

## Top 15 Feline Poisons

*Tina Wismer, DVM, DABVT, DABT  
ASPCA Animal Poison Control Center*

*Justine A. Lee, DVM, DACVECC, DABT  
CEO, VETgirl*




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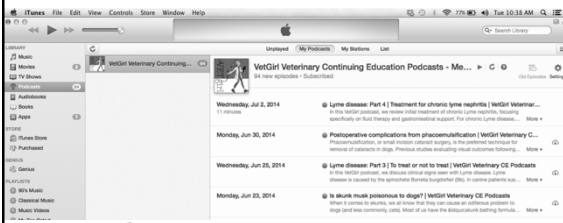


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## Introduction

Justine A. Lee, DVM,  
DACVECC, DABT  
CEO, VETgirl






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## Introduction

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## Top 15 Feline Poisons

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CEO, VETgirl*

Dog or Cat



≠

Small Human

Cat



≠

Small Dog



## Feline Exposures

- ◆ 10.7% of all APCC cases
  - Dogs = 88.2%
- ◆ Most common:
  - Insecticides
  - Human medications
  - Plants



## The Difference between Cats & Dogs

- ◆ Chewers (cats) vs gulpers (dogs)
  - Esp. dogs
    - ◆ 'potato chip' mentality
  - Taste buds
  - Grooming behavior



## Cats love....

- ◆ Chewables
- ◆ Pill pockets

## Species Differences - Metabolism

- ◆ Metabolic processes evolved to allow individual species to handle various components of their diet
  - Animals with more restricted diets (true carnivores – cats) evolved fewer biotransformation pathways than those with a more diverse diet (herbivores, omnivores)
  - Problem when animals encounter a xenobiotic that requires a biotransformation pathway they do not possess

## Metabolism: Phase II Reactions

- ◆ Glucuronidation
  - "Defective" in cats
    - Cats UDP-glucuronosyltransferase encoded by a pseudogene and is dysfunctional
    - Cats cannot glucuronidate phenols, naphthols, morphine, acetaminophen, aspirin, etc.
- ◆ Sulfation
  - Poor in cats



## What is so special about cats?

- ◆ More selective eating habits
- ◆ Grooming behavior
- ◆ Concentrated urine
- ◆ Readily vomit (when they want to)



## What is so special about cats?

- ◆ Eight reactive sulfhydryl groups on hemoglobin
  - Increased susceptibility of RBC to oxidative damage
    - Forms Heinz bodies and methemoglobinemia
    - Very sensitive to aniline dyes, onions/garlic, acetaminophen, benzocaine
- ◆ Short RBC life span (66-79 d)



## TOP 15 FELINE TOXINS...



## How We Induce Emesis: Cats

- ◆ **No H<sub>2</sub>O<sub>2</sub> or apomorphine!**
  - Hemorrhagic gastritis 25%
  - Ineffective
- ◆ **Xylazine**
  - Dose: 0.44 mg/kg, IM
  - Have yohimbine antidote on hand!
  - CONS:
    - Doesn't work
    - Excessive sedation
    - Cardiovascular collapse



## Other options?

- Dexmedetomidine
  - 0.1 ml IM
  - 1-2 mcg/kg IV
  - Sedation dose: 40 mcg/kg IM
- Sedation:
  - Hydromorphone 0.05 mg/kg SQ
  - Midazolam 0.2 mg/kg SQ
- Fast boluses of random?
  - Cefazolin
  - Morphine
  - Famotidine

**Apomorphine**



## THE POISONS...



## Glo Jewelry

- ◆ Dibutyl phthalate
- ◆ Unpleasant taste
- ◆ Clinical signs: drooling, hyperactivity, head shaking
- ◆ Treatment: taste treat and wipe off any liquid; use dark room to find



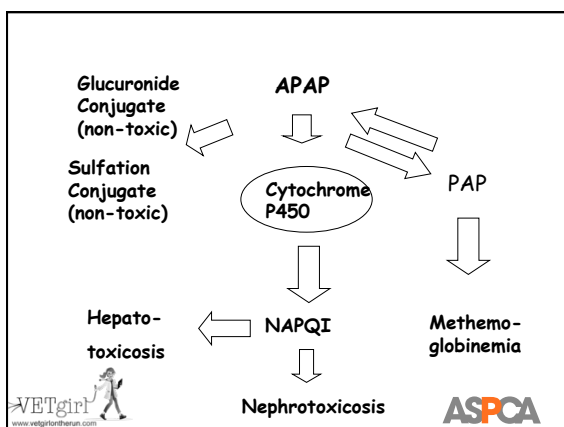
## Acetaminophen

- ◆ Analgesic, antipyretic, mild anti-inflammatory
- ◆ Exact mechanism of action is unknown
  - Believed to block production of prostaglandins from arachidonic acid by inhibiting COX-3
- ◆ Forms:
  - Tablets: 80-650 mg
  - Liquid: 32-100 mg/ml



