

SAVING PETS' LIVES, 24 HOURS A DAY, 7 DAYS A WEEK

PET POISON HELPLINE



Topical Toxins Poisonous to Pets

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Introduction



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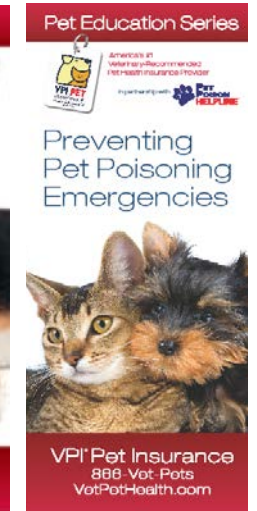
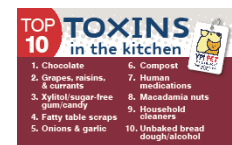
VPI[®] and Pet Poison Helpline[®] working together

- Shared mission in highlighting the importance of preparing for accidents and poisonings in small animals
- Addressing the cost of veterinary care
 - VPI covers the \$39 Pet Poison Helpline fee when a pet is brought in to your hospital for care
- Enabling best medicine
 - Pet owners with VPI Pet Insurance spend twice as much on their pets (single events) than those without VPI Pet Insurance



VPI® and Pet Poison Helpline® working together

- Providing veterinary reviewed pet health information online
 - www.petpoisonhelpline.com/owners
 - www.petinsurance.com/healthzone.aspx
- Providing complimentary pet owner educational materials for your practice - available for ordering:
 - First Aid for Your Pet brochure
 - Poisoning Emergencies brochure
 - Toxins in the Kitchen stickers
 - Toxic Human Meds stickers
 - Emergency Numbers stickers



Pet Poison Helpline

- Animal poison control
 - 24/7 availability
 - **\$39** one-time fee/case
 - Unlimited case follow-up
 - Access to multiple specialists
 - Board-certified veterinary toxicologists (DABVT, DABT)
 - Emergency/Critical Care (2 DACVECCs, ECC resident)
 - Internal Medicine (DACVIM)
 - Herpetology
 - PharmDs/Clinical Pharmacists





How are we different?

- Pet Poison Helpline
 - Staffed by veterinary specialists, veterinarians and veterinary professionals
- SafetyCall International
 - 24/7 human and animal poison control center
 - World's largest industry poison control
 - Staffed by human medical staff and veterinary professionals
- Call volumes
 - 150,000+ calls/year
 - 65% of calls are animal-related





Topical toxins: Why do we care?

- Seem harmless?
- Natural so, therefore, safe?
- Some tubes are *deadly!*



Topical toxins

- Zinc oxide
- Corticosteroid creams
- Triple-antibiotic creams
- Pyrethrins
- Tea tree oil
- Fentanyl
- Nicotine
- The DEADLIEST ONES:
 - 5-FU
 - Calcipotriene

Topical Toxins

- Topical “toxin” examples
 - Creams, ointments, essential oils, ocular medications, parasiticides
- Common routes of exposure
 - Topical:
 - Well-meaning owners
 - Labeled products
 - Oral:
 - Accidental ingestions (chewing into the tube)
 - Chronic ingestion of topically applied products

Expected Outcomes

- **Minor:** Mild and self-limiting clinical signs. Little to no treatment needed.
 - Zinc oxide ointments
 - Steroid ointments
 - Antibiotic ointments
- **Moderate:** Systemic clinical signs requiring medical treatment. Not expected to be life threatening with appropriate care.
 - Tea Tree Oil (melaleuca)
 - Nicotine patches
 - Pyrethrins
 - Fentanyl patches
- **Major:** Will cause signs that, if left untreated, will likely result in permanent organ damage or death.
 - 5-Fluorouracil (5-FU)
 - Salicylates (aspirin)
 - Dovonex (vitamin D₃)



Other than stains on the carpet, there's little to fear.

