Veterinary medicine®
Essential medicine for exemplary patient care

INCLUDES THE dvm360.com toolkit
Client compliance

December 2014 | Volume 109 | Number 12 | PEER-REVIEWED | dvm360.com

Naturally derived, Naturally easy.

Now from Bayer, Essential 6® spot-on and the Dermoscent® line of skin and coat care products for dogs and cats.

Essential 6® spot-on provides naturally-derived essential oils, essential fatty acids and Vitamin E with a simple, elegant delivery protocol. Essential 6® spot-on can help:

- Restore the skin barrier which may support hydration[1]
- Soothe irritation of dry, flaky skin[2]
- Manage coat texture, luster and odor[3]

Find out how Essential 6® spot-on and the Dermoscent® line of convenient skin and coat care products can appeal to busy pet owners. For more details, see your Bayer sales representative.

Ask about the full line of Dermoscent® products:

Essential 6® spot-on
Essential Mousse
Dermoscent BIO BALM®
ATOP 7® Spray
PYOclean® Wipes

For topical use on dogs or cats only. Do not ingest. Avoid contact with eyes. Keep out of the reach of children. For technical product information or to report adverse events call 1-855-886-7971. For customer service or to place an order call 1-800-633-3796.

[1] Cerrato S, Ramió-Lluch L, Fondevila D, et al. (2013). Effects of Essential Oils and Polyunsaturated Fatty Acids on Canine Skin Equivalents: Skin Lipid Assessment and Morphological Evaluation. *Journal of Veterinary Medicine.*1-9.
[2] Blaskovic M, Rosenkrantz W, Neuber A, et al. (2014). The effect of a spot on formulation containing fatty acids and essential oils on dogs with atopic dermatitis. *The Veterinary Journal.* 199(1):39-43.
[3] Bensignor E, Nagata M, Toomet T. (2010). Preliminary multricentric open study for dermocosmetic evaluation of a spot-on formulation composed of polyunsaturated fatty acids and essential oils on domestic carnivores. *Pratique medicale et chirurgicale de l'animal de compagnie.* 45:53-57.

DVM®

Veterinary medicine®
Essential medicine for exemplary patient care

Mission

Veterinary Medicine is a peer-reviewed journal dedicated to providing concise, credible, and essential information on the most common and crucial clinical problems seen in companion-animal practice.

Subscriber Services: Call (800) 815-3400 in the United States, or (888) 527-7008 or (218) 740-6477 in Canada; fax (218) 740-6417; or write to: *Veterinary Medicine*, 131 W. 1st St., Duluth, MN 55802-2065. If you are unable to connect with the 800 numbers, email fulfill@superfill.com. **Reprint Services:** Call 1-877-652-5295 ext. 121 or email bkolb@wrightsmedia.com. Outside US, UK, direct dial: 281-419-5725. ext. 121 **Back Issues:** Individual copies are available for one year; to order, call (800) 598-6008. Permissions/International Licensing. Call Maureen Cannon at (440) 891-2742. **List Sales:** Please contact List Account Executive Renée Schuster at (440) 891-2613. **Editorial Offices:** Write to 8033 Flint, Lenexa, KS 66214; or call (913) 871-3800. **Visit our websites:** dvm360.com; thecvc.com; industrymatter.com.

Veterinary Medicine (ISSN 8750-7943 print; ISSN 1939-1919 online) is published monthly by Advanstar Communications Inc., 131 West First St., Duluth, MN 55802-2065. One year subscription rates: $60 in the United States and Possessions; $72 in Canada and Mexico; $97 in all other countries. Single issue orders: $18 in the United States and Possessions; $22 in Canada and Mexico; $24 in all other countries. Periodicals postage paid at Duluth, MN 55806 and additional mailing offices. POSTMASTER: Please send address changes to Veterinary Medicine, P.O. Box 6087, Duluth, MN 55806-6087. Canadian GST Number: R-124213133RT001. Publications Mail Agreement Number: 40612608. Return undeliverable Canadian addresses to: IMEX Global Solutions, P.O. Box 25542, London, ON N6C 6B2, Canada. Printed in the U.S.A.

Is the dog bowl half empty or **half full**?

Want to know if your canine patients are more optimistic or pessimistic? Animal welfare studies have long focused on responses to negative stimuli or stress and the avoidance of these influences. However, anticipation of a positive or pleasurable experience may be a better indicator of a dog's state of mind. This has been previously looked at in dogs with separation anxiety that have appeared to demonstrate a higher level of pessimism. An Australian study has looked at methods for potentially more practical means of testing baseline levels of optimism in dogs.

The testing was performed by using a portable apparatus that, when triggered, dispensed a set volume of lactose-free milk or water cued by audible tones. Dogs were recruited from owners, Assistance Dogs Australia, and a private security firm. Only 20 of the 40 dogs initially included in the study were able to complete all three of the testing sessions. Security dogs were excluded the most. Reasons for exclusion included failure to train well to the tones and ceasing to touch the target on cue in

GETTYIMAGES/ELDAD CARIN

See us at these upcoming conferences and learn how you could win* a FREE iPad® mini: NAVC, Booth #339 Gaylord, Jan. 2015, Orlando; WVC, Booth #668, Feb. 2015, Las Vegas; AAHA, Booth #813, Mar. 2015, Tampa; and ACVIM, Booth #320, June 2015, Indianapolis.

*NO PURCHASE NECESSARY. Must be 21 years of age and a licensed veterinarian or registered veterinary technician to be eligible to win. Void where prohibited. See official rules at the Aratana Booth.

1901 Olathe Blvd, Kansas City, Kansas 66103 844-ARATANA info@aratana.com

ARATANA THERAPEUTICS™

further testing phases. Several dogs also appeared to find the milk reward unappealing.

Once the dogs habituated to the environment and equipment, they were trained to touch a target based on a specific audible tone associated with a milk reward and to refrain from touching the target on hearing another tone associated with an allotment of water. Several testing sessions were conducted with the equipment as each dog's response time was recorded. Initially the dogs were presented with a random set of the milk or water tones. During other testing sessions, ambiguous tones were also introduced. Each dog's interpretation of these signals—whether they anticipated a positive or negative result—was reflected in the time taken to touch a target. Eventually, the dogs reached a tipping point where the expectation switched from positive—expecting milk—to negative, taking more time to touch the trigger. How quickly the dogs responded to the tones after this switch was also analyzed.

These results suggest that an accessible means of testing individual dogs for optimism versus pessimism could be used to better match dogs with specific jobs and environments and improve overall quality of life in the future.

Based on latency response times, each dog was assigned to an optimism category:

- Optimistic
- Moderately optimistic
- Balanced
- Moderately pessimistic

The dogs were slower to touch the target as tones got closer to the water tone, yet there were significant differences in the response times between individuals. Some dogs were more likely to touch the target than others, regardless of cue. Less optimistic dogs stopped responding to the tones sooner when touching the targets did not yield a milk reward.

