarrhea, weight loss, and ill thrift. Finally, for an absolute lack of specificity, you can't do much better than *inflammatory* – it doesn't tell you anything at all about the cause, the lesion, or the symptoms.

The symptoms

Poirot completed his examination of the victim. "It is quite clear to me what caused the death of this poor unfortunate", he said. "What?" said Holmes, drawing deeply on his pipe. "A total absence of life", answered Poirot with all of the confidence of a man who had spent years finely honing his craft.

Like Poirot, many vets and owners fail to recognize the symptoms of IBD, as they are mild and intermittent until advanced disease is present. Unlike many other ferret diseases, there are no "classic" signs of IBD, so the diagnosis is often overlooked. Initially, affected animals have intermittent soft stools, and they may show a lack of appetite or a shift in food preference. Over a period of weeks to months, stools may progress to a grainy or birdseed appearance, indicating the intestine's inability to properly digest protein, starch, and fat.

The modus operandi

Holmes puffed his pipe again. "Ingenious", he said. "It appears the victim was driven to choke himself to death. Hence, I suspect the killer may be a telemarketer or a purveyor of life insurance." "Fiendish", opined Poirot.

Abnormal stool is the most common presenting sign of IBD in ferrets.

At its most basic, IBD is an affliction in which the body turns against itself – the normal defenses of the GI tract overload so that the gut itself becomes damaged. To properly understand IBD, you must first understand the natural protective mechanisms of the gastrointestinal tract.

Most people are unaware of the very important role that the immune mechanisms of the intestine play in protecting the body from disease. In fact, over half of the total lymphoid tissue of the body resides in the gastrointestinal tract. Every day, an amazingly complex network of cells sifts through all of the substances in the gut, deciding what is normal and what is a potential threat. Previously recognized substances (antigens) such as dietary components are allowed free passage, and new antigens are evaluated for threat potential.. Threats may come in the form of ingested bacteria, viruses, toxic or allergenic substances; even developing tumor cells may elicit a protective inflammatory response. Another amazing part about this system is that once a "threat" antigen is eliminated, it not only shuts itself down, but also creates a line of specific "memory cells" which provide a rapid response should that same antigen reappear months or years down the road.

So what happens when the body identifies a threat antigen? Like any good offense, it employs a number of weapons against the enemy. Once a threat antigen is detected, lymphocyte "generals" spring into action, assuming two important roles: "helper" cells which are responsible for inciting and maintaining the inflammatory response, and "suppressor" cells, which turn it off. The lymphocytes secrete cytokines, chemical messages that not only tell other cells what to do, but also make the area inhospitable to the invaders. Cytokines recruit other types of inflammatory cells to the site, to gobble up some invaders and release destructive enzymes to kill others (and unfortunately, anything else in the area.) More lymphocytes arrive and join the fight. Lymphocyte "killer" cells engage in close combat with invaders, punching holes in their membranes with lethal force. Other lymphocytes produce antibodies, which coat the invaders, and packaging them for destruction.

In most cases, the battle is violent and swift, and when the invaders are conquered and the debris is removed, suppressor lymphocytes take over. Surviving inflammatory cells depart, memory cells are created to watch vigilantly for the return of that invader, and cellular regenerative processes begin repairing the damage.

In this particular case, lymphocytes are the primary cells orchestrating the inflammatory reaction. In another, less common form of IBD, known as eosinophilic enteritis, eosinophils, which normally function primarily in allergic or anti-parasitic reactions, are the primary cells, multiplying madly and spewing their destructive enzymes throughout the gastrointestinal tract.

As you might surmise, the war is very damaging to the gut lining and extensive repairs are required for proper digestion to resume. The normal intestine is lined by millions of small finger-like projections (villi). These villi increase the surface area of the intestine many hundreds of times, which is important for extracting as many nutrients and water as possible. IBD's unrelenting inflammation causes loss of villi, and up to 90% of the absorptive area of the intestine, as well as the digestive enzymes contained on the villi. Nutrients now pass through the gut undigested and unabsorbed, diarrhea inevitably results.

We don't know exactly why the inflammatory response does not shut down in affected animals – it may be due to a continual presence of a true threat, or the aberrant recognition of a harmless substance, such as a normal bacterial inhabitant or a common dietary component,

as a threat. A second popular theory is that there is a problem with the suppressor lymphocytes, rendering them unable to turn off the inflammatory response. Regardless of the cause, the end result is a persistent inflammatory response that cannot be shut down without medical intervention, and ongoing bowel damage.

The cause(s)

Poirot reached over and picked up a large bound ledger on the floor. "Our day is almost complete, Holmes", he said, "for this book contains the address of our killer." "You never cease to amaze me, Poirot", said Holmes, as he held out his hand for the volume, entitled The Complete Residential and Business Listings of London.

The list of potential and proposed causes for IBD is endless - viruses, bacteria, dietary antigens, and toxic substances have all been considered, and only a few agents have been conclusively proven or excluded. In humans, dietary gluten has been overwhelmingly implicated as the cause of a form of IBD known as celiac disease. Evidence is mounting that normal bacterial inhabitants of the intestinal tract may have a prominent role in IBD. Research in mice has shown that IBD-prone mice, when raised with sterile intestinal tracts do not develop IBD. In cotton-top tamarins, small monkeys that develop inflammatory colitis, a new bacteria has recently been identified which causes the disease in previously healthy individuals.

In the ferret, there is a growing body of evidence that microorganisms are a prime cause of IBD, although likely not the only causes. *Helicobacter mustelae*, a ubiquitous bacteria in the ferret stomach, causes profound lymphocytic inflammation which destroys the stomach lining, necessitating treatment in about 10% of all ferrets. In my own laboratory, recent research has shown a high incidence of coronavirus antigen (up to 40% in some areas) in the intestine of ferrets diagnosed with inflammatory bowel disease. While it would be nice to believe that these two infectious agents are the only causes for IBD in ferrets, the evidence for other types of agents in other species is far too compelling to ignore.

Diagnostic options

"Are you confident that the victim is dead?" asked Poirot. Holmes deftly removed the dead man's wallet and put it in his own pocket. Seeing no reaction, he nodded his head.

Currently, the options for the definitive diagnosis of IBD in ferrets or other animal species is limited to surgical biopsy. Today, however, biopsies may be obtained via endoscopy in ferrets, without requiring abdominal surgery and a prolonged recovery. There is currently no blood test for IBD, and imaging procedures, such as X-rays and ultrasound are notoriously poor for identifying inflammatory lesions of the bowel. A combination of appropriate clinical signs and several relatively non-specific indicators on routine bloodwork, may suggest a diagnosis of IBD. However, there are a number of other conditions, such as Helicobacter, coccidiosis, and proliferative colitis that can display an identical picture, and would be worsened by empiric therapy for IBD.

Treatment options

Based on incontrovertible evidence that the killer acted alone and out of their great respect for the recommendations of the two greatest detectives in the world, Scotland Yard locked up all men, women, and children in London who could not provide an alibi for their whereabouts on the night in question. While highly taxing to the British penal system, and profoundly impacting many businesses in and around the London area, it is safe to say that a similar murder was never again reported, and the case was closed.

In most cases, the treatment for IBD is immunosuppression. As we are unsure of

the causative agent in most cases, the typical approach is to shut down the inflammatory reaction with immunsuppressive drugs such as high doses of steroids. Treatment for *Helicobacter mustelae* is an exception – as a bacteria, it can be treated with antibiotics, and if the infection is cleared, the persistent inflammation will diminish as well. In cases of post-ECE inflammatory bowel disease, we do not have this option, as there are no effective antiviral drugs, and As there are no drugs which effectively treat viruses, and we are forced to immunosuppress the animal.