## Acetaminophen

- ◆ Rapidly absorbed from the GI tract
- ◆ Peak plasma levels
  - 10-60 min for regular products
  - 60-120 min for extended release forms
- ◆ Uniformly distributed into most body tissues
  - Highest concentration in the peri-portal zone of the liver and renal medulla



## Acetaminophen - Cats

- ◆ There is no safe acetaminophen dose for cats
  - Deficient in glucuronyl transferase
  - 10 mg/kg has produced signs of toxicity



## Liver necrosis

- ◆ NAPQI binds to sulfhydryl groups on cell membranes
  - If glutathione is present, it can conjugate and neutralize the NAPQI
  - Cell necrosis
- ◆ Central lobular necrosis
  - Higher concentration of cytochrome P-450 and associated enzymes
  - Less common in cats than in dogs



## Methemoglobinemia

- ◆ Mucous membranes appear muddy or brown in color
  - Accompanied by tachycardia, tachypnea, weakness, and lethargy



## Acetaminophen: Other Clinical Signs

- ◆ Depression
- ◆ Facial or paw edema
- ◆ Hypothermia
- ◆ Vomiting
- ◆ Death



## Diagnosis

- ◆ Exposure history
- ◆ Clinical signs
- ◆ Qualitative acetaminophen plasma levels can confirm exposure
  - Human hospital
  - 4 hours post exposure
  - Not sensitive enough for cats



## Decontamination

- ◆ Early decontamination is most beneficial
  - Emesis
  - Activated charcoal and cathartic
    - enterohepatic recirculation
  - Monitor for methemoglobinemia
    - In cats, methemoglobin values increase within 2-4 hours, followed by Heinz body formation



## Acetaminophen: Treatment

- ◆ N-acetylcysteine (Mucomyst®)
  - Precursor in the synthesis of glutathione
  - Can be oxidized to organic sulfate needed for the sulfation pathway
  - Provides an alternate substrate for conjugation to reduce the extent of liver injury or methemoglobinemia



### Treatment

- ◆ NAC is available in 10% and 20% solutions
- ◆ Loading dose: 140 mg/kg
  - Dilute to 5% concentration in 5% Dextrose or sterile water
- ◆ 70 mg/kg QID for 7 treatments
  - 12 to 17 doses
  - 280 mg/kg loading dose



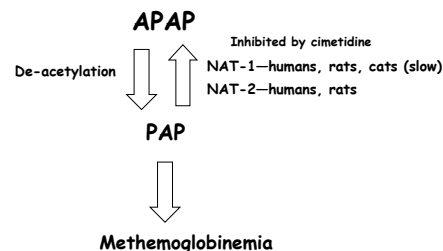
### Treatment

- ◆ Oral NAC
  - Nausea and vomiting
  - 2-3 hour wait between activated charcoal and PO NAC (activated charcoal will bind)
- ◆ IV NAC
  - Also dilute to 5%
  - Give slow IV over 15 to 20 minutes



### Treatment

- ◆ IV fluids
- ◆ Oxygen/whole blood
- ◆ Monitor liver enzymes
- ◆ Ascorbic acid ??
  - Helps with reduction of methb back to hb
  - Questionable efficacy, may irritate the stomach
- ◆ Cimetidine ??
  - Inhibits cytochrome p-450 oxidation system
  - NOT in cats!!