The results suggest that an accessible means of testing individual dogs for this personality trait could be near and could be used to better match dogs with specific jobs and environments and improve overall quality of life in the future. For example, pessimistic dogs make great security or guard dogs, while optimistic ones might be suited for detecting drugs. VM

Starling MJ, Branson N, Cody D, et al. Canine sense and sensibility: tipping points and response latency variability as an optimism index in a canine judgement bias assessment. *PLOS One* 2014;9(9):e107794.

Don't feel like reading?

Listen to this study summary by scanning the QR code above or by visiting **dvm360.com/HYH**.

More Berries for the Buck!

At just **half the cost** per tablet of the leading competitor, **CranMate® Nutritional Supplement** is the cost-effective solution for supporting urinary health in your patients.

- Rich in A-type PACs (proanthocyanidins) and antioxidants
- Enhances natural mechanisms for flushing out harmful bacteria
- Free of unwanted sugars and oxalic acid
- Convenient daily dosing of palatable chewable tablets: 1 tablet per 44 lbs.

Recommend the Best Value in Cranberry Supplements: CranMate®

From the makers of PROIN® (phenylpropanolamine hydrochloride)

PRN PHARMACAL

800.874.9764 • prnpharmacal.com

Getting to the **bottom** of **feline facial dermatitis**

What to do when your client exclaims, "My cat has something wrong with his face!"

By Douglas J. DeBoer, DVM, DACVD

Feline facial dermatoses represent a reasonably common clinical complaint but a wide variety of underlying diseases. Here is an overview of the many disease syndromes that can cause facial dermatitis in cats.

Hear all about it!
Listen to Dr. DeBoer explain how a toothbrush is just the right diagnostic tool for dermatophytosis by scanning the QR code below or by visiting **dvm360.com/CVC14DeBoer**.

Parasites

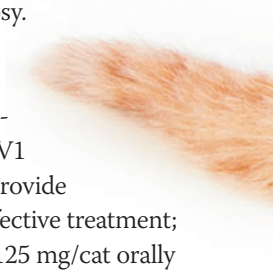
Facial dermatitis related to a parasite is most commonly caused by a mite infestation rather than something more common such as fleas or cheyletiellosis. Feline scabies (*Notoedres cati*) is rare but causes an extremely pruritic dermatitis of the face and neck. One of the newly described *Demodex* species mites, such as *gatoi* or the "unnamed" mite, may cause contagious, pruritic facial dermatitis. These mites are easily found and mostly easily treated.

In the southern United States, cutaneous hypersensitivity reactions to mosquito bites are occasionally seen—typically as ulcerative to plaque-like lesions on the hairless portion of the nose. Although difficult to diagnose at first, these lesions will abate with brief corticosteroid treatment and restriction to indoors.

Infections

Infections are not a common primary cause of dermatitis restricted to the face, with the strong exception of dermatophytosis. Nevertheless, a cytologic examination should be performed to check for any bacterial or yeast overgrowth, which is typically secondary. A Wood's lamp examination and fungal culture are mandatory in all cases of facial dermatitis, no matter the appearance.

The other important infectious cause of facial dermatitis is feline herpesvirus 1 (FHV1). Although rare, this aberrant infection causes severe ulcerative, necrotic erosions to plaque-like lesions on the face that may be mistaken for other diseases such as eosinophilic granuloma. Generally the virus can be found by direct histologic examination, immunohistology, or PCR testing of the biopsy tissue. This is a good example of why it is important for any cat with persistent, rather severe, ulcerative facial dermatitis to undergo a biopsy.



In addition to providing a specific diagnosis, finding FHV1 allows you to provide specific and effective treatment; famciclovir at 125 mg/cat orally b.i.d. for at least 21 days has proved very effective.

Allergic disease

In theory, food, environmental, and insect allergies can all

manifest as facial dermatitis. Of these, a food allergy should be a primary suspect in feline head and neck pruritus. Dietary restriction and provocation trials are mandatory to make a diagnosis.

Pemphigus foliaceus

As the most common autoimmune skin disease in cats, pemphigus foliaceus typically has a strong component of facial distribution, particularly on the bridge of the nose, around the eyes, and on the ear pinnae. Most cats also have involvement of their footpads or nailbeds (caseous paronychia), but this is not always the case. Many cats with pemphigus foliaceus will have a prolonged history of cycles of improvement and worsening clinical signs. The clinical appearance of pemphigus foliaceus is rather dramatic and unusual, but it is important to confirm this disease by performing a biopsy.

There have been reports of pemphigus foliaceus-like disease in cats caused by primary infections, particularly with dermatophytes. Because of the waxing and waning nature of pemphigus foliaceus, you may mistake your empirical treatment for a different disease as successful.

Feline acne

There is much myth and legend about the cause of feline acne. Most cases are probably idiopathic, perhaps with a cause similar to that in people—defective cornification in the follicle or a sebaceous duct leading to plugging with keratinaceous debris and secondary infection. Rarely, a defined cause such as primary bacterial infection or dermatophytosis may be responsible. Causes such as the type of food bowl, food allergy, and failure of chin grooming are much more speculative, and there is no convincing evidence for this pathogenesis.

Treatment relies initially on clearing any secondary bacterial infection with antibiotics and then providing daily facial hygiene with keratolytic topical products (2% to 3% benzoyl peroxide or salicylic acid), which may need to be done periodically on a long-term maintenance basis. For

GETTY IMAGES/MONIKA WISNIEWSKA

recalcitrant cases, I have had success with topical tretinoin gel or cream (0.025% applied twice daily until resolution and then once every one to two days to maintain remission if needed).

"Dirty face" in Persian cats is an uncommon but frustrating idiopathic facial dermatitis that is considered by some to be a more severe form of feline acne. In this disease, comedones and crusts extend beyond the chin area to the facial folds and preauricular areas. Diagnostic evaluations should be performed to rule out definable causes, but most cases are idiopathic, and a genetic alteration may exist in this breed. Therapy is symptomatic, using topical products as for feline acne.

Indolent ulcers

Indolent ("rodent") ulcers appear as well-demarcated ulcers with raised borders present on the margin of the upper or lower lip. Initial diagnosis is generally straightforward, based on clinical appearance and cytology: remove surface debris with a gauze pad to expose the moist underlying tissue, and then take impression smears. Finding eosinophils on cytologic examination is sufficient to make an initial tentative diagnosis. Note that if cocci are also found, especially within the inflammatory cells, first treat the cat with antibiotics since this disease can sometimes reflect an aberrant response to bacterial infection.