The administration of the steroid prednisone, one of the key treatments in IBD, profoundly affects the body's ability to mount a viable inflammatory reaction. Steroids inhibit the inflammatory response at a number of steps - migration of inflammatory cells, liberation of cytokines, and at higher doses, actually kill lymphocytes. A major concern with this approach is that prednisone is not selective for the gut, but affects the entire body, and may render the animal unable to fight off invaders in other organ systems.

Aziothioprine (Imuran) has recently been used in ferrets that do not respond well to prednisone, but there is much that still needs to be learned about the dosGE and effects of this drug in ferrets. Bone marrow suppression has been reported in several ferrets receiving this drug; so periodic monitoring of complete blood counts is strongly advised.

Dietary changes are also of great benefit in IBD ferrets. The severely damaged intestine requires a bland diet that is highly digestible. Chicken baby food continues to be my personal favorite for animals with chronic GI illness; however, the prescription diet a/d (available through your veterinarian), or a number of types of "duck soup" may be used to advantage in affected animals. Anecdotally, a switch to non-traditional kibbles such as turkey and barley may alleviate some clinical symptoms, possibly by eliminating offending dietary antigens from the diet. It is unlikely that simply switching brands of commercially available ferret chow would be of any significant help in the treatment of IBD, as most have a very similar array of ingredients.

The future of IBD

You don't have to be Sherlock Holmes or Hercule Poirot to see that there is a lot to be learned about IBD in ferrets. To date, only two causes have been definitively incriminated in its development – one bacteria (Helicobacter) and one virus (coronavirus). There is likely many more waiting to be discovered, but the trail is difficult and proof is hard to come by.

Further research is warranted in the extra-intestinal manifestations of IBD as well. Definite correlation between IBD and diseases of other organ systems in humans has been made, including immune-mediated anemia, hepatic lipidosis, clotting disorders, and skin disease (all of which are seen with fair regularity in ferrets). The possibilities are intriguing, to say the least.

The future certainly holds more research and likely some amazing discoveries about the origin of inflammatory bowel disease, its diagnosis, and treatment. That, my friends, is elementary.

Heat Stroke in Ferrets

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Mechanisms of heat loss:
Radiation - the loss of body heat to the ambient environment
Conduction - the loss of body heat to a cooler substance touching the body
Convection - the loss of body heat to air or fluid currents moving over the body
Evaporation - the loss of body heat through respiration and panting (and sweating to some degree, although this is more convection)

Temporary increases in body temperature can usually be handled by these measures, but as the ambient temperature rises, they lose their effectiveness.

A Brief Overview of Hyperthermia:
As the body temperature rises, the brain tells the body to dissipate heat by increasing cardiac output to increase blood flow to the skin and muscles. Blood flow to the internal organs is decreased to allow the maintenance of normal blood pressure. Continued high body temperatures will result in a number of problems related to this, including stimulation, then depression of the respiratory system, a change in the chemical makeup of the blood, hypoxia (decreased oxygen levels), and then cellular damage as free radicals form in the absence of oxygen. This cellular damage can be irreversible. As the free radicals cause the blood vessels to dilate, hypotension and shock occur.

As heat levels remain high, direct cellular damage is done by the high temperatures. Decreased blood flow results in hypoxia and changes in metabolism. The blood can begin to form microclots in the blood vessels, resulting in even further damage as blood flow is restricted. Multiorgan failure can occur.

Signs of heat stroke can be as mild as excessive panting and weakness or progress through a range of symptoms including muscle cramping, nausea, depression, seizures, coma, and death. An animal may appear to recover from heat stroke only to develop signs of organ failure or other problems a few days to a week later. Kidney failure, liver and gastrointestinal signs, cardiac problems, and DIC (disseminated intravascular coagulation) are all possible sequelae, or may even be present during the initial episode. Nervous system damage can occur, as can severe muscle injury.

The amount of damage done to the body depends on two things - how high the core temperature becomes, and the length of time that it is elevated. Fevers are not considered to be heat stroke, as they are rarely at temperatures (105 F or higher) that can cause damage, and are considered an appropriate response to a body's illness.

Ferrets and Heat:
Ferrets are evolved as cold weather animals. This means that their mechanisms for heat loss are much less efficient than their mechanisms for retaining heat. They cannot sweat, and their fur tends to be dense and to entrap air near the skin, so convection is of very little help to them. Radiation is very inefficient above an ambient temperature of about 80% of their body temperature, so about 80 F. Conduction is of use if there is a cool surface near them, but otherwise useless. And evaporation - panting - is of minimal help due to their small size - there simply isn't enough surface area for evaporation to be cooling to them at all.

Unfortunately, this all means that ferrets are very susceptible to heat stroke at temperatures above 80 to 85 degrees. A ferret with heat stroke may be very red, or flushed in appearance. They may be prostrate, glassy-eyed, or even unconscious. Since ferrets with insulinoma may exhibit similar signs, it is important to note the ambient temperature before determining which problem it may be.

Treatment of Heat Stroke:
Since the degree of damage done is dependent on the length of time the temperature is elevated, start cooling the ferret as soon as heat stroke is suspected. While instituting these measures, get to a veterinarian so that further treatment can be begun.

- Do NOT immerse the ferret in an ice or cold water bath. This will cause the peripheral blood vessels to constrict and actually make things worse.
- Do not cool lower than 103 degrees rectal temperature, as doing so will actually result in hypothermia.
- Do not use alcohol or ice packs on the skin.
- Do not give subcutaneous fluids unless directed to do so by your vet. They may cause peripheral blood vessels to constrict.
- Use cool or tepid water to wet the skin and hair coat.
- Direct a fan toward the animal to increase air flow, which will increase the heat loss as the water on the skin evaporates.
- If the animal is conscious and will drink, small amounts of a cool liquid will be helpful, but do not force the animal to drink.

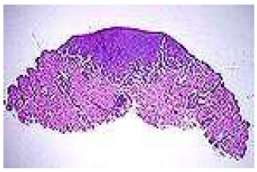
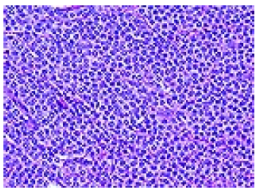
Once you are at the veterinarians, an assessment will be made of whether further measures are needed. They may include intravenous fluids, cool water enemas, or other cooling procedures. Drugs to control any cardiac problems will be started. Oxygen therapy should be done to increase the amount of oxygen reaching the tissues, and may require intubation. Bloodwork is needed to determine the function of the kidneys and liver, and will probably need to be repeated depending on the degree of heat stroke suffered. The ferret may need to be hospitalized for some time. Drugs may be needed to protect the gastrointestinal system.

Prevention of Heat Stroke:
First and foremost, air conditioners are wonderful things. If, for any reason, climate control is not possible, the following are some ways to keep your ferrets from suffering heat stroke.

- Circulate the air - fans, open windows, etc.
- Cool surfaces for them to lie on - bottles of ice in the cage, stone tiles are some examples. With bottles of ice, be careful to wrap the bottle in cloth to avoid getting the ferret too cold.
- Cool water to drink - bowls allow them to wet themselves (and everything else, unfortunately!) and many ferrets will drink more from a bowl than from a bottle.
- Swimming or cool water baths - a wet ferret is rarely an overheated ferret.

For those who also own other pets, this all applies to them as well, with the exception of temperature. However, I have seen dogs with heat stroke on days where the temperature was not above 85 F, so watch your cats and dogs on hot days as well. Especially watch any animal with heart or respiratory disease, no matter what species they are.