### Treatment

- ◆ S-adenosylmethionine (SAME, Denosyl®)
  - 20 mg/kg/day



### Prognosis

- ◆ Good if treated promptly
  - severe signs of methemoglobinemia or hepatic damage have poor to guarded prognosis
- ◆ Clinical signs of methemoglobinemia may last 3-4 days
- ◆ Hepatic injury may not resolve for several weeks





### Drugs that affect serotonin

- ◆ SSRI
- ◆ Amphetamines






### Serotonin (5-hydroxytryptamine)

- ◆ Precursor of melatonin
- ◆ Regulation of:
  - aggression
  - motor control
  - pain perception
  - cardiorespiratory function
- personality
- sleep
- body temperature
- sexual function

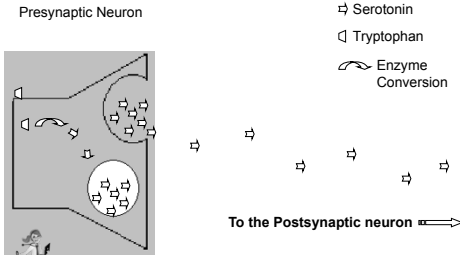



### Serotonin (5-hydroxytryptamine)

- ◆ Inhibits excitatory neurotransmission in CNS
- ◆ Stimulates constriction of peripheral smooth muscle
  - Gastrointestinal tract
  - Bronchi and bronchioles
  - Arteries and arterioles
  - Uterus
- ◆ Promotes platelet aggregation



### Normal Serotonin Metabolism



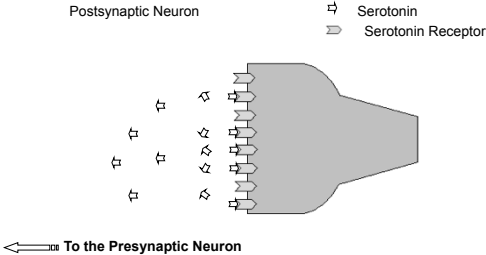
Presynaptic Neuron

- ⇨ Serotonin
- ◻ Tryptophan
- ⤵ Enzyme Conversion

To the Postsynaptic neuron ⇨


### Normal Serotonin Metabolism



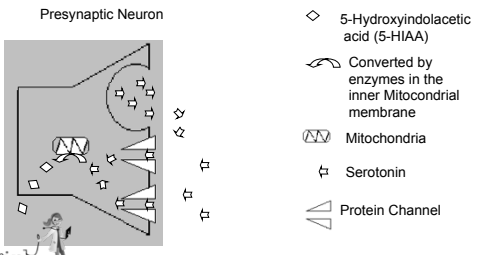
Postsynaptic Neuron

- ⇨ Serotonin
- Serotonin Receptor

← To the Presynaptic Neuron





### Normal Serotonin Metabolism



Presynaptic Neuron

- ◇ 5-Hydroxyindolacetic acid (5-HIAA)
- ⤵ Converted by enzymes in the inner Mitochondrial membrane
- Ⓜ Mitochondria
- ⇨ Serotonin
- ◁ Protein Channel

## Serotonin Syndrome

- ◆ A complex group of clinical signs resulting from the over stimulation of serotonin receptors
  - CNS effects (dementia, disorientation, agitation, seizures)
  - Autonomic effects (salivation, vomiting, diarrhea, hyperthermia, hyper/hypotension, mydriasis)
  - Neuromuscular effects (rigidity, hyperreflexia, ataxia, tremors)

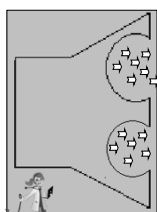


## Serotonin Syndrome

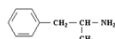
- Mydriasis
- Vomiting
- Tremors
- Tachycardia
- Ataxia
- Agitation



## Drugs That Increase Serotonin Release



Amphetamines



$C_9H_{11}N$

Examples:

- Cylert
- Ritalin
- Dexedrine
- Adderall

Also:

- Cocaine

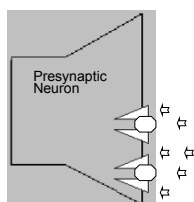


## Mechanisms of Serotonin Syndrome

- ◆ Inhibits reuptake of serotonin
  - SSRIs
  - TCAs
  - amphetamines
  - cocaine
  - dextromethorphan
  - meperidine



## Selective Serotonin Reuptake Inhibitors (SSRI)



Block re-uptake of serotonin

sertraline

fluoxetine

Also:

- Fluvoxamine
- Nefazodone
- Trazodone
- Venlafaxine

paroxetine



## Treatment

- ◆ + Activated charcoal
- ◆ Fluids
- ◆ Methocarbamol
- ◆ Cyproheptadine
- ◆ Acepromazine
- ◆ Diazepam (not with amphetamines)



