



# Ferrets! Ferrets! Ferrets!

*Symposium vets spend an entire day discussing the domestic ferret*

*by Lori Barber, photos by Patty Asheuer*

What has 240 legs, knows what “*ferreteria*” means in Spanish, and can spot adrenal-related alopecia at 20 paces? The 120 veterinarians who attended the AFA “Management of the Ferret” symposium, of course!

The AFA symposium was a satellite course to the 135th Annual Convention of the American Veterinary Medical Association on July 25 in Baltimore, Md., and continuing education credits were available to the more than 120 veterinarians who attended.

Pamela Slack, DVM, (Alexandria Animal Hospital, Alexandria, Va.) chaired the event, which featured presentations by Judith Bell, DVM, (University of Guelph, Canada); Deborah Kemmerer, DVM, (West End Animal Hospital, Newberry, Fla.); carnivore nutrition specialist Tom Willard, PhD, (Performance Foods, Dayton, Oh.); Tom Kawasaki, DVM, (Woodbridge, Va.); Robert Hoyt, DVM, (National Heart, Lung and Blood Institute, National Institutes of Health, Bethesda, Md.); Susan Erdman, DVM, (Massachusetts Institute of Technology, Boston, Mass.); Mark Finkler, DVM, (Roanoke Animal Hospital, Roanoke, Va.); and Charles Weiss, DVM, (Potomac Animal Hospital, Potomac, Md.). Sally Heber, AFA president, (Shady Hollow Ferret, Thurmont, Md.) also participated in the panel discussions. Copies of the presenters slides and handouts are available in the proceedings published by the AFA (see the AFA Products Order Form in this issue).



*Sally Heber, AFA President*

### **REPRODUCTION/ PERINATAL AND EARLY GROWTH AND DEVELOPMENT**

#### **Panel Chair: Sally Heber**

Judith Bell initiated the “cradle to grave” presentations with a discussion the reproduction, early growth, and development of ferrets. Former chief veterinarian for Marshall’s Farms and a ferret owner, Dr. Bell has likely observed and treated more ferrets than any other veterinarian in the world. Dr. Bell’s obvious

affection for the domestic ferret moved many of the ferret owners in the audience to tears as she closed her presentation with some personal words and photographs of her own ferrets as they grew from cradle to grave.



*Judith Bell, DVM*

Dr. Bell focused her discussion on the breeding and care of pregnant and nursing jills and young kits. According to Dr. Bell,

if a healthy, whole jill is kept in optimum breeding conditions (14 hours of daylight to every 10 hours of darkness), she will come into heat at approximately 4 months of age. If a whole jill receives 8 hours of daylight each day, she should come into heat at approximately 1 year of age. A jill will not come into season if kept in 12-hour light cycles. A jill should remain in heat 9–14 days before being bred (3.5 weeks is too long to wait before breeding) and can be bred twice to increase the litter size. Breeding older jills and breeding for young kits will result in smaller litters.

Pregnant and nursing jills have greatly increased nutritional needs and are prone to pregnancy toxemia, an energy imbalance. It is important to have jills acclimatized to a richer diet before they become pregnant, since ferrets are picky eaters and a jill’s rejection of the more nourishing food can result in many problems with the pregnancy. Ferrets experience a 41–42 day gestation period. Kits are born with a fat pad on their necks that they can use for nutrition for a short time if there are problems with the jill, but Dr. Bell recommended that breeders always breed two jills at the same time in order to have a “back up” in case, among other possible mishaps, a jill rejects or tries to cannibalize her kits or contracts mastitis (which can be transferred to the second jill through the adopted kits). Dr. Bell noted that Gentamicin should never be used in ferrets to treat mastitis.

Five days after birth, a kit’s weight should be doubled. By 3 weeks of age, all male kits should weigh 100 grams and be able to eat solid, moistened food. A kit’s ears and eyes will open at approximately 30 days of age.



