



The 2022 Online Toxicology Symposium



Myths and Misconceptions in Veterinary Toxicology

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Myths, or 'old wives tales' have always been prevalent in veterinary medicine. We hear these commonly in practice (I know he's sick 'cause his nose is warm. My dogs are brother and sister, they would never have puppies together.). However, with the rise of the internet, rumors and misinformation can spread like wildfire.

Internet rumors are probably the most modern form of folklore (handed-down beliefs, stories, and customs). These stories are written to be as believable as possible, and often contain precautionary advice on how to avoid harm to your pet. These tales also tend to evolve in time due to embellishment and repetition; internet rumors in particular have a way of being resurrected months or years after the initial distribution, often with adjustments made to make them more plausible.

Milk is the universal antidote

Many times owners will call after a pet has ingested something it shouldn't have and they will tell you they have already given milk. Milk can help to dilute caustic substances (acids, alkalis) and irritants (detergents), along with dissolving the insoluble calcium oxalate crystals found in some plants. The calcium in milk may also decrease the absorption of certain pharmaceuticals (bisphosphonates, tetracyclines). Unfortunately, milk does not treat all toxins.

Atropine is the universal antidote

Atropine can be used to reverse the muscarinic signs (salivation, lacrimation, urination, dyspnea, drooling, emesis) from organophosphate and carbamate insecticides. Atropine however, does not treat all toxins. This misconception probably arises from many years ago when most insecticides were organophosphates or carbamates. Today, these compounds are rarely encountered.

Burnt toast is the universal antidote

This myth arises from the use of activated charcoal in poisonings. Unfortunately, the black bits off of burnt bread are not absorbents like activated charcoal.

Weak tea is the universal antidote

Tea does contain tannins, which can be helpful in treatment of some toxicants (rhododendrons, azaleas), but it does nothing to treat other poisons.

Febreze kills pets

When Febreze first came out on the market in 1999 there was an extensive internet email rumor that implicated it in the deaths of many dogs. The email occasionally is sent around again. Febreze can cause respiratory issues in birds and allergic reactions in some dogs, but it has not been linked to any dog deaths.

Swiffer wet jet kills pets

Another internet rumor started in May of 2004, which stated “Swiffer wet jet contains a compound which is ‘one molecule away’ from antifreeze and caused liver failure and death in a German shepherd dog.” Nothing in the ingredients of the Swiffer liquid poses risk of hepatotoxicity. If antifreeze or a closely related glycol were involved, we would expect renal, not liver damage. Any molecule is ‘one molecule away’ from antifreeze.

Ultra Clorox bleach kills pets

Per the internet, Ultra Clorox bleach poses danger to pets and should not be used in households with pets because it contains sodium hydroxide, which is “LYE,” which is not present in ‘regular’ bleaches. The truth is that all bleaches contain lye (sodium hydroxide) and compared to other bleaches, Ultra Clorox does not pose additional hazard to pets when used as directed.

Almonds are poisonous to pets

Per the myth, almonds contain cyanide and will kill your pet. This myth does have some truth behind it. Bitter almonds do contain cyanide. However, we eat sweet almonds which contain no cyanide. Bitter almond essential oil may be purchased but because it has been processed, there is no poisoning risk.

Pistachios are poisonous to pets

This myth is all over the internet if you google ‘pistachios and dogs.’ There is no basis to this myth. Nuts can certainly cause GI upset but are not considered poisonous.

Chocolate gives dogs worms

Per this misconception, you shouldn’t give your dog chocolate, not because it is poisonous, but because it will give them worms. This myth may have resulted from the fact that dogs who eat chocolate may vomit or have diarrhea, and the roundworms (already present in the dog) may be seen in the vomit or stool.

If you give your dog water after it eats mouse poison it will explode

Per the pest control operator, ‘This poison causes the mice to leave the house looking for water and once they drink, they explode.’ This is not true. None of the rodenticides cause mice to explode. This myth is perpetuated as the pest control operator doesn’t want you to know that the mice are dying inside the walls of your house.

Rimadyl (or insert pharmaceutical name here) kills pets

If you look on the internet, any drug used in veterinary medicine is blamed for multiple problems.