## Venlafaxine (Effexor®)

- ◆ Bicyclic antidepressant
  - immediate release and extended release medication
- ◆ Potent serotonin and noradrenaline reuptake inhibitor
- ◆ Cats love capsules



## Vyvanse® (lisdexamphetamine)

- ◆ Treat ADHD in children
- ◆ Prodrug of dextroamphetamine
  - 20, 30, 40, 50, 60 and 70 mg capsules
- ◆ Cats are attracted to this medication



## Lisdexamphetamine

- ◆ Same signs as other amphetamines
  - Hyperactivity, tremors, tachypnea, tachycardia, vomiting, hypertension, hyperthermia, seizures
- ◆ Treat with acepromazine, fluids, etc.



## Liquid potpourri

- ◆ Essential oils/cationic detergents
- ◆ High concentrations only
- ◆ Cats only
- ◆ Clinical signs:
  - Corrosive injury (e.g., drooling, ulcers)
  - Ataxia
  - Dyspnea/tachypnea → pulmonary edema/ARDS
  - Acute hepatic failure



## Liquid potpourri

- ◆ Treatment:
  - Dermal decontamination
  - Fluid therapy
  - Gastrointestinal protectants
  - Monitoring LFT



## Corrosive Agents: Acids

- ◆ Toilet bowl cleaners, anti-rust compounds, automotive batteries, pool sanitizers, etc.
- ◆ Coagulative necrosis of tissue
- ◆ Pain may limit exposure
- ◆ Esophageal damage less likely



### Corrosive Agents: Acids

- ◆ Oral pain, salivation, dysphagia, vomiting, oral/esophageal/gastric ulceration, abdominal pain
- ◆ Dermal irritation or ulceration
- ◆ Corneal erosion or ulceration
- ◆ Pulmonary irritation



### Corrosive Agents: Alkalis

- ◆ Drain openers, automatic dishwasher detergents, batteries, toilet bowl cleaners, swimming pool products, radiator flushes
- ◆ pH > 11
- ◆ Liquefactive necrosis of tissues
- ◆ Deep penetration into tissue
- ◆ Initial pain may be minimal



### Corrosive Agents: Alkalis

- ◆ Onset of signs may be delayed
- ◆ Depression, salivation, anorexia, oral ulceration, dysphagia, vomiting, abdominal pain, melena
- ◆ Hyperthermia may be pronounced
- ◆ Esophageal ulceration possible
- ◆ Inhalation injury possible



### Corrosive Agents: Cationic Detergents

- ◆ Quaternary ammonium compounds
  - Benzalkonium and benzethonium chlorides
- ◆ Pyridinium compounds
  - Cetylpyridinium and cetrimonium chloride
- ◆ Quinolinium compounds
  - Dequalinium chloride



### Corrosive Agents: Cationic Detergents

- ◆ Disinfectants and sanitizers
  - Rocal, KennelSol, Barbacide
- ◆ Algaecides
- ◆ Simmering liquid potpourri
- ◆ Fabric softeners
- ◆ Corrosive injury at 2% or less



### Corrosive Agents: Cationic Detergents

- ◆ Cats are especially sensitive
- ◆ Local injury resembles alkaline corrosive injury
- ◆ Can see systemic effects



## Corrosive Agents

- ◆ Do NOT attempt to neutralize
- ◆ Do NOT attempt emesis or lavage
- ◆ Do NOT administer activated charcoal



## Corrosive Agents

- ◆ Immediate dilution with milk or water
- ◆ Sucralfate slurries
- ◆ Pain medication
- ◆ Supportive care
- ◆ Gastrostomy tube



## Corrosive Agents: Cationic Detergents

- ◆ Manage corrosive injury
- ◆ Symptomatic treatment
  - IV fluids
  - Diazepam
  - Correct acid/base imbalance



## “Well it has green leaves” ...

- ◆ Plant identification is always a big problem
  - Many different common names
  - Same common name for different plants
- ◆ Even “non-toxic” plant material may cause mild GI upset if ingested
- ◆ Animals ingesting water in reservoir of houseplant may also ingest toxic principle of plant (e.g. cardiac glycosides) or systemic insecticide from soil



## Insoluble Calcium Oxalates

- ◆ Found in many common houseplants
- ◆ Shiny, thick green leaves



## Insoluble calcium oxalate-containing plants

- ◆ Calcium Oxalate Raphides (Crystals)
  - Raphides shoot out of the idioblast when cell is disturbed (chewing)
  - Raphides penetrate the oral/GI mucosae causing damage



*Philodendron* spp.