Mast cell tumors

	Gross photograph of a ferret with a cutaneous mast cell tumor on the point of the left shoulder. (Photo courtesy of Dr. Steve Sanders, Cottage Veterinary Clinic, Walnut Creek, CA)
	Cutaneous mast cell tumor from a ferret. Note the superficial distribution of the cells - this is why they are easily excised. Also note how the tumor does not elevate the overlying epidermis, which is why these tumors are flat on gross inspection. (HE, 2x)
	Higher magnification view of the neoplasm shown above. Note the monotonous population of mast cells with centrally located hyperchromatic nuclei and few discernable cytoplasmic granules. (HE, 10X)

Mast cell tumors are the second most common tumor of the skin in the ferret, and an excellent example how diseases of ferrets differ significantly from those of the dog and cat. These tumors generally appear as flat, scaly areas on the skin of the ferret, which may or may not be associated with hair loss. Often, the tumors appear as an itchy scab on the ferret's skin. Mast cell tumors increase in frequency with age in the ferret, and several mast cell tumors may be present at once on the skin of ferrets.

Mast cell tumors in the ferret are invariably benign, and pose no significant health risk, other than that incurred with general anesthesia and surgery. However, in the dog, and to a lesser extent, in the cat, mast cell tumors are malignant, and can result in aggressive invasion of surrounding tissues, metastasis to distant tissues, and may result in death. Thus, veterinarians who do not have extensive ferret experience, upon receiving a pathology report documenting the presence of a mast cell tumor, may incorrectly give a poor prognosis, recommend additional surgery, or chemotherapy. The presence of multiple mast cell tumors, or the recurrence of additional mast cell tumors does not warrant a worse prognosis – **all mast cell tumors in the ferret should be considered to be benign**.

Mast cells are cells which help to mediate the immune system of man and animals. They contain substances such as histamine, which when released into the surrounding skin, may result in intense itching, thus these tumors are often associated with intense itching in the ferret. In dogs, the histamine may also result in gastrointestinal ulceration, and gastric ulcers may be seen in dogs with mast cell tumors. However, **gastric ulceration does not occur in ferrets with cutaneous mast cell tumors**; the causes of gastric ulcers are well-documented in the ferret, and mast cell tumors are not one of them.

The treatment for mast cell tumors in the ferret is simple – surgical removal. These tumors are generally well-delineated, and rarely invade below the skin, so removal of the tumors is rarely incomplete. Microscopically, the neoplasm is composed of well-differentiated mast cells with centrally located hyperchromatic nuclei, and a low mitotic rate. Mast cells of ferrets contain few granules as composed to dogs and cats, so special stains such as Giemsa, Luna Mast, or toluidine blue are generally of little assistance. Eosinophils are fairly rare in this tumor, similar to those seen in the cat.

Several years ago, I reported a single case of a poorly differentiated mast cell tumor in the ferret. This tumor was present in numerous abdominal organs, including the liver and mesenteric lymph nodes, but no mestastasis was seen in the skin. This was a rare case that has not been repeated, and I have yet to see a cutaneous mast cell tumor in the ferret with extracutaneous metastasis.

Bruce Williams, DVM, DACVP
January 1999

http://www.afip.org/ferrets/Mast/mastcell.html

Larger View

Gross photograph of a ferret with a cutaneous mast cell tumor on the point of the left shoulder. (Photo courtesy of Dr. Steve Sanders, Cottage Veterinary Clinic, Walnut Creek, CA)

WHAT IS LYMPHOMA

Lymphomas are cancers of white blood cells called lymphocytes. These cells help fight infection and repair wounds. Most of the lymphocytes are in the various organs of the lymph system, but they can also be found in the blood, skin, and gastrointestinal tract. Malignant lymphomas and lymphosarcomas [*Lymphoma and lymphosarcoma are different terms that describe the same condition*] are solid lymphocyte tumors that form in the lymph nodes of the body and spleen. From there they can spread to many organs of the body. Many different organs can be infiltrated with cancerous lymphocytes and the disease can have any number of signs that can be confused with many different diseases.

There are two basic clinical presentations of lymphoma in ferrets. An aggressive form that is seen in ferrets under approximately 2 years of age and often called "juvenile lymphoma." Sadly, the prognosis is usually very poor in these cases. The more "classic" form of lymphoma is seen in older ferrets and while this disease is almost always terminal, chemotherapy can sometimes result in a miraculous turn around; however, the period of time that the ferret will remain in remission can vary from only a few weeks to many months with continued treatment.

Lymphoma is classified by location and this has been defined by the following stages:

- Stage I - Involvement of a single site or tumor
- Stage II - Involvement of multiple sites on the same side of the diaphragm
- Stage III - Involvement of spleen and lymph nodes on both sides of the diaphragm
- Stage IV - Involvement of multiple sites on both sides of the diaphragm

An uncommon presentation is cutaneous lymphoma. Although uncommon, it has been seen in ferrets and of all the lymphomas, if one has to have lymphoma, this would be the one to have. Progress of the disease can be slow, often taking years and metastasis is uncommon. The feet are often affected and the ferret may be euthanized due to loss of function after time rather than because the disease has metastasized.

DIAGNOSIS

Diagnosis requires a needle aspirate or biopsy of a lymph node or a biopsy of an organ, with the spleen probably yielding the highest number of positives. If your vet has diagnosed lymphoma simply through blood work and an elevated lymphocyte count, you do not have a valid diagnosis. You need to ask your vet for a more accurate diagnosis or seek a second opinion. Tissues should always be examined by a pathologist with ferret experience whenever possible.

Note that some ferrets can get large fat pads along the sides of their neck that are sometimes diagnosed as enlarged lymph glands when in fact it may be nothing but fat. The bottom line is that a diagnosis that has been done without a tissue biopsy is not complete and the diagnosis of a terminal disease should not be accepted.

TREATMENT

Treatment may consists of surgery, chemotherapy, radiation, alternative medicine or a combination of treatments. Lymphoma that involves the liver, stomach or intestine generally respond poorly to chemotherapy. Ferrets that have received glucocorticoids for an extended time period, for example prednisone for insulinoma or IBD, may be resistant to the antitumoral effects of steroids.

With aggressive treatment started right away, your ferret has the best chance at the longest survival time. Dr. Katrina Ramsell of Southwest Animal Hospital, Beaverton, OR, has several lymphoma protocols which have proven quite successful in the treatment of lymphoma. Dr. Ramsell has graciously offered to supply her protocol paper to anyone in need. Please contact Dr. Ramsell at mailto:exoticpetvet@hotmail.com?subject=Lymphoma protocol sheet.

CARDIOMYOPATHY IN YOUR FERRET

Heart failure

Written by Dr. Ron Hines DVM PhD

Veterinarians do not know why some ferrets develop this type of heart disease. We know that it was common in cats when they ate diets that did not have enough taurine. Manufacturers corrected that problem. We see less cardiomyopathy in ferrets than we used to - so perhaps taurine was also involved.

Heart disease in ferrets tends to sneak up on owners. It is only when the pet is an advanced stage of heart failure that signs become obvious. By then, treatment is difficult and a cure is impossible.

When portions of the ferret's heart muscle die, the heart can no longer pump blood through the pet's body efficiently. In response, the heart gets flabby and large. This is also called congestive heart failure. This causes blood in the pet's body pools in the tummy and lungs when its circulation becomes too sluggish. The signs you will see are a pot belly and a soft cough in your pet. It will tire easily and not be as active as it once was. This form of cardiomyopathy is called dilitative cardiomyopathy.

Occasionally the wall of the heart does not get thin and flabby. Instead, it increases in thickness. This form of heart disease is called hypertrophic cardiomyopathy. Although the heart appears quite different from the first type, the effects on the ferret are the same. .

Once the pet is brought to a veterinarian, signs of the disease are usually quite apparent. The pets tend to breath rapidly and shallow and their heart rate is very weak and very fast. But the most striking changes appear on x-rays. The pet's lungs will show that they are soaked in pooled fluid (pulmonary edema) and the diameter of the heart will be much larger than it should be - crowding out other body organs.