Pot scrubbing sponges manufactured by Proctor & Gamble contain dangerous derivative of agent orange

The myth is that an owner cleaned out aquarium with a new sponge and when he placed the tropical fish back into aquarium, they died. He concluded that the Pot scrubbing sponges manufactured by Proctor & Gamble contain a dangerous “derivative of 2,4-D, more popularly known as Agent Orange” that can kill pets. This rumor is wrong on many levels. First of all, Proctor & Gamble doesn’t make sponges. 2,4-D is not Agent Orange, it is a safe herbicide. Most likely the fish died after being replaced in the aquarium following cleaning and not completely rinsing out of aquarium, or destruction of the biological filter.

Tennis balls can explode and kill a dog

This myth is unfortunately true. In 2000 a dog in Portland, OR picked up a tennis ball during a walk and it exploded killing the dog. The ball had been made into a bomb. Per the Portland police, tennis ball bombs are not uncommon and information on how to make them can be found on the internet. They caution people to leave found tennis balls alone, especially if they are wrapped in electrical or duct tape.

Tennis balls contain lead

Tennis balls themselves do not contain lead, but there have been inks used to print logos on the balls that have tested high in lead.

Paper towel tubes contain zinc

This myth states that the glue used in the cardboard found in the middle of paper towel rolls and toilet paper contains enough zinc to poison an animal. This is untrue.

Dogs die after eating children’s stuffed toys containing flame retardant materials.

Per the circulating email: "The dog ate a child's teddy bear and was very sick. When the vet opened the dog up to remove what she thought was an intestinal obstruction she found a huge gelatin type mess inside and the dog’s intestines were black and the tissue dead. The dog will die no surgery can fix him up there was no living intestine left from stomach to colon. This was not an obstruction, so the vet called the manufacturer of the Teddy Bear on a quest to find out what the gel was and what killed the dog. Turns out the stuffing in children's toys contains ingredients for flame retardants and mite control! It is designed to become a gel. It is highly toxic." Not true, dog had a mesenteric torsion.

Rawhide manufactured overseas is poisonous to dogs

“Rawhides from overseas can kill dogs.” There is some truth to this, but it is somewhat of a misconception. There was one batch of rawhides from Thailand that were contaminated with arsenic, but this was many years ago. However, rawhide, no matter the source, can be contaminated with salmonella or other bacterial toxins.

To prevent heartworm in dogs, once a year you give two copper pennies by mouth

Per this myth, the copper in the pennies is attracted to the heart and will kill the worms. Pennies cause zinc toxicity so this is a very dangerous practice.

Ice cubes will cause your dog to bloat on a hot day

Internet rumor that a person gave their dog ice to cool off on a hot day and the dog developed bloat and died. Dogs do not bloat from drinking ice water on hot days.

Garlic is a natural way to get rid of fleas

Wanting to use a safe flea control on pets is understandable, but owners may equate natural with safe, which is not always the case. The simple answer is no, garlic is not efficacious for treating fleas. Garlic can however cause hemolytic anemia and methemoglobinemia. For dogs, 10 g/kg of fresh garlic (or its equivalent) may be a problem.

Ingesting mouse bait will cause an animal to seek water, and when the animal drinks the water it will activate the poison

Water is not needed to activate mouse poison. The three most common types of bait in the United States (anticoagulants, bromethalin, cholecalciferol) all work on their own when ingested. This myth likely came about because no one wants to think that mice may die inside their home. Hence the pest control officer tells people the mice leave the house to find water.

Hostas make bubbles & bloat in a pet's stomach

The theory is that since Hostas contain saponins, and saponins are used to make soap, if a pet ingests the plants they will make soap bubbles in the pet's stomach. That, according to the rumors, leads to bloat. It's true that saponins are used to make soap, but it's not true that soap or soap bubbles are produced in a pet's stomach if plants containing saponins are ingested. Pets will commonly vomit after ingesting Hostas.

Cats and dogs are small fuzzy people

Drugs that people take without any problems (Aleve, acetaminophen) can cause serious problems in pets. However, many human medications (levothyroxine, benzodiazepines) are tolerated at much higher doses in animals.