- ◆ Philodendron
- ◆ Panda plant
- ◆ Parlor ivy



*Dieffenbachia* spp.

- ◆ Dumbcane
- ◆ Dieffenbachia



*Aglaonema* spp.

- ◆ Chinese evergreen
- ◆ Silver evergreen



*Caladium* spp.

- ◆ Caladium
- ◆ Heart-of-jesus



*Monstera deliciosa*

- ◆ Swiss cheese plant
- ◆ Split leaf philodendron
- ◆ Lacy-leafed philodendron



*Spathiphyllum* spp.

- ◆ Peace lily
- ◆ White anthurium
- ◆ Mauna loa
- ◆ Spathe flower



*Epipremnum areum*

- ◆ Pothos
- ◆ Heartleaf vine
- ◆ House ivy
- ◆ Devil's ivy

*Schefflera* spp.

- ◆ Umbrella plant
- ◆ Schefflera

*Zantedeschia* spp.

- ◆ Cala lily
- ◆ Arum lily
- ◆ Trumpet lily



## Insoluble calcium oxalate-containing plants

- ◆ Many others
  - *Alocasia antiquorum* Elephant's ear
  - *Anthurium* spp. Flamingo plant
  - *Arum* spp. Jack in the pulpit
  - *Calla palustris* Wild Calla
  - *Syngonium podophyllum* Arrowhead plant



## Insoluble calcium oxalate-containing plants

- ◆ Oral irritation, drooling, gagging, vomiting, vocalization
- ◆ Usually self limiting
- ◆ Swelling of oral cavity or difficulty breathing
  - Life threatening problems are rare
- ◆ Treatment
  - Milk or yogurt
  - GI protectants, antiemetics
  - Tracheostomy



## Heartworm Medications

- ◆ Chewables
- ◆ Variable ingredients
  - Ivermectin
  - Milbemycin
  - Pyrantel
  - Piperazine



## Piperazine

- ◆ Adverse signs in some cats at therapeutic dosages
  - Emesis, weakness, tremors, ataxia, nystagmus
- ◆ Symptomatic treatment
  - Fluids
  - Dark, quiet environment
  - Recovery by 3-4 days



## Insecticides: cats vs. dogs

- ◆ Cats → develop systemic toxicity
  - Twitching, tremors, seizures
  - Bitter taste → severe hypersalivation
  - Starts at the head → progresses to tail
- ◆ Dogs → not systemically absorbed
  - Dermal effects of paresthesia
  - Intense itching, anxiety, skin twitching
  - Bitter taste → severe hypersalivation
  - Gets on paws ("unable to walk!")



## Insecticide: Treatment

- ◆ Depends on the concentration → is it toxic?
- ◆ Cats:
  - If presenting tremoring/twitching, sedate with 40-50 mg/kg of methocarbamol IV.
  - Once sedate, bath with liquid dish soap 3X (full body)
  - IV access
  - Thermoregulation
  - IV fluids + IV methocarbamol
    - IV diazepam doesn't work as well



## Human and veterinary NSAIDS

- ◆ Common OTC anti-inflammatory drug
- ◆ Ibuprofen (e.g., Midol, Advil, Nuprin)
  - 50, 100, 200, 300, 400, 600, 800 mg tablets
  - 40 mg/mL, 100 mg/5 mL suspensions
  - Combined with flu/cold ingredients ("D")
- ◆ Naproxen (e.g., Aleve, Anaprox, Napralen)
  - 200, 220, 250, 275, 375, 500 mg tablets...
  - Suspensions



## How do NSAIDs work?

- ◆ NSAIDs inhibit conversion of arachadonic acid to prostaglandins by inhibition of COX enzymes
- ◆ But some prostaglandins are good!
  - Maintain renal blood flow
  - Maintain mucosa of GIT
  - Stimulate HCO<sub>3</sub> buffer secretion
- ◆ Risk factors:
  - Cats
  - Renal or hepatic disease