If you lift your ferrets lips, you will see that the gums are no longer a uniform pink. Instead, they will be bluish or grayish and color comes back only slowly when the gums are pinched. This is called slowed capillary refill time (CRT). Normal capillary refill time in your ferret is less than three seconds.

It is rare that further diagnostic tests are required. Dog heartworms occasionally infect ferrets causing similar signs. So that possibility may need to be ruled out. If you take your pet in for a yearly health checkup and your veterinarian uses an ultrasound or echo cardiograph machine, they may pick up the problem much earlier.

What Treatments Are Available For My Pet?

The most important think we can do to make your ferret feel better is to give medications that reduce the amount of fluid pooled in its lungs. The second most important thing is to give drugs that will help the pet's heart pump blood more efficiently. However, in all cases , this is a progressive disease that will require more medications as time goes on. A few ferrets manage to live up to two years after this disease is diagnosed but that is quite rare. The majority do not survive over 8 months.

Diuretics

Sometimes, it is sufficient to just remove the fluid that has accumulated in the pet's lungs. The most common drug for this purpose is furosemide (Lasix). It can be given up to three times a day. You will see changes in your ferret within an hour of giving him his medicine. It will cause your pet to urinate more and to drink more. Be sure water is always available.

Ace Inhibitors

The medications we use in your ferret are the same ones physicians use in people. The most popular one is enalapril (Vasotec,Enacard). The ferret's kidneys must be in good condition when receiving this medication and should be occasionally monitored with blood tests.

Forticor (benazepril HCl, Lotensin)

Benazepril is also an angiotensin-converting enzyme (ACE) inhibitor drug. It is similar in it's effect to enalapril Like enalapril, it increase the efficiency with which failing hearts pump blood.

Calcium Channel Blockers

The most commonly used one in ferrets is diltiazem (Cardizem).

Beta-blocker Medications

The most commonly used on in ferrets is atenolol (Tenormin).

Digitalis

Many vets use this medication in the last stages of heart failure. I avoid using it because of the severe side effects I have seen in pets receiving it. But most of these pets are not ferrets - so if your veterinarian suggests giving the drug it may be worth a try. Animals receiving this drug do not survive very long.

Vetmedin (pimobendan)

This medication is a phosphodiesterase III inhibitor. Vetmedin works by increasing the amount of calcium available to the heart muscles and also lowers vascular resistance and blood pressure so the ferret's heart does not have to work as hard.

Please visit HOFA at:

http://www.hofarescue.org

https://www.facebook.com/groups/heartofohioferret/

Ferret First Aid Kit

- **Gauze bandage rolls**
- **Scissors**
- **Eyedropper**
- **Q-Tips**
- **3% Hydrogen peroxide**
- **Antibacterial ointment**
- **Betadine**
- **Vaseline**
- **Eyewash (.9 to .2% boric acid)**
- **Styptic pencil**
- **Kaopectate or Imodium AD-Childrens liquid**
- **Pepsid AC**
- **Karo Syrup or Honey**
- **Nutrical/Ferretvite**
- **Rectal thermometer**
- **Chemical ice pack**
- **Microwavable hot pack or heating pad that as a low setting**
- **Towels and washcloths**
- **Syringes – several sizes**
- **Turkey/chicken Baby food**
- **Boost/Ensure (Vanilla flavor)**
- **Liquid Children's Benydril**
- **Pedilyte**
- **Couple empty prescription bottles for mixing medications**
- **Amoxicillin (Prescription only)**
- **Lactated Ringers (Prescription only)**
- **Carafate (Prescription only)**

How to medicate a ferret who doesn't want to be medicated.

Tools

A towel to place the ferret on
A very small syringe. A one cc works best
medications mixed with something good tasting (like turkey/chicken baby food) and watered down.
Nutrical/Ferretvite for a treat afterward. One calmed down ferret.

The method:
With the ferret on your lap. Get comfortable and let him/her see and smell the syringe. Put the end of your finger in the side of the mouth to gently force it open from the left side, and insert the end of the syringe into the right side. Squirt in no more than 2 to 3 drops while holding the head up so the liquid runs to the back of the throat and massage the throat so the ferret doesn't try to spit. After two to three squirts, let the ferret run into a hutch where it can compose itself for a few seconds. While this is happening, refill your syringe if all the medication isn't used up yet. Repeat the procedure until the medication is gone.

The finale: Use the Nutrical/Ferretvite as a TREAT also to cleanse the pallet of the ferret. This will also give the ferret something to look forward to the next time you have to medicate it.

Ferret Reference Ranges

Hematology Ranges	
WBC	2.5 - 8.0 x10^3/μL
PCV	43 - 55 %
Neutrophils	50 - 80 %
Lymphocytes	20 - 50 %
Monocytes	0 - 3 %
Basophils	0 - 1 %
Eosinophils	0 - 1 %
Platelets	300 - 750 x10^3/μL

Blood Chemistry Ranges	
Total protein	5.5 - 7.6 g/dL
Albumin	2.4 - 4.5 g/dL
BUN	10 - 33 mg/dL
Calcium	7.7 - 11 mg/dL
Cholesterol	60 - 300 mg/dL
Chloride	90 - 110 mmol/L
Creatinine	0.1 - 0.4 mg/dL
Globulin	2.9 - 4.9 g/dL
Glucose	80 - 120 mg/dL
Potassium	4.3 - 5.8 mmol/L
Sodium	140 - 160 mmol/L
Phosphorus	4.2 - 8.5 mg/dL
ALP	15 - 45 U/L
AST	50 - 280 U/L
ALT	10 - 280 U/L
Total bilirubin	0 - 1.0 mg/dL

Normal Temperature (℉)	Normal Heart Rate (beats per minute)	Normal Respiratory Rate (breaths per minute)	Average Weight F=female M=male
100-104	200-350	30-40	F: 1.5-3lb M: 2.5-6lb

VITAL SIGNS and EMERGENCY SITUATIONS

It is important to know what is normal in your pet in order to determine when something is wrong. **Observation of your pet's daily activities such as eating, sleeping, playing, breathing, defecating and urinating is critical to the detection of illness**. If you know your pet's normal routine you will be able to quickly detect when that routine changes.

There are obvious signs of illness such as loss of consciousness, weakness, slow or no response to stimulus, lameness, diarrhea, vomiting, choking and unusual breathing patterns which will be easy to spot. In addition, there are also some vital signs that you can observe to help determine the severity of the illness. Please examine the following areas of your pet now while he/she is healthy so you will know what is normal.

VITAL SIGNS

MOUTH - If you look in healthy ferret's mouth you should observe that the tongue and gums are dark pink and moist. There should be no foul odor to the breath. If you press your finger firmly onto the upper gum near the canine tooth and then take it away you should observe the gum tissue "blanching" (turning white) where you have pressed the blood out of the area. Within 1 to 2 seconds the area should then become pink again. This is called the *capillary refill time* (CRT), The CRT in a normal ferret should be about 1 to 2 seconds. A CRT of 3 seconds or longer can indicate shock, a toxic condition, and cardiovascular disease or blood loss. If the gums or tongue look blue, gray or are "muddy" colored it can indicate a lack of oxygen, cardiovascular disease, a toxic condition or shock. Very light pink or white gums can indicate a loss of blood or shock. Yellowish gums can indicate liver disease. Foul smelling breath can be caused by kidney, liver, dental, intestinal or other metabolic disease. A loss of moisture in the mouth where the gums and saliva become dry and 'sticky", can indicate dehydration.