In an otherwise healthy young animal, it is acceptable to treat a cat with *one* course of injectable corticosteroids (20 mg methylprednisolone acetate every two weeks for a total of three injections). If the disease is especially severe, recalcitrant, or recurrent, search for an underlying cause (including biopsy with assessment for FHV1 presence), and avoid repeated corticosteroid use. For recalcitrant cases, cyclosporine at 7 to 10 mg/kg once daily until remission, then tapering to a minimum maintenance dose, is often effective. VM

Douglas J. DeBoer, DVM, DACVD
Department of Medical Sciences
School of Veterinary Medicine
University of Wisconsin
Madison, WI 53706

Rapinovet™ (propofol)

Smooth induction.
Quick recovery.
Great value.

For customer service or to place an order, call 1-800-633-3796. For product information, call 1-800-422-9874.

CAUTION: Federal law restricts this drug to use by or on the order of a licensed veterinarian.

WARNINGS: Induction of anesthesia with Rapinovet™ injection is frequently associated with apnea and respiratory depression. Hypotension and oxygen desaturation can occur also, especially following rapid bolus administration. Apnea is observed less frequently following maintenance doses of Rapinovet™ injection when given as the sole maintenance agent, or when a maintenance dose is administered during inhalant anesthesia. To report adverse effects, call 1-800-422-9874.

When using Rapinovet™ injection, patients should be continuously monitored, and facilities for the maintenance of a patent airway, artificial ventilation, and oxygen supplementation must be immediately available. The clinical use of propofol without available supplemental oxygen and artificial ventilation has not been adequately evaluated and is not recommended.

RP141006

See brief summary on page 372.

"Why are my cats *fighting*?"

Feline friends can develop into feline foes overnight, confounding their owners. Help re-establish peace in the household with these management tips.

By Ellen M. Lindell, VMD, DACVB

A sudden onset of aggression between cats in the home can be shocking to cat owners. A traumatic event can trigger aggressive behavior between previously compatible companions. When aggression develops suddenly, the first course of action is to carefully question the owners about any recent changes in routine or any stressful events. A house guest, a small painting project, or a new puppy next door may all seem innocuous yet can trigger serious aggression between resident cats.

When cats present for sudden onset of aggression, examine both the aggressor and victim for an underlying medical cause. Relevant laboratory work may be indicated before concluding that the diagnosis is behavioral.

DEFINING THE PROBLEM

Several types of aggression occur between household cats.

Status-based and territorial aggression

Status-based and territorial aggression may first appear as one of the household cats

GETTY IMAGES/CYNOCLUB

approaches social maturity. A mature cat can be threatening to the original resident cat. The up-and-coming cat may pursue access to valuable resources or may behave aggressively in an apparent attempt to establish an exclusive territory.

Fear-based aggression

A fearful cat quickly becomes a victim, triggering a pursuit. Once the flee-chase-flee cycle is established, it can be difficult to interrupt. Owners should ensure ample safe access to all resources such as food, water, and litter boxes.

Redirected aggression

Redirected aggression occurs when a cat cannot gain access to the primary trigger. Sometimes an external trigger can be identified, such as a stray cat just outside the window. Trapped inside, the house cat cannot access the stray and, instead, directs its aggression toward the companion cat.

Redirected aggression can progress to fear-based aggression. A cat that is the recipient of an unexpected attack is likely to become fearful. When a victim runs away in fear, a flee-chase-flee cycle ensues. On the other hand, some frightened cats assume a more assertive posture, initiating a chase rather than running away.

Since cats in tight social groups routinely rub against each other, thereby distributing "friendly" pheromones, instruct owners to rub their cats' cheeks with a common towel.

TREATMENT STRATEGIES

Environmental modification and management

If the level of aggression or fear is relatively low, environmental modification alone can be therapeutic. Owners should ensure that both cats have easy access to all resources including food, water, and litter boxes. Cat trees and shelves should be available to provide comfortable resting places on all levels.

For most cases, it is important to physically separate the cats when they cannot be supervised until treatment has been completed. This not only reduces the risk of injury but prevents reinforcement of aggression and fear. Be aware that for some cats confinement is stressful and cannot be accomplished without either desensitization or pharmacologic intervention.

It is important to allow each cat plenty of time to explore the entire home. While one cat is confined, the other should be free to roam, and vice versa. Since cats in tight social groups routinely rub against each other, thereby distributing "friendly" pheromones, instruct owners to rub their cats' cheeks with a common towel.

When there is a known inciting event, as is common with redirected aggression, the owners should separate the cats for several days before attempting any reintroduction.

Behavior modification

Systematic desensitization and counterconditioning. For safety during reintroduction, the cats should be exposed to each other through a barrier such as a screen or tall gate. If the cats begin to exhibit friendly posturing, perhaps attempting to gently bat at one another or rub faces, then they are likely to remain friendly. If they hiss or growl or become piloerect, they need to be separated again, and a systematic desensitization and counterconditioning (DSCC) should be started.

To accomplish DSCC, the owners should offer each cat attention and special food initially far from the barrier until the cats appear comfortable. After

Hear all about it!

Listen to Dr. Lindell explain how windows can cause cat fights by scanning the QR code below or by visiting **dvm360.com/CVC14Lindell**.

Additional behavioral issues as clues to diagnosis

While treating intercat aggression, you should identify and manage concurrent behavioral concerns. Examples include anxiety or aggression that may be exhibited in other contexts. Urine marking is a common consequence of intercat aggression. Sometimes, urine marking is the first or even the only sign that suggests there might be friction between household cats.

a few successful sessions, they can move a bit closer together. When a session is over, the cats should go back to their respective confinement areas.

Over time, the cats can be desensitized to each other's activities. For instance, owners can play with the cats to increase activity. DSCC can also be used to reduce the fear of known triggers for aggressive events.

Remind owners to be prepared for an emergency. They may be able to interrupt a fight with a large water gun or a heavy blanket. The plan should be to end all sessions on a positive note.

Response substitution. For social cats with a low level of arousal, response substitution can be used. A cat can learn to exhibit a new response to replace chasing. For example, owners can use clicker training to teach a cat to jump up onto a cat tree. Once this skill has been mastered, the owner can prevent a chase by sending the cat to the tree for a treat.

Pharmacologic intervention

Cats with abnormal levels of anxiety or aggression and cats that exhibit multiple problematic behaviors may benefit from anxiolytic medication. The selective serotonin reuptake inhibitor fluoxetine is well-tolerated and can reduce both anxiety and aggression in many cats. Before prescribing any medication, consider and discuss the risks as well as benefits with the owners. Client understanding and consent are essential since most psychotropic medications are not labeled for use in cats.