ZINC OXIDE

Zinc Oxide Ointment: MINOR

- Sources
 - Diaper rash creams (Desitin[®], 20-40%)
 - Generic “skin protectants”
 - Sunscreen
- MOA: Strong gastric irritant (former emetic)
- Elemental zinc toxicity is not expected

Zinc Oxide Ointment: MINOR

- Clinical Signs:
 - Spontaneous vomiting (very common)
 - +/- diarrhea
- Treatment
 - Symptomatic and supportive care
 - Fluid therapy
 - Anti-emetics (e.g., maropitant, etc.)
 - AC unlikely to be effective
 - Do not administer A/C



Zinc Oxide Ointments: The exception

- One Case Report:
 - Elemental zinc toxicosis following *chronic, massive* ingestion of ointment
 - Signalment: 6 yo, MC, 24.6 kg, Shetland sheepdog
 - PC: Rectal mass removal
 - Exposure:
 - Frequent application/ingestion of 40% Desitin[®] cream over 4 days
 - Ingestion of ¾ lbs of cream or 4,000 mg/kg of Zn
 - Clinical Signs:
 - Day 4: Lethargy, hematuria, icterus, ↑serum Zn levels
 - Complete recovery following multiple blood transfusions and aggressive care

Commonly encountered—uncommonly problematic.

STEROIDS AND ANTIBIOTICS

Topical Steroids and Antibiotics: MINOR

- Source:
 - OTC creams/ointments, ophthalmic products
 - Steroids: 1 % hydrocortisone, betamethasone, or triamcinolone
 - Antibiotics: neomycin sulfate, bacitracin, and polymyxin sulfate (i.e. Neosporin[®] and generic “triple antibiotic”)
 - Rule out topical NSAIDs – more dangerous and potent!
- Clinical Signs:
 - GI: mild, self-limiting vomiting and diarrhea
 - Petroleum-based carrier = laxative
 - Renal: possible mild PU/PD

Topical Steroids and Antibiotics: MINOR

- Treatment
 - Symptomatic and supportive care
 - Outpatient therapy
 - Fluid therapy
 - Anti-emetics (e.g., maropitant, ondasetron, etc.)
 - No need to administer A/C

Shake, shiver and roll...

PYRETHRINS & PYRETHROIDS

Pyrethrins/Pyrethroids: MINOR (dog) to MODERATE (cat)

- Common topical canine flea/tick treatment
 - Squeeze-on, 40-45% concentration
 - (Shampoo, powder, home insect sprays, <1%, not an issue)
- Cats are FAR MORE sensitive than dogs!
 - Metabolized via glucuronidation
 - Cats—develop toxicity at 5-10% permethrin
 - Cats who groom dogs are at risk too

Pyrethrins/Pyrethroids: Clinical signs

- **Dogs: often related to paresthesia**
 - Don't confuse with systemic toxicity!
 - Not an "allergic" reaction
 - Clinical signs: agitation, nervousness, skin twitch
 - Typically not primary redness or inflammation (secondary to trauma and pruritis)
 - Vomiting and salivation common with ingestion
- **Cats: systemic toxicity**
 - Facial twitching, ear flicking, whole body "twitches," tremors, seizures

Pyrethrins/Pyrethroids—treatment

- Stabilize, then decontaminate
- Cats
 - Methocarbamol!!
 - High doses OK (150-250 mg/kg)
 - Give IV slow, to effect (oral too slow)
 - Diazepam – typically poor response
 - IV fluids, monitor renal values (if prolonged tremors)
- Dogs
 - Think paresthesia, not systemic toxicity
 - Bathe in cool water (dish soap)
 - Vitamin E oil to application site PRN x 1-3 days

Not your mother's tea party...

TEA TREE (*MELALEUCA*) OIL

Tea Tree Oil (*Melaleuca*): MODERATE

- Source—extract from Australian tea tree leaves
 - Found as 100% oil or diluted into antiseptics, face washes, anti-parasite products
- MOA: Unknown
 - Rapidly absorbed from the skin or GI tract

Tea Tree Oil (*Melaleuca*): MODERATE

- Toxic dose: < 10 mls on dogs or cats
- Clinical signs:
 - Weakness, CNS depression, ataxia, tremors, hypothermia, hepatotoxicity (rare)
 - Characteristic odor on pet's fur!
 - Time to onset: 2-8 hrs
 - Time to resolution: 1-2 days

Tea Tree Oil (*Melaleuca*): MODERATE

- Treatment
 - Decontamination:
 - Bathe with a de-greasing detergent (dish soap)
 - Flush out of ears
 - Activated charcoal
 - Even with *dermal* toxicosis?
 - Supportive care: IV fluids, thermal support, monitor LES
 - Intravenous lipid emulsion (ILE)?



More than just a smoker's buzz.