EYES - **A normal ferret's eyes should be fully open, moist and the *sclera* (white part of the eye) should be white with very small dark pink to red blood vessels.** The *conjunctiva,* which is the part of the eye under the lid, easiest to see if you gently pull the lower lid down, should also be dark pink. Ferrets squint their eyes when they are experiencing pain, weakness or dehydration. If the eyes lose their shiny appearance it may indicate dehydration. A "glassy" or "far-away" look to the eyes can indicate low blood sugar, pain, shock or central nervous system disease. A yellow cast to the white part of the eye can mean liver disease. A loss of color in the blood vessels of the sclera as well as the appearance of light pink or white conjunctiva can indicate shock, loss of blood or cardiovascular disease. Excessive tear production can indicate generalized pain, foreign material or infection of the eye, corneal ulcers, blocked tear duct, environmental irritant or dental pain.

HYDRATION - Hydration relates to the fluid content of the tissues. **When an animal is dehydrated, body tissues are loosing fluid more rapidly than they are being replaced.** The visible result of dehydration includes a loss of elasticity of the skin and loss of moisture in mucous membranes such as the gums, and conjunctiva. To test for dehydration use the skin over the shoulders or back. Don't use the skin over the neck because it is thicker than other areas of the body and has a tendency to be less elastic naturally and therefore may give a false reading of dehydration. To test for dehydration, grab a piece of skin firmly between your thumb and forefinger and pull it upwards away from the ferret's body. This procedure is called "tenting the skin" because the piece of skin now looks like a little tent. This should not be painful to your pet and you do not need to pull hard. When you release the skin it should immediately return to its normal position. Practice this on your ferret before he/she becomes ill so you can have a sense of what is normal. You can also practice on yourself by pulling up the skin on the back of your hand and then releasing it to get the same effect. If the pet is dehydrated, the skin will return more slowly to its normal position. The more dehydrated the pet, the more slowly the "tent" will return to a flat position. You can time how long it takes for the skin to return to its normal shape by seconds and report that to your veterinarian. Other signs of dehydration, as mentioned under EYES and MOUTH, include dry, "sticky" gums and dry -looking eyes.

PAIN - Ferrets are tough little creatures that tend to hide pain as much as possible and go about their daily life. However there are some specific signs of pain that you should be aware of.

- **Squinting** - Ferrets squint their eyes either in response to a specific painful eye problem or in response to generalized pain. General debilitation and weakness and moderate to severe dehydration can also cause squinting. If your ferret is squinting constantly and doesn't stop when it plays or in response to handling, then there is a problem.

- **Lameness** - Lameness can indicate pain or loss of neurological function in a specific limb. If you touch the affected leg and your pet winces, pulls away quickly, or cries, then it is painful. Ferrets can also exhibit generalized hind limb weakness for a variety of reasons. The most common cause for a hind limb weakness, which is not painful, is when the whole ferret is weak from a systemic disease. For some reason ferrets show generalized weakness in their hind quarters first.

- **Aggression** – A normally docile ferret that suddenly becomes aggressive should be suspected of having a painful condition. This is particularly true if the aggression is associated with touching any part of the body, you should suspect a possible painful condition.

- **Tense abdomen** - Ferrets normally have relaxed abdomens that are easy to palpate. If your ferret is walking around with a tense abdomen or hunched posture, seems touchy or cries when you pick him/her up under the abdomen, it is very likely your pet is feeling some abdominal pain and this could be a serious problem.

- **Rapid breathing –** Ferrets in pain can breathe more rapidly, usually shallow breaths. Rapid breathing, however, can also be a sign of other disease. (See section on Difficult Breathing or Rapid Breathing)

FEVER - Although it is not essential for you to learn to take your ferret's temperature, it is not a difficult procedure to learn if you have an assistant to help. As mentioned previously, ask your veterinarian for assistance in learning the proper technique. The normal body temperature of a ferret ranges somewhere between 100.5 degrees F and 102.5 degrees F. We consider it a fever if the temperature goes over 103 and a serious situation if it goes over 104.5 degrees F.

This information should only be used as a guideline,

HOFA recommends obtaining the advice of a veterinarian.

EMERGENCY SITUATIONS

BLEEDING -The total blood supply of a ferret is about 10% of its body weight. Therefore a ferret that weighs 1000 grams (2.2 lbs.) has about 100 cc (6 tablespoons) of blood. Healthy ferrets can safely lose up to 10% of this volume (10cc or 2 teaspoons) without serious consequence. People often panic when they see blood and they frequently overestimate the volume of the loss. Blood may be soaked into cage papers, bedding or towels and has a tendency to spread out making the actual blood loss appear greater than it is. This does not mean that blood loss is not a serious situation, but if you understand the volume of "safe loss" than it is easier to calmly evaluate the actual severity of the problem.

A ferret that loses more than the "safe" volume of blood will gradually become weak and the mucous membranes including the gums and conjunctiva will become pale. The heart rate becomes very rapid and the pet can also exhibit rapid breathing.

- **Cause** - Blood loss is commonly related to trauma to the skin or nails. However, blood can also be lost through the intestinal tract or respiratory tract due to infection, ulcers, cancer, and trauma or poisoning via vomiting, diarrhea or coughing. **Consider internal blood loss an emergency**. Ulcers, cancer or trauma to the urinary or reproductive tract can cause blood in the urine. Other types of internal bleeding such as rupture of the spleen or liver can only be seen externally as weakness and pale mucous membranes. If the ferret is suffering from a disease that prevents the blood from clotting such as liver disease, hyperestrogenism (females being in "heat" too long) or poisoning, then bleeding can occur from any orifice of the body or small tear in the skin.
- **Action**
  - **The first thing to do with any blood loss is to determine from where it is coming and try to stop it**. If it is external and the wound is small, it may be possible to apply pressure to the area to stop the flow of blood. It is difficult to bandage ferrets unless they are very weak. If your pet is fighting your efforts to bandage a wound, don't persist because the increase in blood pressure caused by the struggle may renew or increase the bleeding. Avoid washing the area if the bleeding has stopped, because a clot may already have formed and removing it will start new bleeding. Use undiluted hydrogen peroxide to clean the wound because it not only is an antiseptic, but it can help slow the flow of blood. If a nail is bleeding, apply styptic powder. Do not apply styptic powder to skin wounds because it can contaminate the wound and will have to be cleaned out at a later date. The presence of blood clots is a good sign because it means the body has the ability to stop the bleeding.
  - **Next evaluate your pet for excessive blood loss by checking the color of the mucous membranes**. Call your veterinarian as soon as you have evaluated the situation. Obtain immediate veterinary attention if the bleeding cannot be stopped, the pet is showing signs of anemia or the bleeding is coming from an internal source. If possible, bring in materials that contain blood such as cage papers or towels. These items are helpful in determining the amount of blood loss.

CHOKING - Ferrets normally make a "choking" or "reverse sneeze" sound that is a cross between a sneeze and a cough. It is quite loud and is often mistaken for a serious problem. This is the ferret's way of clearing foreign material out of its throat. This normal behavior will stop within a few seconds and occur occasionally on a daily basis. Another situation that is often mistaken for choking is when ferrets drool and paw at their mouths. This behavior is caused by such conditions as hypoglycemia (low blood sugar), nausea or foreign material in the mouth. None of these conditions will cause a ferret to suddenly collapse. However, a ferret that is choking because of an obstruction to the trachea (windpipe) will become very weak and collapse in a matter of seconds to minutes. The gums and tongue will be muddy to blue in color and the breathing will be erratic and then cease. This is a dire emergency.