Kits are prone to several illnesses. Rotovirus, the “shrinking kit” syndrome, is marked mostly by diarrhea. The diarrhea itself, however, is often not seen because the jill keeps the kits clean. Kits that are not growing steadily and have stiff, shiny fur from constant cleaning should be observed for diarrhea. Kits also can contract a bacteria that causes bulging eyelids that look “froggy.” If the kits’ eyes are still sealed, the eyelids must be opened, drained, and treated. If the kit is less than 3 weeks old, the eyelids will likely reseat.

Young ferrets are also prone to respiratory distresses that can be caused by contracting a human flu or cold virus or by excessively humid air. Although many pet stores keep ferret kits in the area with other “exotics” that need warm, damp air, ferrets fare much better in cool, dry atmospheres.



*Tom Willard, PhD*

Tom Willard of Performance Foods, manufacturer of Totally Ferret, discussed ferret nutrition and gave a nutritional biochemistry refresher course to the attending veterinarians.

Dr. Willard identified and briefly described the nutritional needs of the five stages of a ferret’s life: growth, lactation, gestation, adulthood, and old age. Dr. Willard also emphasized the importance of high quality drinking water for ferrets.

In a question and answer session following his presentation, Dr. Willard discussed his philosophy on providing ferrets with a variety of food and treats. In short, Dr. Willard asserted that treats are useful for training a ferret and encouraging it to bond with its owner but are not needed to provide gastronomical excitement in the ferret’s life. The same is true for providing a ferret with a variety of foods. Ferrets, as most owners know, are very picky eaters because they imprint early on a food source by its smell.

While encouraging a ferret to imprint on more than one kibble can be helpful to an owner if the supply of the preferred kibble is interrupted, Dr. Willard claims that the variety is generally not exciting to a ferret and can cause stomach upset.

So, Dr. Willard advises that instead of hooking a ferret on sugary treats, owners should offer pieces of kibble as rewards and work towards providing an unchanging, dry diet.



*Pamela Slack, DVM*

## THE ADULT FERRET Panel Chair: Pamela Slack, DVM

Deborah Kemmerer, a practicing veterinarian in Newberry, Fla., discussed some of the most common ailments seen in adult and geriatric ferrets (adrenal disease and insulinoma are addressed by Drs. Tom Kawasaki and Charles Weiss).

According to Dr. Kemmerer the most common problem she sees in ferrets under 1 year of age is intestinal blockage. She noted, however, that lymphoma in the gastrointestinal tract can mimic the symptoms of blockage.

ECE (epizootic catarrhal enteritis) is seen frequently, and these ferrets generally must be force fed. Dr. Kemmerer stated that starvation is the most frequent cause of death in ferrets with ECE, noting that most owners do not effectively force feed their ferrets, even when instructed to do so by a veterinarian. Ferrets with ECE should be force fed 20cc of watery food (preferably A/D) 3 times a day. Dr. Kemmerer has used Banamine successfully to stimulate the appetites of ferrets with ECE.



*Deborah Kemmerer, DVM*

Urogenital problems are often seen in conjunction with adrenal disease. Male ferrets may develop prostatic cysts from which the pus must be drained. Pyometras are generally seen in intact ferrets. Granulosis cell tumors can mimic adrenal disease and are fairly common.

Ferrets can also contract helicobacter infections of which the only symptom may be an enlarged spleen. Many gastrointestinal disorders in ferrets are often related to helicobacter infections, and a 6-week course of amoxicillin is recommended treatment for the bacteria. Later in her



# MEDICAL NEWS

presentation, Dr. Kemmerer noted that an enlarged spleen should not be automatically removed during an adrenal operation because the enlarged spleen itself can be a side effect of adrenal disease and the loss of the spleen will inhibit a ferret's ability to make red blood cells.