NICOTINE PATCHES

Nicotine Patches: MODERATE

- Source
 - Brands: Nicoderm[®], Habitrol[®], Leader[®], Nicotinell[®]
 - Each patch: 7-50 mg nicotine
 - 1 unfiltered cigarette: ~12 mg
 - Used patches contain nicotine too
- Toxic dose
 - Canine LD₅₀ (oral): 9-12 mg/kg
- MOA/pharmacology:
 - Binds to nicotinic cholinergic receptors
 - CNS stimulant then depressant
 - Rapidly and completely absorbed from the GIT

Nicotine Patches: MODERATE

- Time Frame
 - Onset of action: 15-60 min
 - Duration of signs: Hours to days
 - GI transit time of patch: 25-57 hours (experimental dogs)
- Clinical Signs
 - Early signs:
 - **GI**: Salivation, vomiting
 - **CNS**: Hyperexcitability, mydriasis, tremors
 - **CARDIAC**: Tachycardia, tachypnea, hypertension
 - Following the hyperexcitable phase, may see seizures and death
 - Delayed: CNS depression, ataxia, respiratory depression

Nicotine Patches: MODERATE

- Treatment
 - Treatment typically focused on clinical signs vs. patch removal
 - If ASX: decontamination:
 - Emesis (if not vomiting)
 - Activated charcoal with a cathartic 1X
 - Supportive care
- **Contraindications** (DO NOT GIVE!)
 - Antacids (may ↑ gastric absorption)
 - No H₂ blockers!



More narc for your buck.

FENTANYL PATCHES

Fentanyl Patches: MODERATE

- 50-100X more potent than morphine
- Patch, when chewed, release drug
- “Spent” patches as up to 84% of original fentanyl

- Source
 - Patch ingestion
 - Iatrogenic toxicity during surgery (heat ↑ excretion)

Fentanyl Patches

- Rapid onset of signs
 - Dogs: Sedation, CNS depression, cardiac/resp depression, miosis, hypothermia
 - Cats: Paradoxical CNS stimulation and mydriasis
- Death due to resp. depression (rare)
- Decontaminate?
 - Emesis:
 - Only if quickly after ingestion
 - If ASX
 - Endoscopic retrieval of patch

Fentanyl Patches: MODERATE

- Opioid reversal: **naloxone**
 - Inexpensive!
 - Dose: 11-44 mcg/kg IV, IM, or SC
 - Repeat, repeat, repeat!
 - Wide margin of safety
- Don't have naloxone?
 - Consider **torbugesic** 0.1 mg/kg IV, IM for partial reversal
- Supportive care
 - Thermal support
 - Treatment for bradycardia
 - Atropine: 0.01-0.02 mg/kg IV, IM
 - Glycopyrrolate: 0.01-0.02 mg/kg IV, IM
 - Ventilation
 - Diazepam for seizures



Took two of these? Call me right away!

SALICYLATES

Salicylates: MODERATE TO MAJOR

- Acetylsalicylic acid (aspirin or ASA):
 - Acne control creams, masks, pads, face washes, and make-up (Clearasil[®], Noxzema[®])
 - Concentration 1-5%
- Methylsalicylate:
 - Linaments (BenGay[®], HEET[®])
 - 18-30%
 - Oil of wintergreen
 - 1mL of oil is equivalent to 1.4 grams of aspirin
 - 1 teaspoon (5 mL) is equivalent to 21.5 adult aspirin tablets (325 mg)!
 - 1 tsp has lead to children's death

Salicylates: MOA/Pharmacology

- Inhibits COX which causes reduction in prostaglandins and thromboxanes
- Irreversible effect on platelet aggregation
- Uncouples oxidative phosphorylation resulting in hyperthermia
- Rapidly absorbed from stomach and upper small intestine
- Excreted via kidneys both by filtration and tubular secretion
- $T_{1/2}$:
 - Dogs = 7.5 to 8 hours
 - Cats = 38-45 hours

Salicylates: Range of toxicity

- Dogs:
 - Up to 75 mg/kg have resulted in signs of GI distress
 - 100-300 mg/kg should be referred to the clinic
 - >300 mg/kg need full and aggressive treatment
 - >400 mg/kg have resulted in death and carry a poor prognosis
 - >500 mg/kg carry an extremely poor prognosis
- Cats:
 - Anything over 25-30 mg/kg is generally felt to be a toxic dose

But do you know how to calculate it?