FOLLOW THROUGH TO RECONCILIATION

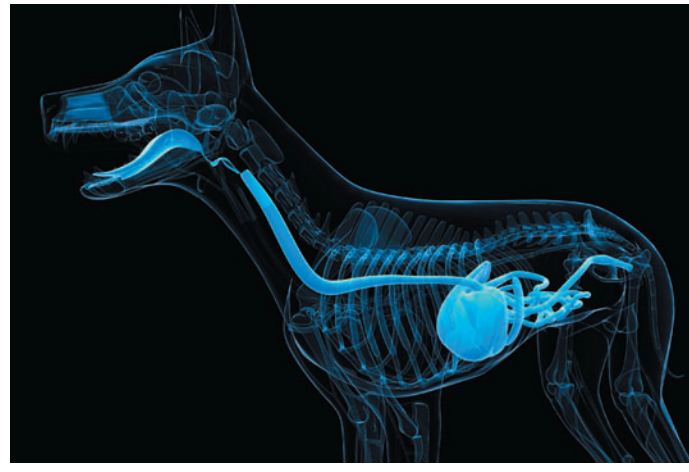
Encourage clients to work slowly but steadily. Many owners are overwhelmed with the task of supervising cats and studying cat postures. Regular follow-up support will encourage them to persevere. Ask owners to return in seven to 10 days for a recheck appointment. This visit will offer an opportunity to address any difficulties with the implementation of either the safety protocol or the behavior modification plan. In many cases, the prognosis for controlling intercat aggression can be good. However, some cats are not compatible and owners should be prepared to enforce a permanent separation if necessary. VM

Ellen M. Lindell, VMD, DACVB
Veterinary Behavior Consultations, PC
Bethel, Connecticut

Practical GI function testing

These tests can help narrow down your differential diagnoses for chronic enteropathies.

By Albert E. Jergens, DVM, PhD, DACVIM



GETTY IMAGES/SCIEPRO

Chronic enteropathies are common in dogs and cats and include adverse reactions to food, idiopathic inflammatory bowel disease (IBD), and antibiotic-responsive diarrhea. While definitive diagnosis often requires collecting mucosal biopsy samples for histopathologic evaluation, noninvasive laboratory tests are useful in diagnosing these disorders and monitoring treatment.

Tests for small intestinal function and disease

Cobalamin

The physiologic mechanism of cobalamin (vitamin B_{12}) is complex and requires a functioning digestive system. Major disorders that interfere with cobalamin uptake include exocrine pancreatic insufficiency, distal or diffuse small intestinal disease, and excessive bacterial utilization of cobalamin associated with bacterial dysbiosis.

Hypocobalaminemia is most often seen with long-standing and severe intestinal disease (IBD, lymphoma, or fungal enteritis) affecting the small intestine. Measuring serum cobalamin concentrations in animals with chronic enteropathies is important since failure to recognize this deficiency may result in delay of clinical recovery. Importantly, low serum cobalamin concentrations have been shown to be a risk factor for negative outcome in dogs with chronic enteropathies, including IBD and protein-losing enteropathy (PLE).[1] If low concentrations are detected, appropriate dosages of cyanocobalamin are typically administered subcutaneously once a week, with serum concentrations reassessed at four- to six-week intervals.

Folate

This water-soluble vitamin (vitamin B_9) is abundant in canine and feline diets, making nutritional deficiencies unlikely. Folate concentrations are typically measured in concert with cobalamin and may provide information indicative of small intestinal dysbiosis or proximal small intestinal mucosal disease. Note that serum folate concentrations may be influenced by bacterial production of folate and are therefore a less sensitive indicator of small intestinal disease than cobalamin.[2]

Citrulline

This amino acid is synthesized predominantly by intestinal enterocytes. Citrulline has been shown to be a marker of functional enterocyte metabolic mass, and preliminary studies have shown plasma citrulline concentrations are significantly decreased in dogs with parvovirus enteritis.[3] Thus, citrulline might serve as a potential marker of spontaneous and acute intestinal dysfunction. However, additional

clinical trials evaluating this marker are warranted.

Evaluation of intestinal protein loss

PLEs are a heterogeneous group of disorders characterized by enteric loss of plasma proteins. Common causes of PLE include inflammatory enteropathies, infectious enteritis, lymphangiectasia, intestinal neoplasia, and marked microbial imbalances. Most animals exhibit the classic clinical signs of emaciation and weight loss, and panhypoproteinemia is often found on laboratory evaluation.

It is important to first rule out other causes of hypoalbuminemia due to glomerular injury and hepatic failure or insufficiency. Definitive diagnosis of PLE requires the collection and histopathologic assessment of mucosal biopsy samples.

Fecal A1-PI

An ELISA assay for the measurement of fecal alpha 1-proteinase inhibitor (A1-PI) has been validated in dogs and may be used to assess protein loss in the gastrointestinal (GI) tract.[4] Because of the cumbersome criteria for collecting multiple fecal samples, the laboratory assessment of A1-PI as a diagnostic test for intestinal protein loss is performed infrequently. This laboratory assay may be most useful in assessing response to therapy in dogs with PLEs.

Serum albumin

Hypoalbuminemia has been associated with a negative outcome in separate canine IBD studies.[1,5] Severe IBD and other chronic enteropathies may predispose patients to hypoalbuminemia due to enteric plasma protein loss as well as nutritional deficiencies and nutrient malabsorption.

One retrospective study found a low serum albumin concentration was associated with a negative outcome (*i.e.* poor clinical response to dietary and drug therapies or euthanasia) in 80 dogs diagnosed with IBD.[5] In my experience, dogs having severe hypoalbuminemia (< 1.5 g/dl) with cavity effusion, salient GI signs, or both are at greater risk for negative outcome (euthanasia).

Intestinal inflammation and damage markers

Several serologic markers for inflammation have been designed to predict the disease course and response to therapy of canine chronic enteropathies.

pANCA

Titers for perinuclear antineutrophil cytoplasmic antibodies (pANCA) have been evaluated as diagnostic markers in canine IBD in separate studies. In one study in 31 dogs, results indicated that pANCA was a highly specific marker for IBD, although the sensitivity of the assay was too low to be of value as a screening test.[6] This immunofluorescence assay was shown to be most useful in detecting dogs with food-responsive enteropathy at the time of diagnosis.

More recently, pANCA was shown to be a highly specific serologic marker vs. antinuclear antibody testing for differentiating IBD from other GI disorders.[7] In addition, other studies have shown that pANCA is of value as a diagnostic marker for familial PLE in soft-coated Wheaten terriers.[8] Unfortunately, this assay is not readily available in North America and is presently limited for use in research investigations.

CRP

C-reactive protein (CRP) is an acute phase protein produced by the liver in response to inflammation. It is a sensitive but nonspecific inflammatory marker shown to correlate with moderate to severe clinical disease activity in canine IBD. This marker is the best-characterized inflammatory marker as no fewer than four different studies have shown that dogs with IBD have heterogeneous serum elevations of this marker.[9]

New studies have evaluated the index of variability for CRP, suggesting that the use of a population-based reference range is not appropriate for evaluating changes in CRP in individual patients. Instead, serial CRP mea-

Hear all about it!

Listen to Dr. Jergens explain why cobalamin status is critical in GI testing by scanning the QR code below or by visiting **dvm360.com/CVC14Jergens**.