Cardiac distress in ferrets can be caused by cardiomyopathy, lymphoma, and heartworms. With cardiomyopathy, an enlarged heart may or may not be apparent, but fluid will be present. A practitioner in the mosquito-laden state of Florida, Dr. Kemmerer is considered an expert on the treatment of heartworms in ferrets. (*For more information about the treatment of heartworms in ferrets, read Dr. Kemmerer's article on page 18.*)

According to Dr. Kemmerer, the symptoms of heartworms in ferrets resemble those of dogs more than those of cats, and ferrets are a dead end host for heartworms, i.e., a mosquito that bites a ferret with heartworms and then bites another animal will not pass on the worms to the second animal. Dr. Kemmerer also stated that Immiticide should not be used on ferrets as it kills the worms too quickly, and the ferrets will develop fatal clots. Caparsolate should be used on day 1 of treatment, with Prednisone to help prevent embolus, and cage rest for the animal is an absolute requirement. Because owners are often soft about confining their ferrets to a cage, at her practice Dr. Kemmerer houses the ferrets for one month, giving the owners a reasonable boarding rate, to enforce strict cage rest to aid recovery.

## CLINICAL PATHOLOGY

Tom Kawasaki graciously stepped in to speak for Dr. Bruce Williams who was unable to attend the symposium. Dr. Kawasaki, who has been treating ferrets in Virginia since the 1970s, discussed the clinical pathology of the domestic ferret, citing a vast number of normal and abnormal counts from his own and Dr. Williams' research.



Tom Kawasaki, DVM

One of the most common tests to be performed on pet ferrets is the fasting blood glucose. Dr. Kawasaki noted that a reading of  $>80$  mg/dl is normal;  $60-80$  mg/dl is somewhat low and should be monitored, perhaps treated medically; and  $<60$  mg/dl should be treated surgically. A ferret with persistent hyperglycemia of more than  $500$  mg/dl should be considered diabetic. While too numerous to discuss here, the other valuable data cited by Dr. Kawasaki are available in the proceedings of the symposium published by the AFA.



Robert Hoyt, DVM

## MICROSURGICAL TECHNIQUES

The presentation by Dr. Robert Hoyt of the National Heart, Lung and Blood Institute provided a break from the usual ferret-related topics of nutrition and disease and delved into the postage stamp-sized world of microsurgical techniques. Microsurgical equipment and techniques enable surgeons to repair

tiny blood vessels and nerves in humans and may provide veterinarians an alternative to ligating the vena cava during the removal of a ferret's right adrenal gland.

According to Dr. Hoyt, magnification is the key to success in microsurgery, so a good microscope, preferably one in which two people can look at the same time, is absolutely necessary. Other microsurgical equipment is often borrowed from other medical professions, such as dentistry. Dr. Hoyt discussed the specialized forceps, scissors, and vascular clips used in microsurgery and noted that there are products specially designed for surgeons to use while practicing suturing under a microscope. Dr. Hoyt stated that surgeons must practice the micro techniques not only to hone their surgical skills and to adapt to operating under a microscope but also to develop a posture that will ward off fatigue and prevent contracting "the shakes" in their hands.

## ONCOLOGY

### Panel chair: Mark Finkler

Susan Erdman studies neoplasias in the domestic ferret at the Division of Comparative Medicine at the Massachusetts Institute of Technology and has made some headway into the quagmire of whether lymphoma is a viral disease. Dr. Erdman noted although it is no longer believed that lymphoma in ferrets is related to either the Aleutian disease or feline leukemia viruses, there is still likely a viral source for the disease as her studies are beginning to indicate.



Mark Finkler, DVM

There are many types of lymphomas, including those of the bone and eye. Lymphomas with an accompanying mediastinal mass are generally T cell lymphomas, while gastric lymphomas are usually B cell lymphomas. Gastric lymphomas are not always visible with radiography, but cellular tests



Susan Erdman, DVM

can distinguish between gastritis and lymphoma. Dr. Erdman noted that an enlarged spleen does not necessarily indicate lymphoma in a ferret and can be an effect of, among other things, anesthesia used before surgery. Anemia appears to be a consistent syndrome in ferrets with lymphoma, but the link between the two disorders is unknown.