Salicylates: Clinical signs

- Common (start 4-6 hrs post ingestion)
 - GI—vomiting (hematemesis), melena
 - Hyperthermia
 - Respiratory—tachypnea
 - CNS—lethargy, weakness, depression, ataxia, coma
 - Acid/base—early respiratory alkalosis followed by a severe metabolic acidosis
- Less frequent
 - GI—gastric perforation
 - Hematopoietic—anemia, thrombocytopenia, bone marrow suppression, Heinz bodies (cats)
 - Respiratory—pulmonary edema
 - Renal failure and/or centrilobular liver necrosis

Salicylates: Treatment

- Antidote: None
- Decontamination:
 - Emesis induction?
 - Activated charcoal/cathartic (ACC) X1
- Fluid therapy: IV fluids
 - Maintain renal vasodilatation
- GI protectants x 10-14 days
- Cooling measures (do not cool below 103.5°F)
- Sodium bicarbonate—may increase elimination
- Diazepam for seizures
- Blood or plasma transfusions
- Vitamin K₁ for prolonged coagulation

Better known as “5-FU” ...which is quite close to what you’ll want to say.

5-FLUOROURACIL (5-FU)

5-Fluorouracil (5-FU): MAJOR

- Source
 - Rx anti-neoplastic, 0.5-5%
 - Superficial basal cell carcinomas and actinic keratosis (humans)
 - Limited topical and IV use in veterinary medicine
 - Brand names
 - Efudex[®], Carac[®], ADrucil[®], Fluoroplex[®]

5-Fluorouracil (5-FU): MAJOR

- Inhibits DNA and RNA synthesis and production
- Rapidly absorbed from GIT
- Toxicity:
 - Cats: Even very small amounts may cause CNS signs
 - Dogs:
 - 8.6 mg/kg = minimum reported toxic dose
 - 20 mg/kg = minimum reported lethal dose
 - 46 mg/kg = ONE dog survived this dose!
 - **This is only 1/2 of a 40 gm (5%) tube in a 50 lb dog!**
- Prognosis
 - Cats = grave (any amount)
 - Dogs = guarded to poor, ~25% survival rate

5-Fluorouracil (5-FU): MAJOR

- Onset of action
 - 1-5 hr
 - Death within 7 hours
- Clinical Signs
 - Persistent vomiting
 - Sloughing of the GIT
 - Multi organ failure
 - Severe and non-responsive seizures
 - Dose dependent myelosuppression (pancytopenia)
 - Death

5-Fluorouracil (5-FU): MAJOR

- Treatment
 - **ANTIDOTE:** Uridine triacetate (Orphan Drug, available on a per patient basis)
 - Anecdotally less effective in dogs. More info: ClinicalTrials.gov, type in “5FU overdose”
 - Emesis not typically advised (already symptomatic)
 - Baseline blood work (e.g., CBC, chemistry, venous blood gas)
 - Manage hypovolemia (IV crystalloids)
 - Gastrointestinal support: GI protectants, anti-emetics
 - Seizures—non-responsive to diazepam
 - Aggressive anticonvulsant therapy:
 - Barbiturates, propofol, gas anesthesia
 - If leukopenic ($<1000 \times 10^3 / \mu\text{l}$), consider antibiotics
 - Anxiolytics?
- Monitor
 - CBC every 3-4 days for at least 18 days
 - RBCs, WBCs, platelets continued to drop through day 13
 - Cell lines returned to normal by day 25

Caught between a rock and a hard place.

CALCIPOTRIENE

Calcipotriene: MAJOR

- Source
 - Vitamin D analogue
 - Topical psoriasis treatments
 - Dovonex[®] (calcipotriene) cream or solution
 - 0.005% or 50 mcg/gm
 - Packaged 60 and 120 gram aluminum tubes
 - Taclonex[®] (calcipotriene and betamethasone)
 - Calcipotriene: 50 mcg/gm
 - Betamethasone: 0.5 mg/gm

Calcipotriene: MAJOR

- Promotes calcium retention
 - ↑ Ca and phos absorption from the GIT
 - ↑ Ca reabsorption from the distal tubules
 - ↑ Ca mobilization from the bones

- Toxicity results in
 - Hypercalcemia (total serum calcium and iCa)
 - Hyperphosphatemia
 - Metastatic tissue calcification

- Enterohepatic recirculation occurs

Calcipotriene: MAJOR

- Range of Toxicity
 - Minimum acute toxic dose (dogs): 37 mcg/kg
 - Chronic
 - 3.6 mcg/kg/day x 1 week in dogs=
↑ Ca, ↑ Phos, ↑ BUN & creatinine
 - Cats: unknown but more sensitive