- **Cause** - **Choking is usually due to a partial or complete obstruction to the airway caused by something solid, such as food, or liquid, such as water**. Occasionally it can be caused when a very weak ferret is being hand fed too rapidly. Choking can also be caused by anything that causes inflammation of the airway, thus closing it off, such as an anaphylactic (allergic) reaction, trauma to the trachea or an ingested or inhaled toxin.
- **Action** - If your ferret is choking and has collapsed then hold him/her with the head pointed towards the ground and give a few quick, sharp blows to the back along the upper body to see if the material can be dislodged. You can try to take a look at the back of the throat and see if you can determine if there is something there that can be dislodged. If you can, try to dislodge it by suction with a syringe. If the breathing has stopped, you can try "mouth to nose" resuscitation by holding the mouth shut and blowing into the nose gently. Get in the car and get your ferret to a veterinarian immediately.

Ferrets that are active and alert but still cough or choke excessively need to be examined as well, but it may not be an emergency. You can try to look in the mouth to see if there is a problem being careful to keep your fingers away from the sharp teeth. We had a case of a ferret that swallowed a human hair about 12 inches long and part of the hair was still stuck in the ferret's mouth while the rest was in the stomach. It caused the little guy to cough and gag for some time until we removed it. It was not an emergency, but was certainly annoying to the patient!

DIFFICULTY BREATHING OR RAPID BREATHING - A ferret can have difficulty breathing or rapid breathing but not exhibit any choking or coughing. The breathing may either be shallow or deep. The color of the gums, tongue or conjunctiva is pale pink, muddy or blue. The ferret is usually lethargic and may also have lost its appetite.

- **Cause -** Causes of difficult breathing include cardiac disease, respiratory disease, air in the chest (due to a puncture of the chest wall or puncture of the lung), tumors in the chest, poisoning, blood electrolyte imbalance due to systemic disease (such as liver or kidney disease), neurologic disease and rupture of or pressure on the diaphragm. Severe pain anywhere in the body can also cause rapid breathing.
- **Action – It is an immediate emergency if a ferret is having difficulty breathing and has muddy or blue-colored gums or tongue. Do not administer anything orally to your pet** because the food can easily get into the lungs and worsen the condition. It is better to keep your pet cool (not cold) rather than warm because warm air is more difficult to breath. Check the ferret's vital signs and get veterinary attention immediately.

DROOLING and/or PAWING AT THE MOUTH - Ferrets can exhibit excessive salivation and paw aggressively at their mouths. The saliva may bubble out of the mouth and coat the chin and lower neck.

- **Cause** - The most common cause of this condition is a low blood sugar caused by insulinoma (pancreatic beta cell cancer). The ferret may be drooling because the hypoglycemia causes nausea. Other conditions that can cause nausea include ulcers, foreign bodies and infections of the stomach and some toxins. Another cause of drooling and pawing at the mouth is the presence of foreign material in the mouth such as wire, string, piece of dry food (typically caught in the roof of the mouth) or other foreign object.
- **Action** - If your ferret is drooling or pawing at the mouth, carefully exam the mouth to see if you can identify any foreign objects. Use tweezers or a Q-tip to dislodge the material rather than your fingers. If the material cannot be removed, seek veterinary assistance immediately because general anesthesia is usually needed to remove the material. If there is nothing in the mouth try administering a small amount of honey or Kayro syrup mixed with warm water orally. If the problem is hypoglycemia, the condition should go away in 5 to 15 minutes. Giving the honey will only keep the situation at bay temporarily and your veterinarian should still be consulted **immediately for further instructions.**

EATING A FOREIGN OBJECT - Ferrets, particularly under the age of one, enjoy eating a number of materials around the house, which can potentially lead to an intestinal obstruction.

- **Cause –** Some of the ferret's favorite items to eat are made of foam or latex rubber and include dog or cat toys, stereo speakers, headphones, insides of athletic shoes, children's toys, pipe insulation and rubber bands. Other potentially dangerous items eaten are large pieces of dried fruit or vegetables, which the ferret cannot digest and pieces of towels or cloth. Ferrets have the ability to vomit, but they often do not regurgitate the foreign material they have eaten. **These materials cannot be digested and if large enough they can become wedged in the stomach or anywhere along the intestines and ultimately causes death**. The best way to avoid this problem is to put all tempting items out of the ferret's reach. A ferret that has already developed an intestinal obstruction will become weak, depressed and eventually have seizures and completely collapse. The gums, tongue and conjuctiva will be muddy or pale in color indicating severe shock. In addition, the ferret will be severely dehydrated, breathing rapidly, and may have a bloated, tight abdomen. This is a dire emergency.
- **Action –** If you suspect that your pet has eaten a foreign object but is still active, alert and acting completely normal you may be able to get it to pass by using a lubricating type laxative. Cat hairball laxatives work well and can be found at most pet stores and veterinary clinics. Hairball laxatives are basically a petroleum product with flavoring. Administer up to 3 cc (about 2 inches of paste) three times in 24 hours to help the foreign material pass. Since the ferret intestinal tract is short, you should see results in less than 24 hours. Also make sure the pet is still eating and drinking. You can administer liquid as well in the form of an unsweetened fruit juice or water. If nothing comes through, but your pet is still acting normal, then the foreign material may be retained in the stomach or may nevert have been eaten. Consult your veterinarian for further instructions. **If your pet is exhibiting signs of severe distress such as rapid breathing, depression, and a bloated tight abdomen it is important to not administer anything orally or you may seriously aggravate the condition.** Ferrets in this condition should seek veterinary attention immediately. Ferrets that have a complete intestinal obstruction can die in 24 to 48 hours without medical and surgical attention.

SUDDEN WEAKNESS/UNCONSCIOUSNESS - Sudden weakness or unconsciousness is a serious situation. Weakness can be exhibited as a complete lethargy and inability or reluctance to move or can be exhibited as a loss of balance or unsteady gait.

- **Cause** - Sudden weakness and unconsciousness can be caused by a wide range of conditions including severe anemia, hypoglycemia, pain, high fever, cardiac failure, cancer, partial or complete blockage of the intestinal tract, trauma to the nervous system, kidney disease, liver disease and poisoning to name just a few.
- **Action** - Sudden weakness is an emergency situation, particularly if the weakness is severe. Evaluate your pet's vital signs according to the guidelines listed and call your veterinarian with that information to determine how quickly your pet needs to be seen. Note if there was any possibility for trauma (such as falling, being stepped on, etc.) If you cannot reach a veterinarian immediately, you can try giving some honey or Kayro syrup mixed with warm water orally to see if your pet regains some strength. It is important to tell your veterinarian that you administered these substances and what the results where**. If your ferret is unconscious, do not attempt to give oral medications because your pet will be unable to swallow and may choke**.

SEIZURES - A seizure is caused by abnormal brain activity that leads to unconsciousness followed by varying ranges of body movements. Seizures can range from mild and rapid and almost imperceptible to severe with prominent movement of the extremities and loud vocalizations. Most seizures last only a few seconds, even though it seems like hours when you are watching one, and are not immediately life threatening. However, seizures that persist for several minutes are considered an emergency situation.