## Veterinary NSAIDS: CATS

- Carprofen and deracoxib
    - 4 mg/kg: GI ulcers
    - 8 mg/kg: ARF
    - >27 mg/kg: death
- Metacam\***  
meloxicam  
 5 mg/mL Solution for Injection  
 Non-steroidal anti-inflammatory drug for use in dogs and cats only  
 Caution: Federal law restricts this drug to use by or on the order of a licensed veterinarian.  
 \*Warning: Repeated use of meloxicam in cats has been associated with acute renal failure and death. Do not administer additional injectable or oral meloxicam to cats. See Contraindications, Warnings, and Precautions for detailed information.
- Meloxicam:
    - 3-5X the therapeutic dose → GI and renal
    - > 0.3 mg/kg once or repeated doses → AKI
    - 10% cats: AKI (normal adverse event) → up to 25%?
    - Use one dose?
- REFERENCE: Talcott PA, Gwaltney-Brant SM. Nonsteroidal Antiinflammatories. Small Animal Toxicology Elsevier 2013, pp. 702.



## How do we treat NSAID toxicosis?

- ◆ Decontaminate! (e.g., emesis, activated charcoal)
  - Recent ingestion?
  - Does it undergo enterohepatic recirculation?
  - Activated charcoal ± cathartic
- ◆ Clinicopathologic monitoring
  - Baseline CBC, chemistry, UA, USG
  - If nephrotoxic dose:
    - PCV/TS, renal panel q. 24 hours X 2-3 days
    - Recheck 1-2 days later



## NSAIDs: Treatment

- ◆ Aggressive IVF
  - Does *not* aid in elimination
  - Vasodilate renal vessels → prevent ARF
  - 2.5-3.5X maintenance
  - Goal of fluid therapy:
    - Hemodilution: PCV/TS 35%/5 mg/dL



## NSAIDs: Treatment

- ◆ Anti-emetic therapy
  - Especially if MD A/C
- ◆ Gastric protectants
  - Sucralfate
  - H<sub>2</sub> blocker vs. misoprostol vs. omeprazole



## Which lilies are poisonous?

- True lilies of the *Lilium* and *Hermerocallis* species
  - Easter lily, Tiger lily, Day lily, Stargazer lily, Oriental, Wood, Red, Asiatic lilies
- Only seen in cats?
- Unknown water soluble toxicant
  - All of the plant, even pollen!
  - Minimal amount → toxic



## Tiger Lily (*Lilium* sp.)



## Oriental Lilies (*Lilium* sp.)



## Oriental Lilies (*Lilium* sp.)



## Identify if it's a poisonous lily!

- ◆ Rule out if it's in the *Lilium* or *Hemerocallis* spp.
- ◆ These types are toxic, but do not result in direct nephrotoxicity



Lily of the Valley (*Convallaria majalis*)



Peruvian lily (*Alstroemeria* spp.)



Calla Lily (*Zantedeschia*)



Peace Lily (*Spathiphyllum*)



## What do we see with lily toxicosis?

- ◆ GI: Anorexia, vomiting (within hours)
- ◆ CNS: Depression (within hours)
- ◆ RENAL:
  - Azotemia (12-24 hours)
  - Anuria (1-5 days)



## What do we see with lily toxicosis?

- ◆ Aggressive decontamination
  - Emesis induction
    - Xylazine 0.44 mg/kg IM once
  - Anti-emetic
  - Activated charcoal + cathartic 1X



## What do we see with lily toxicosis?

- ◆ Fluids, fluids, fluids X 48 hours
  - 2.5 - 3X maintenance
- ◆ Gastrointestinal support if azotemic
  - H<sub>2</sub> blocker
  - Phosphate binders



## What do we see with lily toxicosis?

- ◆ Monitor UOP
- ◆ Monitor renal panel q 24 hours X 2 days
- ◆ Prognosis
  - Treat aggressively!
  - Prognosis: good if treated early!
  - Grave if no treatment, if > 18 hours, or anuria



## Tulips

- ◆ Contain: glycosides, glycoproteins, lectins
- ◆ Plant, greens and flower ingestion: minimally toxic → gastrointestinal (GI) signs
- ◆ Bulb ingestion: Profound GI, rarely, CNS signs



## RODENTICIDES



## Why you care and need to pay attention!

- Blue pellets ≠ ACRs
- Green blocks ≠ ACRs
- Since 2011, new EPA mandates!
  - They're taking away the one with the antidote!
  - More bromethalin & cholecalciferol
    - No antidote
    - More expensive to treat
    - Totally different MOA
- ◆ Call for free advice!