Calcipotriene: MAJOR

- Clinical Signs
 - Onset in 8-24 hrs
 - GI: anorexia, vomiting, +/- GI ulceration
 - CNS: depression, weakness
 - Renal: PU/PD, dehydration, isosthenuria, azotemia
 - Cardiac changes (rare)

Treatment

- Promote calciuresis!
 - Aggressive 0.9% NaCL diuresis
 - Furosemide
 - Dexamethasone or prednisone
- Inhibit bone resorption: Pamidronate (Aredia)
 - Bisphosphonate drug
- Decrease phosphorous:
 - Oral phosphate binders (aluminum hydroxide)
- Gastrointestinal support:
 - GI protectants as needed
 - Anti-emetics
- Antidote: Intravenous lipid emulsion?

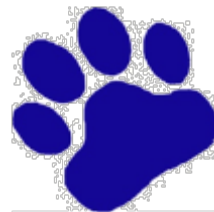
Calcipotriene: MAJOR

- Treat for 2-3 weeks!
- Labs
 - Repeat Ca, phos, BUN, creatinine q 12-24 hours.
 - Phos rises before Ca (indicator of poisoning)
 - Long-term monitoring q. 2-5 days
- Prognosis
 - Good if treatment is started before hypercalcemia
 - Guarded to poor if:
 - Soft tissue mineralization
 - Gastric ulceration
 - Dyspnea (lung mineralization)



When in doubt, call for the bad ones

- Something you're not familiar or comfortable with
- Human drugs
 - Mixed drug ingestions
 - Severe clinical signs
 - Animals with preexisting disease



SAVING PETS' LIVES, 24 HOURS A DAY, 7 DAYS A WEEK

PET POISON HELPLINE



Did you get your “wheel of vomit”?

info@petpoisonhelpline.com

For veterinary clinics only – one per clinic!

WHEEL OF VOMIT

For assistance with a patient, call Pet Poison Helpline at **800-213-6680** 866-VET-4VPI (866-838-4874)

Hydrogen peroxide, 3% (Dosage: 1 ml/kg PO)
Dose listed in ml (FOR DOGS ONLY)

Apomorphine (Dosage: 0.02 mg/kg IV)
Dose listed in mg (FOR DOGS ONLY)

WHEEL OF VOMIT

For assistance with a patient, call Pet Poison Helpline at **800-213-6680** 866-VET-4VPI (866-838-4874)

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Decontamination should only be performed when appropriate. When in doubt, Pet Poison Helpline should be consulted. This calculator should be used as a guideline only. Doses should be based on lean body weight. Please be aware there are ranges in dosing and additional dosing may be necessary.

Dosing for hydrogen peroxide, 3% in dogs: Give 1 ml/kg PO; if no emesis in 5-10 minutes, give 2 ml/kg PO. Do not exceed 5 ml/kg PO total.

When you should not induce emesis: symptomatic patient, risk of aspiration pneumonia, certain toxicants (e.g. hydrocarbons, corrosives, etc).

Emetics that are no longer recommended: syrup of ipecac, salt, mustard.

Activated charcoal is not recommended following ingestion of specific toxicants such as corrosives, ethylene glycol, heavy metals, hydrocarbons, xylitol, paint balls, salt, etc.