- **Cause** - In ferrets two and older, seizures are most commonly caused by severe hypoglycemia caused by insulinoma. Other causes of seizures include head trauma, infection or inflammation of the brain tissue, cancer in the brain, poisons, and blood electrolyte imbalances due to liver disease, kidney disease or intestinal obstructions.
- **Action** - Be very careful when handling a seizuring pet because he/she may inadvertently bite you when thrashing about. Seizuring pets are unconscious and as bad as the seizure may look or sound they are completely unaware of what is going on and do not feel pain. Cover your pet loosely with a towel, which may help to shorten the seizure. Hold the towel-wrapped ferret in your lap and talk to him/her softly until the seizure is over. Gently stroking the ferret may also help, but keep your hands away from the ferret's mouth. It does not help if you become agitated while holding your pet. Most seizures only last a few seconds. Once the seizure is over, the ferret may act dazed and confused for up to an hour afterwards. Evaluate your pet's vital signs and call your veterinarian immediately. If you cannot reach your veterinarian right away and the ferret starts to seizure again, try placing some honey or Kayro syrup diluted with water on the gums. Use a Q-tip rather than your finger to avoid bites. This may help because the most common cause of seizures in ferrets is hypoglycemia. **If the seizure does not stop after a couple of minutes, you have a potentially life-threatening emergency on your hands and you should seek veterinary attention immediately.**

VOMITING/DIARRHEA - Ferrets have a very short digestive tract and food moves through in about 3 to 4 hours from the stomach to the large intestine. Ferrets do have the ability to vomit, but don't tend to do so as regularly as dogs and cats when they eat something disagreeable. **You should seek veterinary attention if the ferret is vomiting or passing diarrhea multiple times over two to three hours, passes blood in the vomit or stool or is exhibiting sudden or increasing weakness along with the vomiting or diarrhea.**

- **Causes** - There are many causes for vomiting and diarrhea in the ferret. The most common are problems related directly to the intestinal tract such as infections, obstructions, cancer, eosinophilic gastroenteritis, sudden changes in the diet or toxins (plants, insecticides, rodenticides, household cleaners, and overdose of medications). Other causes include kidney or liver disease and any systemic disease that causes metabolic changes.
- **Action** – **Do not give a vomiting pet anything orally**. Do not give pets with diarrhea anything orally unless your pet is dehydrated and you have to wait several hours to see a veterinarian. In this case you can give your pet some very dilute honey, Kayro syrup, nonsweetened fruit juice or electrolyte solution such as Gatorade or Pedialyte (found in the baby section of grocery stores) to give your pet some glucose and fluid. Evaluate the vital signs and call your veterinarian for further instructions. **If your pet is noticeably weak or is passing blood in the vomit or diarrhea, seek immediate veterinary attention**. If possible, collect samples of vomit or diarrhea and place them in plastic bags to take to the veterinarian for evaluation.

STRAINING TO URINATE - **Straining to urinate is a serious situation most often caused by a partial or complete blockage of the bladder or urethra**. A bladder that can not be emptied is not only extremely painful, but will ultimately rupture. The ferret will go to the litter box frequently and stand for an abnormally long time trying to urinate with little or no urine being produced. Some ferrets will cry loudly while trying to urinate. The urine passed may be blood tinged, or thick with mucous. This condition can be confused with straining to defecate because ferrets stand in the litter box in a similar stance to either urinate or defecate, and they often perform both functions almost simultaneously. In addition, ferrets that are straining to urinate may actually pass small pieces of soft feces because they are straining so hard, further adding to the confusion. Ferrets are rarely constipated and by far the most common reason to see a ferret, particularly a male, in the litter box straining, is because of an inability to urinate.

- **Cause** - **The most common cause of straining to urinate in the young ferret is an obstruction of the bladder due to bladder stones**. **In the male ferret three or older, the most common cause is obstruction of the bladder due to prostate enlargement, which obstructs the urethra.** Prostate enlargement is a result of adrenal disease in the ferret and this issue will have to be addressed in the treatment plan. Other causes of straining to urinate can be urinary tract infection or inflammation, cancer in the urinary tract, trauma to the urinary tract, post surgical adhesions and internal masses causing pressure on the bladder or urethra.
- **Action** - **The inability to pass urine is an extreme emergency**. Evaluate your pet's vital signs and get veterinary attention immediately. Even though you may note dehydration in your pet, **do not administer any fluids (or food) prior to the veterinary visit**. If the bladder is completely obstructed, any additional fluids given prior to removing the blockage will only increase the amount of urine produced and thus the internal pressure and pain in the bladder.

BROKEN BONES - Broken bones are not common in ferrets compared to other emergencies. Bones are most often broken in the extremities. Spinal and pelvic fractures are uncommon. The ferret will not use the affected limb and may either drag it or hold it up. The ferret will exhibit pain when the fractured area is touched by pulling away, crying out or attempting to bite the handler.

- **Cause** - Most fractures in ferrets are caused by being stepped on or run over by a wheeled object (car, bike, etc.). Other causes are falling, being dropped or fighting with a larger species of animal.
- **Action** - If you suspect that your ferret has a broken bone, put the pet in a small box or carrier to restrict movement. It is better to leave your pet in a container so that he/she can find the most comfortable position rather then holding the pet continuously. Do not attempt to splint the bone because you will cause more damage, stress and pain to the ferret who will aggressively fight your attempts. In rare occasions, the broken bone ends may protrude through the skin. Cover the area, if you can, with sterile gauze and a light wrap, however don't waste too much time in this attempt to avoid undue stress to your pet. Broken bones of the extremities are painful, but not immediately life threatening and should be seen as soon as possible by your veterinarian. Broken bones of the spine, pelvis, ribs or head are much more serious and can be life threatening. Handle your pet as little as possible and get veterinary attention immediately.

This information should only be used as a guideline.

HOFA recommends obtaining the advice of a veterinarian.

SYMPTOM CHART

Eyes

Bulging or swollen eyes	Glaucoma
Runny or watery eyes	Allergy, cold
Pus	Conjunctivitis
Brown crusting	Distemper
White spot or "disk" in eye/s	Cataract
Blindness	Cataract

Mouth

Pale gums	Anemia, low blood pressure
Red, sore or bleeding gums	Tarter buildup; gingivitis
Bluish gray gums	Lack of Oxygen
Blackened teeth	Dead tooth
Dark or stained teeth	Age, tetracycline as kit
Rash on chin and lips	Distemper
Drooling	Insulinoma seizure; poison
Clenched teeth	Insulinoma seizure
Scratching at mouth	Broken tooth, nausea
Vomiting	Foreign body, ulcers, ECE; hairballs; poison
Vomiting blood	Internal hemorrhage
Panting	Heat stroke; severe pain; insulinoma seizure

Nose

Sore on Nose	Infection
Runny nose, sneezing	Runny nose, sneezing
Short, broken whiskers	Poor nutrition, ill health
Dark pink or red	Insulinoma seizure
Bright red	Hypothermia (heat stroke)

Ears

Black inside	Excessive dirt
Black inside, itching	Mites
Yellow	Hepatitis
Bad smell	Excessive dirt; yeast-type infection
Growth	Tumor; infected bite
Loss of hair on ears	Another ferret chewing on them
Deafness	Congenital, Wardenburg's Syndrome (panda pattern); infection

Paws

"Splayed" feet	Housed on wire
Hair loss	Age, adrenal disease
Dry pads	Clay litter
Dark pink pads	Insulinoma seizure
Bright red pads	Hyperthermia (heat stroke)
Rough, thickened pads	Distemper
Roughened, scratched pads	Lost outside for significant period; housed outdoors/dirt/cement
Long quick	Not regularly clipped
Nail torn out	Caught on bedding; on cage wire
Curled toes	Age, weak hindquarters

Legs

Limping	Stepped on
Staggering	Insulinoma; stroke; ear infection
Stiffness	Arthritis; age; over-caged
Weakness in hindquarters	Age; arthritis; low blood sugar; general illness

Tail

Kinked	Previously broken; birth defect
Lump at end	Chondromas
Black spots	Blackheads
Hair loss	Blackheads; age; adrenal disease

Fur & Skin

Dry	Sleeping in litter; poor nutrition; age; general illness
Black spots	Flea dirt
Fur falling out	Seasonal coat change; poor nutrition; stress; flea allergy
Guard hair sparse	Regrowth of coat
Thinning	Age; unnatural light cycle; adrenal disease; in heat or rut
Pattern Loss: At base of tail	Adrenal disease
Along side back	Adrenal disease
Up back	Adrenal disease
"Graying"	Natural silvering pattern; age
Flaking skin	Flea dermatitis; poor nutrition; allergies; over-shampooing
Yellowed	Hepatitis
Reddened, rough skin	Allergies; fleas; sunburn; bites from others
"Pinched" skin stays pinched	Dehydration
Wart-like growths	Skin tumors
Dark brown or black "moles"	Ticks
"Puffy," inflamed areas	Abscess
Sore slow to heal	Diabetes; adrenal disease; cancer