### Several types available:

- Bromethalin → cerebral edema
  - Cats more sensitive!
- Zinc phosphide → rarely seen in cats



### Several types available:

- Cholecalciferol
  - Severe hypercalcemia → AKI
  - Narrow margin of safety
- Anticoagulant rodenticides (ACR)
  - Bromadiolone (Tomcat)
  - Brodifacoum (d-CON)
  - Diphacinone (Ramik)
  - Defethialone (D-Cease)
  - Cats are very resistant to this!



### General treatment for rodenticides

- ◆ Decontaminate
- ◆ Administering charcoal
- ◆ IV fluid therapy
- ◆ Anti-emetics
- ◆ Blood work monitoring
- ◆ Supportive care



### Paints and varnishes

- ◆ Volatile household compounds
- ◆ Generally non-toxic → causes gastrointestinal signs (e.g., vomiting, diarrhea)
- ◆ Potential concerns include:
  - Contain small amounts of ethylene glycol (<1%, non-toxic)
  - May contain petroleum distillates (hydrocarbons)
  - May contain lead



### Paints and varnishes

- ◆ Treatment:
  - Do NOT induce emesis
  - No need for charcoal
  - Anti-emetics
  - Fluid therapy
  - If lead, consider magnesium sulfate to precipitate lead out of GIT)
- ◆ Do not use poisonous chemicals to get the product off (e.g., mineral oil, paint thinner)
  - Olive oil
  - Shave off



### Minoxidil (Rogaine)

- ◆ Cardiovascular & pulmonary toxicity
- ◆ Reduces peripheral vascular resistance → vasodilates vascular smooth muscle → hypotension
- ◆ Vasodilatory → hypotension → hypoxemia → dyspnea



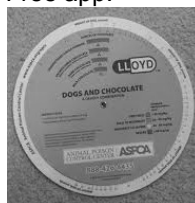
### Summary

- ◆ When in doubt, call ASPCA Animal Poison Control Center!



### Great free ASPCA APCC resources!

- ◆ <http://aspcapro.org/freebies>
- ◆ Free app!



### Huge thank you for our sponsor!



The ASPCA Animal Poison Control Center, based out of Urbana, IL, is the only poison control center, focused solely on animals. Their staff is available 24/7, 365 to assist you and your clients with toxicology-related emergencies.



### #CPRwheel



### 2015 VETgirl Webinar Topics

Check out some of our 2015 RACE-Approved VETgirl webinars  
Please visit our website for a complete list! [www.vetgirlontherun.com](http://www.vetgirlontherun.com)

- Seizure diagnosis and treatment
- Common feline ophthalmic conditions
- What's new in veterinary wound healing
- Common emergency room procedures
- Arrested development: The RECOVER initiative and CPR updates
- To cut or not to cut: Approach to the abdominal radiograph
- Emergency management and treatment of rattlesnake envenomations
- Misconceptions of emergency and critical care
- Summer toxins affecting small animals
- Feline pediatrics: Treating the small and the sick



### Check out our 2015 upcoming VETgirl appearances!



#### Dr. Justine Lee

- ◆ Gulf-Atlantic, Oct 2015
- ◆ WVC, NV Nov 2015
- ◆ Purdue, Nov 2015
- ◆ NAVC, Jan 2016
- ◆ IVS, Fiji, Feb 2016
- ◆ WVC, March 2016

#### Dr. Garret Pachtinger

- ◆ NCASAM, October 2015
- ◆ GVMA, November 2015
- ◆ CVC, San Diego, Dec 2015
- ◆ NAVC, Jan 2016



## Questions?



The smartphone screen displays the VETgirl logo at the top, followed by a list of service features: 'VETgirl is a subscription-based podcast service offering RACE-approved veterinary CE.', 'VETgirl is a rich multimedia experience, with podcasts, webinars, videos, and blogs to enhance learning... for vets, by vets!', 'VETgirl only has time for what's clinically important... and we pass that knowledge on to you.', 'Veterinary specialists provide clinical tips so you can learn "on the go" with 3-5 minute podcasts.', and 'VETgirl Elite: Sign up to get an additional 12 hours of webinar CE a year.' Below the list is a QR code and the website URL 'www.vetgirltherun.com'. At the bottom of the screen, it says 'APPALACHIAN COLLEGE OF VETERINARY MEDICINE' and 'VETgirl LLC, DVM, DACVCP, DACVP'.

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