View the references for this article online at **dvm360.com/GITesting**.

Discover the science.

Veraflox® (pradofloxacin) Oral Suspension for Cats

Efficacy. Safety. Ease-of-use.

Find out more at www.VerafloxOS.com

CAUTION: Federal law restricts this drug to use by or on the order of a licensed veterinarian. Federal law prohibits the extra label use of this drug in food-producing animals. WARNINGS: For use in cats only. PRECAUTIONS: The safety of pradofloxacin in cats younger than 12 weeks of age has not been evaluated.

See brief summary on page 380.

Veraflox® (pradofloxacin)

Oral Suspension for Cats

Designed specifically for the needs of cats.

surements should be performed and modest changes in serum CRP may indicate the initial severity of GI disease and its alteration from baseline in response to therapeutic intervention.[10]

Fecal calprotectin and other S100A proteins

Calprotectin and S100 A8/A9 and A12 are calcium-binding proteins found predominantly within neutrophils and other immune cells in inflamed mucosa. Fecal concentrations of these proteins have been recently shown to be increased in people and dogs with IBD when compared with healthy controls.[11] Importantly, the S100 A12 fecal marker has greater sensitivity for the detection of intestinal inflammation and has been positively associated with endoscopy and clinical scores.

P-GP

The expression of P-glycoprotein (P-GP) in mucosal lymphocytes has also been investigated and shown to be up-regulated in dogs with IBD treated with prednisolone.[12] This earlier study showed that in dogs with steroid-responsive enteropathy, low P-GP expression was associated with a good therapeutic response.

Practical molecular tools

PARR

Polymerase chain reaction for antigen receptor rearrangements (PARR) amplifies variable T or B cell antigen genes and is used to detect a clonally expanded population of lymphocytes. This molecular technique is useful in differentiating severe mucosal inflammation (severe IBD) from alimentary lymphoma. PARR is often performed when histologic examination and immunophenotyping return ambiguous results.

Data derived from feline studies show that this molecular technique is highly sensitive for differentiating between intestinal lymphoma and IBD.[13] However, further studies are needed to assess this technique's value and sensitivity in dogs.

FISH

Fluorescence in situ hybridization (FISH) is a molecular technique used to identify microbial populations in tissues. FISH analysis has been applied to a variety of GI tissues, including the pancreas, liver, and alimentary tract, in dogs and cats. This technique uses culture-independent analysis of bacterial 16S or 23S rDNA genes targeted by DNA probes tagged with a fluorophore. Bacterial populations are then imaged via fluorescence microscopy. Microbial imbalances in diseased GI tissues (*e.g. Helicobacter* species gastritis, idiopathic IBD, feline cholangitis) in dogs and cats have been demonstrated using FISH techniques.[14,15] Specifically, FISH has identified an association between GI inflammation and a shift in the microbiome by means of bacterial translocation or dysbiosis of mucosa-associated microbial populations.[16] VM

Albert E. Jergens, DVM, PhD, DACVIM
Department of Veterinary Clinical Sciences
College of Veterinary Medicine
Iowa State University
Ames, Iowa

ONE SMALL VIAL FOR ANESTHETIC INDUCTION.

ONE GIANT LEAP FOR ANESTHESIA.

SMOOTH INDUCTION

PREDICTABLE TRANSITION

EXCELLENT MUSCLE RELAXATION

RAPID ONSET

RAPID ELIMINATION

WIDE SAFETY MARGIN

MINIMAL SYSTEMIC EFFECTS

CLEAR-HEADED RECOVERY

Introducing **Alfaxan®** (alfaxalone 10 mg/mL)

A new choice in companion animal anesthetic has landed. Offering smooth, predictable results for all surgical interventions in your practice, Alfaxan® helps to support a stress-free anesthetic procedure for clinic staff as well as repeatable, reliable induction, transition, maintenance and recovery for their patients. That's why it has become the induction agent of choice for many veterinarians around the world. It is one small step that you can take to introduce a new level of care into your anesthesia protocols.

Contact your distributor sales representative or Jurox at 1-844-ALFAXAN to learn how your practice can benefit from this innovation in anesthesia.

INDICATIONS: Alfaxan® is indicated for the induction and maintenance of anesthesia and for induction of anesthesia followed by maintenance with an inhalant anesthetic, in cats and dogs.
Important Alfaxan® Risk Information: Warnings, Precautions and Contraindications: When using alfaxalone, patients should be continuously monitored, and facilities for the maintenance of a patent airway, artificial ventilation, and oxygen supplementation must be immediately available. Alfaxan® does not contain an antimicrobial preservative. Do not use if contamination is suspected. Strict aseptic techniques must be maintained because the vehicle is capable of supporting the rapid growth of microorganisms. Careful monitoring of the patient is necessary due to possibility of rapid arousal. Alfaxan® is contraindicated in cats and dogs with a known sensitivity to alfaxalone or its components, or when general anesthesia and/or sedation are contraindicated. **Adverse Reactions:** The most common side effects of alfaxalone include respiratory and cardiovascular derangements, such as apnea, hypotension and hypertension. Appropriate analgesia should be provided for painful procedures. See brief summary on page 382.

Jurox

Repeatable. Reliable. Relax.
www.alfaxan.com

Alfaxan®
(alfaxalone 10 mg/mL)
Intravenous Injectable Anesthetic

For Animal Use Only **141-342**

Alfaxan® CIV

(alfaxalone 10 mg/mL)

Intravenous injectable anesthetic for use in cats and dogs.

BRIEF SUMMARY OF PRESCRIBING INFORMATION

This summary does not include all the information needed to use Alfaxan® safely and effectively. See full package insert for complete information.

CAUTION:

Federal law restricts this drug to use by or on the order of a licensed veterinarian.

INDICATIONS:

Alfaxan® is indicated for the induction and maintenance of anesthesia and for induction of anesthesia followed by maintenance with an inhalant anesthetic, in cats and dogs.

DOSAGE AND ADMINISTRATION (highlights): Please refer to the complete package insert for full prescribing and administration information before use of this product.

Administer by intravenous injection only. For induction, administer Alfaxan® over approximately 60 seconds or until clinical signs show the onset of anesthesia, titrating administration against the response of the patient. Rapid administration of Alfaxan® may be associated with an increased incidence of cardiorespiratory depression or apnea. Apnea can occur following induction or after the administration of maintenance boluses of Alfaxan®. The use of preanesthetics may reduce the Alfaxan® induction dose. The choice and the amount of phenothiazine, alpha2-adrenoreceptor agonist, benzodiazepine or opioid will influence the response of the patient to an induction dose of Alfaxan®.

When using Alfaxan,® patients should be continuously monitored, and facilities for the maintenance of a patent airway, artificial ventilation, and oxygen supplementation must be immediately available.