Many factors come into play when assessing domestic dog and cat exposures to various toxins. For years veterinarians have witnessed wide inter-individual variation in response to drug therapy. Some patients respond well, others fail to respond, and still others experience idiosyncratic toxicity to routine doses of a particular drug. The same things can be noted when we try to predict animal responses to human medications.

Dogs make up the largest percentage of calls to the ASPCA Animal Poison Control Center. This is due to many reasons. Dogs are low to the ground; they investigate with their mouths and they have indiscriminate eating habits. Cats have more selective eating habits than dogs, however, their fastidious grooming habits make almost all dermal exposures into oral exposures also.

Metabolic processes have evolved over time to allow individual species to handle various components of their diets. Animals that are 'true carnivores' (e.g. cats) have a more restricted diet and have evolved fewer biotransformation pathways than those with more diverse diets (e.g. herbivores, omnivores). This can be a problem when animals encounter a xenobiotic that requires a biotransformation pathway they do not possess. The N-acetylation pathway is used for the metabolism of sulfonamides, procainamide, dapson, isoniazid, and hydralazine. This pathway is absent in all dogs due to a loss of both N-acetyltransferase genes. Cats are 'defective' in glucuronidation (pseudogene vs functional gene) so they cannot glucuronidate phenols, naphthols, and morphine. This makes cats highly susceptible to xenobiotics that require glucuronidation for metabolism (acetaminophen, aspirin, etc).

Dogs and cats are more sensitive to RBC oxidative damage than humans (4 vs 8 vs 2 sulfhydryl groups on hemoglobin, respectively). Our pets can easily develop Heinz bodies and methemoglobinemia when exposed to oxidative agents such as aniline dyes, onions/garlic, acetaminophen, and benzocaine.

As dogs and cats are carnivores, they tend to have acidic urine. This can influence the rate of elimination of xenobiotics. Dogs poorly excrete organic acids which increases susceptibility to phenoxy herbicides.

Genetic differences exist not only between people, dogs and cats, but also among different breeds of dogs and cats. Purebred patients represent distinct gene pools and breed specific variations in drug response are recognized. A few CYP pathways have been shown to be polymorphic in dogs. CYP2D15 metabolizes the COX-2 selective NSAID celecoxib in dogs. The half-life varies from 1.5 hr for extensive metabolizers to 5 hours for poor metabolizers. CYP2B11 is the enzyme responsible for propofol metabolism. Its activity varies at least 14-fold in mixed breed dogs, while greyhounds have particularly low activity. This corresponds to reduced clearance of propofol, higher blood concentrations and delayed recovery in greyhounds when compared to mixed breeds.

Some breeds of dogs are deficient in a P glycoprotein (MDR-1 or ABCB1) that keep xenobiotics out of the brain. This is an autosomal recessive trait in some collies, Australian Shepherds, and others and confers an increased sensitivity to avermectins (antiparasitics), loperamide (antidiarrheal), acepromazine (sedative), butorphanol (analgesic) and vincristine, vinblastine, and doxorubicin (chemotherapy agents). "Normal" therapeutic doses of these medications have an exaggerated effect in these animals.

Aging rates vary with breed and age can play a role in the sensitivity to xenobiotics. Young animals tend to have a more permeable GI tract and blood brain barrier (BBB), decreased GI motility, lower levels of metabolic enzymes, lower glomerular filtration rates (GFR), higher caloric requirements/intake and have an increased risk from fat soluble compounds (milk diets, yolk sac). Comparatively, aged animals tend to have decreased GFR, decreased metabolic activity, concurrent degenerative/disease processes and decreased GI motility. Pre-existing diseases can alter intestinal or dermal barriers, alter plasma protein status, affect RBC numbers, decrease function of liver, kidney, other organs and alter the BBB.

Especially in dogs, there is a wide variation in size and body type. For example, sighthounds have a low percentage of body fat. These dogs may also have an increased sensitivity to organophosphorous pesticides and barbiturates.

With just these few examples of genetic differences, it is easy to see that managing toxicoses in different species can be challenging.