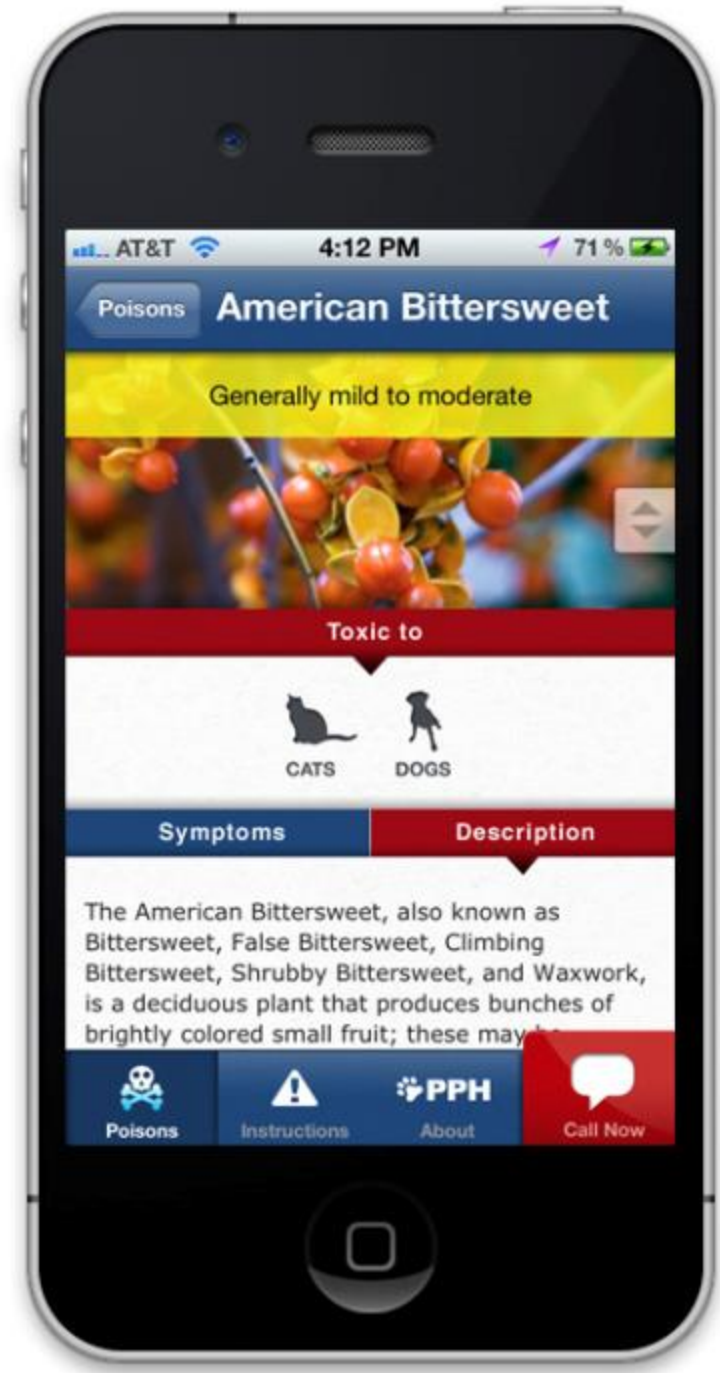
Activated charcoal dose (Dosage: 1 gram/kg PO)
Dose listed in grams (FOR DOG)

Activated charcoal (Dosage: 5 grams/kg PO)
Dose listed in grams (FOR DOG)

WEIGHT OF DOG IN POUNDS

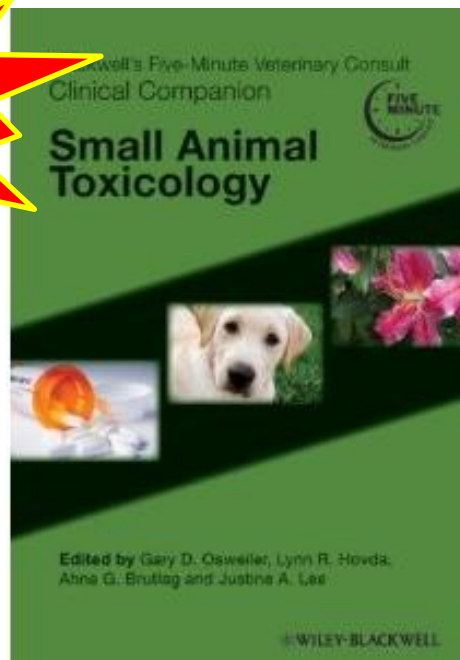
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BABY PRODUCTS POISONOUS TO PETS

Speakers: Justine A. Lee, DVM, DACVECC, DABT
Ahna G. Brutlag, DVM, MS, DABT

Date: April 9, 2013

Time: 12-1 pm CST (1-2pm EST)

TOPICAL TOXINS POISONOUS TO PETS

Speakers: Justine A. Lee, DVM, DACVECC, DABT
Ahna G. Brutlag, DVM, MS, DABT

Date: June 4, 2013

Time: 12-1 pm CST (1-2pm EST)

TOP 10 TOXINS POISONOUS TO SMALL ANIMALS

Speakers: Justine A. Lee, DVM, DACVECC, DABT
Ahna G. Brutlag, DVM, MS, DABT

Date: October 8, 2013

Time: 12-1 pm CST (1-2pm EST)

HOLIDAY DANGERS POISONOUS TO PETS

Speakers: Justine A. Lee, DVM, DACVECC, DABT
Ahna G. Brutlag, DVM, MS, DABT

Date: December 3, 2013

Time: 12-1 pm CST (1-2pm EST)

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