Alfaxan® does not contain an antimicrobial preservative. Do not use if contamination is suspected. Strict aseptic techniques must be maintained because the vehicle is capable of supporting the rapid growth of microorganisms. Failure to follow aseptic handling procedures may result in microbial contamination which may cause fever, infection/sepsis, and/or other life-threatening illness.

Once Alfaxan® has been opened, vial contents should be drawn into sterile syringes; each syringe should be prepared for single patient use only. Unused product should be discarded within 6 hours. Alfaxan® should not be mixed with other therapeutic agents prior to administration.

INDUCTION OF GENERAL ANESTHESIA:

CATS: Induction dose guidelines range between 2.2 - 9.7 mg/kg for cats that did not receive a preanesthetic, and between 1.0 - 10.8 mg/kg for cats that received a preanesthetic. The Alfaxan® induction dose in the field study was reduced by 10 - 43%, depending on the combination of preanesthetics (dose sparing effect). To avoid anesthetic overdose, titrate the administration of Alfaxan® against the response of the patient.

DOGS: Induction dose guidelines range between 1.5 - 4.5 mg/kg for dogs that did not receive a preanesthetic, and between 0.2 - 3.5 mg/kg for dogs that received a preanesthetic. The Alfaxan® induction dose in the field study was reduced by 23 - 50% depending on the combination of preanesthetics (dose sparing effect). To avoid anesthetic overdose, titrate the administration of Alfaxan® against the response of the patient.

The average Alfaxan® induction dose rates for healthy cats and dogs given alfaxalone alone, or when alfaxalone is preceded by a preanesthetic, are indicated in species specific tables found in the full package insert. These tables are based on field study results and are for guidance only. The dose and rate for alfaxalone should be based upon patient response.

MAINTENANCE OF GENERAL ANESTHESIA:

CATS: Following induction of anesthesia with Alfaxan® and intubation, anesthesia may be maintained using intermittent Alfaxan® intravenous boluses or an inhalant anesthetic agent. Please review the full package insert for guidance on recommended intermittent doses of Alfaxan and their expected duration of effect. Clinical response may vary, and is determined by the dose, rate of administration, and frequency of maintenance injections.

DOGS: Following induction of anesthesia with Alfaxan® and intubation, anesthesia may be maintained using intermittent Alfaxan® intravenous boluses or an inhalant anesthetic agent. Please review the full package insert for guidance on recommended intermittent doses of Alfaxan and their expected duration of effect. Clinical response may vary, and is determined by the dose, rate of administration, and frequency of maintenance injections.

Alfaxan® maintenance dose sparing is greater in cats and dogs that receive a preanesthetic. Maintenance dose and frequency should be based on the response of the individual patient.

Inhalant anesthetic maintenance of general anesthesia in cats and dogs: Additional low doses of Alfaxan®, similar to a maintenance dose, may be required to facilitate the transition to inhalant maintenance anesthesia.

WARNINGS:

When anesthetized using Alfaxan®, patients should be continuously monitored, and facilities for the maintenance of a patent airway, artificial ventilation, and oxygen supplementation must be immediately available.

Rapid bolus administration or anesthetic overdose may cause cardiorespiratory depression, including hypotension, apnea, hypoxia, or death. Arrhythmias may occur secondary to apnea and hypoxia. In cases of anesthetic overdose, stop Alfaxan® administration and administer treatment as indicated by the patient's clinical signs.

Cardiovascular depression should be treated with plasma expanders, pressor agents, anti-arrhythmic agents or other techniques as appropriate for the treatment of the clinical signs.

HUMAN WARNINGS:

Not for human use. Keep out of the reach of children.
Exercise caution to avoid accidental self-injection. Overdose is likely to cause cardiorespiratory depression (such as hypotension, bradycardia and/or apnea). Remove the individual from the source of exposure and seek medical attention. Respiratory depression should be treated by artificial ventilation and oxygen.

Avoid contact of this product with skin, eyes, and clothes. In case of contact, eyes and skin should be liberally flushed with water for 15 minutes. Consult a physician if irritation persists. In the case of accidental human ingestion, seek medical advice immediately and show the package insert or the label to the physician.

The Material Safety Data Sheet (MSDS) contains more detailed occupational safety information. To report adverse reactions in users or to obtain a copy of the MSDS for this product call 1-844-253-2926.

DRUG ABUSE AND DEPENDENCE:

Controlled Substance: Alfaxan® contains alfaxalone, a neurosteroid anesthetic and a class IV controlled substance.

Abuse: Alfaxalone is a central nervous system depressant that acts on GABA receptor associated chloride channels, similar to the mechanism of action of Schedule IV sedatives such as benzodiazepines (diazepam and midazolam), barbiturates (phenobarbital and methohexital) and fospropofol. In a drug discrimination behavioral test in rats, the effects of alfaxalone were recognized as similar to those of midazolam. These biochemical and behavioral data suggest that alfaxalone has an abuse potential similar to other Schedule IV sedatives. **Physical dependence:** There are no data that assess the ability of alfaxalone to induce physical dependence. However, alfaxalone has a mechanism of action similar to the benzodiazepines and can block the behavioral responses associated with precipitated benzodiazepine withdrawal. Therefore, it is likely that alfaxalone can also produce physical dependence and withdrawal signs similar to that produced by the benzodiazepines. **Psychological dependence:** The ability of alfaxalone to produce psychological dependence is unknown because there are no data on the rewarding properties of the drug from animal self-administration studies or from human abuse potential studies.

PRECAUTIONS:

1. Unpreserved formulation: Alfaxan® injection does not contain an antimicrobial preservative. Do not use if contamination is suspected. Strict aseptic techniques must be maintained because the vehicle is capable of supporting the rapid growth of microorganisms. Failure to follow aseptic handling procedures may result in microbial contamination which may cause fever, infection/sepsis, and/or other life-threatening illness. Any solution remaining in the vial following withdrawal of the required dose should be discarded. Once Alfaxan® has been opened, any unused product should be discarded within 6 hours. Alfaxan® should not be mixed with other therapeutic agents prior to administration.

2. Rapid arousal: Careful monitoring of the patient is necessary due to possibility of rapid arousal.

3. Preanesthesia: Benzodiazepines may be used safely prior to Alfaxan® in the presence of other preanesthetics. However, when a benzodiazepine was used as the sole preanesthetic, excitation occurred in some dogs and cats during Alfaxan® anesthesia and recovery.

4. Apnea: Apnea may occur following administration of an induction dose, a maintenance dose or a dose administered during the transition to inhalant maintenance anesthesia, especially with higher doses and rapid administration. Endotracheal intubation, oxygen supplementation, and intermittent positive pressure ventilation (IPPV) should be administered to treat apnea and associated hypoxemia.