Dr. Erdman's laboratory performed controlled inoculation studies to investigate the possible viral cause of lymphoma in ferrets. In one study, cells from a ferret known to have lymphoma were cultured and inoculated into eight ferrets at 6 weeks of age. Three of the ferrets received whole cells, three received cell-free material, and two were removed from the study. Four ferrets developed T cell lymphoma after 3 years of age. One ferret developed a greatly enlarged spleen at 6 months of age and developed lymphoma at 2.5 years of age. Dr. Erdman's laboratory will be performing another experiment with cell-free materials to look in the possibility of there being a retroviral link to lymphoma.

Charles Weiss specializes in the care of ferrets at the Potomac Animal Hospital in Potomac, Md. (suburban Washington, D.C.), performs many adrenal neoplasia and pancreatic tumor removal surgeries each year, and has developed a keen eye for the early signs of both diseases.

According to Dr. Weiss, adrenal neoplasia are common in ferrets and should not be mistaken for Cushing's Disease. The classic signs of adrenal neoplasia are alopecia (found in 82% of affected ferrets), vulvular swelling in females, and return to sexual behavior in most males. Dr. Weiss noted that adrenal-related alopecia does not occur on the tail alone and may occur on other parts of the body while not occurring on the tail at all. Other more vague symptoms of adrenal neoplasia are lethargy, muscle atrophy, unusually musky odor, stranguria, and puritis (seen in 15% of affected ferrets).

Because the University of Tennessee Panel does not always indicate existing adrenal neoplasia, and less than 50% of ultrasounds are effective in finding adrenal neoplasia, and drug treatments are not always effective or may have as of yet unknown side effects, surgery is the treatment of choice for adrenal neoplasia. Dr. Weiss found that in a survey conducted in his practice, 80% of adrenalectomies were unilater-

al, 75% of these involving the left adrenal gland. When both adrenal glands are affected, Dr. Weiss generally recommends removing the larger of the two and 60% of the smaller. The vena cava can be ligated, and in cases of very large tumors, it may be found that the tumor has already occluded the vein. Dr. Weiss noted that adrenal neoplasia can also invade the liver lobe.



Charles Weiss, DVM

Dr. Weiss has found insulinoma in approximately 25% of ferrets undergoing surgery for other disorders. These beta cell tumors on the pancreas release excess insulin and are generally found in ferrets more than 3 years old. Symptoms include lethargy, especially deep sleep, staring into space, nausea, hypersalivation, seizures, and fast-

ing blood glucose levels < 40 mg/dl. The pancreatic tumors rarely metastasize but often reoccur after surgery. Post-operative diabetes and pancreatitis are uncommon in ferrets that have undergone insulinoma surgery, and post-surgery prednisone may delay healing and increase the opportunity for secondary infections. (Dr. Weiss' newest research on insulinoma is in press with a major veterinary journal, and we hope to include a summary in a future issue of the *AFR*.)

Mark Finkler concurred with Dr. Weiss' comment that pancreatic tumors often reoccur and stated that he's never seen insulinoma cured by surgery or medication. Until new treatments are found, possibly chemotherapy, owners must simply accept remission of the disease as the best outcome possible. Dr. Finkler has investigated the possible use of Streptocytocin for treating ferrets, but unfortunately, the medication has shown some toxicity.

## DISCUSSION

Following the formal presentations, attendees participated in lively debates covering topics from whether or not ferrets need yearly vaccinations (the medical jury is still out, and AFA recommends that ferrets receive both distemper and rabies vaccines every year), to herbal medicine, to how to treat lymphoma more speedily and aggressively.

Next year's AVMA meeting will be held in New Orleans, La., and local veterinarians are encouraged to contact the AFA to get involved with the planning and production of the symposium.

And finally, a *ferreteria* is a hardware store.