Lungs

Coughing	Cold, heart disease; lymphosarcoma
Wheezing	Allergy; heart disease; pneumonia
Rapid breathing	Heat stroke; pain
Difficult breathing	Heart disease; pneumonia; lymphosarcoma; heartworm

Stomach/Spleen

Stomach distension	Intestinal blockage; heart disease; poison; internal tumor
"Lopsided" abdomen	Enlarged spleen
Hardened area along abdomen	Enlarged spleen
Anorexia	Stomach or mouth ulcers; ECE

Urination/Defacation

Male "dribbling" or crying	Urinary tract blockage; bladder stones; kidney infection; adrenal disease
"Sand" in urine	Bladder stones
Heavy urination &/or excessive thirst	Diabetes; kidney infection
Inability to urinate	Kidney failure; blockage
Inability to defecate	Internal blockage
Diarrhea	Dairy products; food allergies; stress; coccidia; camphobacter
Green diarrhea	Upset stomach; stress; ECE
Dark, tarry stool	Too many raisins; bleeding
Blood in stool	Internal hemorrhage, cancer
Fabric or odd objects in stool	Eating fabric or toys
Frequent, small stool	Poor rectal muscles
Protrusion from anus	Rectal prolapse
Draining area near anus	Anal gland impaction

Reproductive Organs

Bleeding penis	Caught on something
Growth on penis	Tumor
"Dragging" penis across things	Territorial marking; adrenal disease
Swollen vulva	In heat; leftover ovarian tissue; adrenal disease
Pus or discharge from vulva	Infection; adrenal disease

Overall Body

Temperature over 103	Fever
Temperature under 95	Hypothermia; serious illness
Severe anemia	Lengthy heat cycle; internal tumor; severely enlarged spleen
Limp upon awakening	Baby sleep; low blood sugar; insulinoma
Comatose	Insulinoma; stroke
Uncontrollable shivers/tremors	Shock; poison
Convulsions	Insulinoma seizure; epilepsy; poison; shock
Wasting	Cancer; age; internal blockage; internal parasite
Enlarged lymph nodes	Infection; cold/flu; lymphosarcoma
Blood sugar level under 80	Anorexia; insulinoma

Behavior

Fainting	Insulinoma
Lethargy	Anemia; low glucose; age; heart disease; illness
"Listing " to one side	Ear infection; mites; stroke
Walking in circles	Stroke
Excessive grooming	Stress; adrenal disease
Biting when startled	Blind; deaf
Biting other ferrets	Blind; dominance issues
Hopping & leaping	**PLAYING!**

VETERINARIANS THAT TREAT FERRETS

In Central Ohio

Dan Beer, DVM (Vet for HOFA)
Care Pet Clinic
785 E Main St
Columbus, OH 43205
(614) 252-4353
Clinic 1st Sat 9-11am

Animal Care Unlimited
Appts 7 days/week
2665 Billingsley Rd.
Columbus, OH 43235
(614) 766-2317
www.animalcareunlimited.com

Barbara Oglesbee, DVM
Capital Veterinary Referral & Emergency Center
24/7 emergency services (call ahead)
5230 Renner Road
Columbus, OH 43228
(614) 870-0480
www.cvrec.org

Easton Animal Hospital
2959 Selzer Rd
Columbus, OH 43219
(614) 476-0000
www.eastonanimalhospital.com

Diley Hill Animal Emergency Center
Open 24 hours (call ahead after hours)
9695 Basil Western Rd
Canal Winchester, OH 43110
(614) 829-6444
www.dileyvet.com

Alec Land, DVM
Groveport-Canal Animal Hospital
649 Main St
Groveport, OH 43125
(614) 836-3222
www.groveportvet.com

Earl Kittle, DVM, MS
Georgesville Road Animal Hospital
1104 Georgesville Rd
Columbus, OH 43228
(614) 272-0162
www.grah.biz

Wendy K Powell, DVM
The Vet Clinic East
5101 Chatterton Rd
Columbus, OH 43232
614-837-3008
www.vetcliniceast.com

Susan Borders, DVM
Norton Road Veterinary Hospital
1111 Norton Rd
Galloway, OH 43119
(614) 870-7008
nortonroadveterinaryhospital.com

John Gatens, DVM
Obetz Animal Hospital
3999 Alum Creek Dr
Obetz, OH 43207
(614) 491-5676
www.obetzah.com

Nicole Eaton, DVM
Sarah Graham, DVM
Animal Hospital of Polaris
8927 South Old State Road
Lewis Center, OH 43035
(614) 888-4050
www.animalhospitalofpolaris.com

Dawn Keith, DVM
Healthy Pets of Rome Hilliard
2194 Hilliard-Rome Rd
Hilliard, OH 43026
(614) 876-0455
healthypetsofromehilliard.aahavet.org

Thomas Klein, DVM
East Hilliard Veterinary Services
3993 Brown Park Dr
Hilliard, OH 43026
(614) 876-7762
www.easthilliardvet.com

Paul Stephenson, DVM
West Jefferson Animal Hospital
121 E Main St
West Jefferson, OH 43162
(614) 879-8250
www.westjeffersonvet.com

Nancy Rich, DVM
Gahanna Animal Hospital
144 W Johnstown Rd.
Gahanna, OH 43230
(614) 471-2201
www.gahannaanimalhospital.org

Cynthia White, DVM
Town & Country Animal Clinic
4263 E. Broad St.
Whitehall, OH 43213
(614) 235-3453
tcanimalcliniccolumbus.vetsuite.com

Jonathan White, DVM
Indian Creek Vet Hospital
295 Lancaster Ave
Reynoldsburg, OH 43068
(614) 861-1700
www.indiancreekvethosp.com

Jeff Shields, DVM
Cross Creeks Animal Hospital
1540 Cross Creeks Blvd
Pickerington, OH 43143
614-501-9999
www.crosscreeksvet.com

Lee M Nowac, DVM
Sunbury Vet Clinic
491 W Cherry St (Rte 37)
Sunbury, Ohio 43074
(740) 965-4577
www.sunburyvetclinic.com

Thomas A Garey, DVM
Oakside Animal Clinic
339 S. Sandusky St.
Delaware, OH 43015
740-362-8387

Baltimore Veterinary Clinic
8070 Lancaster-Newark Rd
Baltimore, OH 43105
740-862-8363
vaccines & routine care only
www.myvetonline.com/baltimorevcinc

Douglas T Wagner, DVM
Granville Veterinary Clinic
216 S Main St
Granville, OH 43023
(740) 587-1129
www.granvillevet.com

Jere Butcher, DVM
Pleasant Valley Vet Hospital
1710 Otsego Ave.
Coshocton, OH 43812
(740) 622-3376

Neil Bonham, DVM
Lancaster Animal Clinic
1311 River Valley Blvd.
Lancaster, OH 43130
(740) 687-1591
www.lancasteranimalclinic.com

Jessica Williamson, DVM
PetPlex Animal Hospital
4200 Walnut Rd.
Buckeye Lake, OH 43008
www.petplex.net

John Kroner, DVM
Kroner Animal Care
6301 Ervin Rd.
Athens, OH 45701
(740) 592-1982
www.kroneranimalcare.com

PLEASE NOTE: The listing of vets in the Central Ohio area is provided for your convenience. The Heart of Ohio Ferret Association and Rescue does not endorse or guarantee quality, prices or veterinary care of the vets on this list. As always, to provide the best care for your own ferret(s), the decision should be researched and is ultimately your own.