5. Blood Pressure: The myocardial depressive effects of Alfaxan® combined with the vasodilatory effects of inhalant anesthetics can be additive, resulting in hypotension. Preanesthetics may increase the anesthesia effect of Alfaxan® and result in more pronounced changes in systolic, diastolic, and mean arterial blood pressures. Transient hypertension may occur, possibly due to elevated sympathetic activity.

6. Body Temperature: A decrease in body temperature occurs during Alfaxan® anesthesia unless an external heat source is provided. Supplemental heat should be provided to maintain acceptable core body temperature until full recovery.

7. Breeding Animals: Alfaxan® has not been evaluated in pregnant, lactating, and breeding cats. Alfaxalone crosses the placenta, and as with other general anesthetic agents, the administration of alfaxalone may be associated with neonatal depression.

8. Kittens and Puppies: Alfaxan® has not been evaluated in cats less than 4 weeks of age or in dogs less than 10 weeks of age.

9. Compromised or Debilitated Cats and Dogs: The administration of Alfaxan® to debilitated patients or patients with renal disease, hepatic disease, or cardiorespiratory disease has not been evaluated. Doses may need adjustment for geriatric or debilitated patients. Caution should be used in cats or dogs with cardiac, respiratory, renal or hepatic impairment, or in hypovolemic or debilitated cats and dogs, and geriatric animals.

10. Analgesia during anesthesia: Appropriate analgesia should be provided for painful procedures.

ADVERSE REACTIONS:

The primary side effects of alfaxalone are respiratory depression (apnea, bradypnea, hypoxia) and cardiovascular derangements (hypertension, hypotension, tachycardia, bradycardia). Other adverse reactions observed in clinical studies include hypothermia, emesis, unacceptable anesthesia quality, lack of effectiveness, vocalization, paddling, and muscle tremors.

Adverse drug reactions may also be reported to the FDA/CVM at 1-888-FDA-VETS or http://www.fda.gov/AnimalVeterinary/SafetyHealth/ReportaProblem/ucm055305.htm

OVERDOSE:

Rapid administration, accidental overdose, or relative overdose due to inadequate dose sparing of Alfaxan® in the presence of preanesthetics may cause cardiopulmonary depression. Respiratory arrest (apnea) may be observed. In cases of respiratory depression, stop drug administration, establish a patent airway, and initiate assisted or controlled ventilation with pure oxygen. Cardiovascular depression should be treated with plasma expanders, pressor agents, antiarrhythmic agents or other techniques as appropriate for the observed abnormality.

HOW SUPPLIED:

Alfaxan® is supplied in 10 mL single-use vials containing 10 mg alfaxalone per mL.
Manufactured for:
Jurox Inc.
4520 Main Street, Kansas City,
MO 64111, USA
Alfaxan is a registered trademark of Jurox Pty Limited.

US Patent # 7,897,586

4 fundamentals of *superficial* wound healing

Stop infection and speed healing with these wound cleaning and bandaging strategies. *By Jennifer Wardlaw, DVM, MS, DACVS*

1. Prevent further wound contamination.

First and foremost, you must stabilize the patient and assess for other injuries. Also be sure to protect the wound with an occlusive bandage and provide pain relief.

Once you are ready to evaluate the wound, fill it with a water-soluble lubricant. Clip and clean the surrounding area with generously wide margins. Make sure to wear a cap, mask, and gloves to prevent contaminating a wound further or spreading the wound's infection in your hospital. Next, thoroughly lavage the wound to remove foreign material and minimize infection. Up to 90% of bacteria can be removed with proper lavage.

Perform wound lavage with saline or a balanced electrolyte solution. You want to use large quantities under moderate pressure. I like to use lactated Ringer's solution and microwave 1-L bags for one to three minutes to bring the solution closer to the patient's body temperature instead of room temperature to make it more comfortable for the patient. You want to lavage with 7 to 8 psi, which can be achieved by using a 35- or 60-ml syringe with an 18-ga needle. Wait to culture the wound until you have finished your lavage to ensure your results represent the bacteria still in the wound and not what you have already removed.

You can add antiseptic solutions to your lavage, but proper dilutions and usage are important. Povidone-iodine should be diluted to 1:10 or less and may have a residual activity for four to six hours. However, it forms complexes and becomes inactive with organic material and may be absorbed systemically. Chlorhexidine should be made into a 1:40 solution. It has a long residual activity that increases with reapplication, and side effects are rarer compared with povidone-iodine.

2. Débride dead and dying tissue.

Once the wound is thoroughly lavaged, perform débridement to remove the devitalized tissue and foreign bodies. Débridement can be performed surgically, chemically, or mechanically. Surgical débridement can be layered or en bloc, involving complete excision of the wound as with tumor excision. Chemical or enzymatic débridement is typically used in patients that are poor surgical risks or need minimal débridement of an open wound. Mechanical débridement traps devitalized tissue or foreign material in the primary layer of a bandage. This material is removed with each bandage change.

Hear all about it!

Listen to Dr. Wardlaw explain wounds' healing phases by scanning the QR code below or by visiting **dvm360.com/CVC14Wardlaw.**

3. Provide adequate drainage.

Before any wound is bandaged, you must decide whether a drain is indicated. Surgical drains are indicated when dead space cannot be eliminated, fluid accumulation is likely, or infection is present. Disadvantages include an increased risk of infection, and all drains must be bandaged or properly cared for to prevent ascending infections. Drains should not exit through the initial wound or incision, and they should not lie directly under the suture line. Be sure to suture drains to the skin, but best practices discourage tacking buried sutures.

Passive or gravity-dependent drains must be placed ventrally on the wound and have a higher risk of ascending infection. There is *no* advantage to double-exit drains. Active drains, which use a vacuum, can be purchased or created in-house. They drain deeper tissues and are more efficacious with a lower risk of ascending infection. However, active drains may become obstructed.

Knowing when to remove a drain is as important as recognizing when to use one. Typically a drain is removed when the drainage decreases and becomes a transudate (serous or serosanguinous). Most drains are placed for three to seven days. Drains will always produce some fluid because they are foreign material in the body. A drain will cause 1 to 2 ml/kg/day/drain of fluid from its own irritation to the body.

4. Select an appropriate method of closure.

Bandages are used to cover drains and wounds as well as to help with patient comfort, to reduce dead space or edema, to débride wounds, or as vehicles for antiseptics. Bandages consist of three layers—contact or primary, intermediate or secondary, and outer or tertiary.

The contact layer should be sterile and conform to the body contours. This layer must allow drainage to the secondary layer, be nontoxic or nonirritating, and minimize pain. Types of contact layers include dry adherent, wet adherent, and nonadherent. The type of primary layer used on a wound will often change as the wound heals. Numerous options for primary layers with impregnated ointments of medications are available on the market. It is important to remember to use these appropriately as they can result in increased bacterial resistance.

The secondary layer holds drainage, provides support, and decreases dead space. This layer must cover the primary layer completely and be thick enough to absorb all the fluid or drainage from the wound.

The tertiary layer holds the first two layers in place and should be applied with even pressure. Once this layer becomes wet, either from wound fluid or patient contamination, the bandage is useless and must be changed. Always instruct owners to look for slippage and make sure the bandage is clean, dry, and not too tight at least twice a day. VM

Jennifer Wardlaw, DVM, MS, DACVS
Gateway Veterinary Surgery
St. Louis, Missouri

GETTY IMAGES/ANDREW BRET WALLIS

CVC's approach
to the delivery of
continuing education
is so simple it's
unconventional!

THE CONTINUING EDUCATION YOU WANT

- Exceptional programming, led by the industry's most accomplished educators and experts
- A schedule built to maximize your opportunity to earn CE credits

WHERE YOU WANT IT

- Choose an East Coast, West Coast, or Midwestern location to suit your available time and budget
- Each with a convention atmosphere conducive to your learning experience

Try CVC's unconventional, attendee-focused approach to continuing education conventions.

CVC

SAN DIEGO
DECEMBER
4–7, 2014

WASHINGTON DC
APRIL
23–26, 2015

KANSAS CITY
AUGUST
28–31, 2015

CALL 800.255.6864, ext. 6 **CLICK** TheCVC.com **EMAIL** cvc@advanstar.com **FOLLOW**

unconventional

DENTAL PRODUCTS

ANESTHESIA EQUIPMENT

DIAGNOSTIC TESTING

MEDICAL EQUIPMENT

> Human dental patients that have loose teeth describe chewing "like walking on a sprained ankle."
>
> *—Sandra Manfra Marretta, DVM, DACVS, DAVDC*

> The bears I've worked with are real "drug sponges." A long needle helps. No one wants a slightly drowsy grizzly bear.
>
> *—Ryan DeVoe, DVM, MSpVM, DACZM, DABVP (avian, reptile/amphibian practice)*

Looking for Idea Exchange?

It'll be back next month. In the meantime, we need your ideas! Send them to **vm@advanstar.com**.

> Surgical altering reduces a cat's energy needs by 7% to 33%. You may need to reduce the cat food quantity by 20% to 25% after neutering.
>
> *—Margie Scherk, DVM, DABVP (feline practice)*

> I don't recommend that owners of brachycephalic breeds induce emesis at home.
>
> *—Justine Lee, DVM, DACVECC, DABT*

> Three-view thoracic radiographs are now the standard of care.
>
> *—Clifford R. Berry, DVM, DACVR*

> At least 75% of atopic dogs are flea-allergic, so they need good flea control.
>
> *—Ian B. Spiegel, VMD, MHS, DACVD*

Read even more tidbits at dvm360.com /cvc14tidbits. And join us in person in 2015!

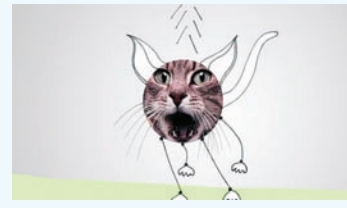
dvm360 Find it all here.

Read the latest Miller online

A pioneer in veterinary behavior

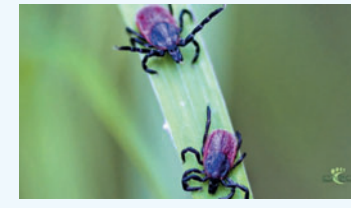
Dr. Robert Miller reflects on the passing of author Bill Campbell. Find this and previous columns by visiting **dvm360.com/Miller**.

Also online …



For your clients: Don't stress out your cat!

dvm360.com/MedicineVideos



CAPC's Tick of the Month: The deer tick

dvm360.com/capc

GETTY IMAGES/YORKIE: NATASHA SIOSS; GRIZZLY: DENNIS DONOHUE

C.E.T.®

From your
CLINIC COUNTER to their KITCHEN COUNTER.

Extend the benefits of in-clinic dental care between visits with proven, professional-grade C.E.T.® Oral Hygiene products.[1–8]

Proper at-home dental care starts with science and ends with compliance. That's why the C.E.T.® Oral Hygiene line offers a range of options backed by clinical data and proven technology that fit easily into your clients' lifestyles.[1–10]

To order, contact your distributor or Virbac representative, or call 800-338-3659.
Visit **www.virbacvet.com/dental** to learn more and download valuable dental resources.

References: 1. Clarke DE. Drinking water additive decreases plaque and calculus accumulation in cats. *J Vet Dent.* 2006;23(2):79–82. **2.** Clarke DE, Kelman M, Perkins N. Effectiveness of a vegetable dental chew on periodontal disease parameters in toy breed dogs. *J Vet Dent.* 2011;28(4):230–235. **3.** Montgomery RE. Aqueous chlorhexidine digluconate extracts from CHX Hextra Rawhide Chews, 2002. Data on file, Virbac Corporation. **4.** Montgomery RE. The salivary peroxidase system. *Dentistry Matters*. 1995;7:1,3. **5.** Gorrell C, Inskeep G, Inskeep T. Benefits of a "dental hygiene chew" on the periodontal health of cats. *J Vet Dent*. 1998;15(3):135–138. **6.** Hennet P. Effectiveness of an enzymatic rawhide dental chew to reduce plaque in beagle dogs. *J Vet Dent*. 2001;18(2):61–64. **7.** Midda M, Cooksey MW. Clinical uses of enzyme-containing dentrifice. *J Clin Periodontal*. 1986;13:950–956. **8.** Pader M. *Oral Hygiene Products and Practice*. New York: Marcel Dekker, Inc.; 1988:318–329. **9.** Montgomery RE, inventor. Proteinaceous animal chew with dentally therapeutic cation. US patent 6,074,662. June 13, 2000. **10.** Montgomery RE, inventor; Oraceutical Innovative Properties LLC, assignee. Proteinaceous animal chew with dentally therapeutic cation. US patent 6,737,077. May 18, 2004.

Virbac

Shaping the future of animal health

GET READY FOR PET DENTAL MONTH

THERE ARE OTHER WAYS THAN BRUSHING

Sometimes brushing isn't an option so Clenz-a-dent™ offers a varity of ways to maintain oral health care with **Rawhide Chews, Dental Sticks and Food Additive** and each are as easy as one, two,

CHEW!

Clenz-a-dent™ Rawhide Chews

The abrasive texture of the rawhide chews help prevent plaque and tarter build up and the palatable poultry flavor makes them a real treat for dogs.

Clenz-a-dent™ Dental Sticks

The abrasive texture of the sticks help keep a dog's teeth clean and their breath fresh.

Clenz-a-dent™ Food Additive

A palatable food additive for cats and dogs. Helps control plaque, tartar and freshen breath. Sprinkle on wet or dry petfood.

Ceva

making happy pet homes

sogeval Shared solutions

www.sogevalus.com | www.ceva.com | 1-800-877-0177