

Pet Toxicology Special Edition

CAHFS

CONNECTION

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Inside this issue:

- Malicious Poisoning
- Testing for Unknowns
- Tremorgenic Mycotoxin Intoxication
- Ivermectin Toxicosis

The CAHFS-Toxicology section provides service for all species. For more information call 530-752-8700 or visit our web site at www.cahfs.ucdavis.edu



Toxicant Screening

The current fee for each individual screen is \$125. However, because it is useful to run both a gas chromatography-mass spectrometry and a liquid chromatography-mass spectrometry method, the combined fee is \$150. For metals, sensitive and specific screens are available; heavy metal screens are run on a routine basis for most of CAHFS' necropsy cases.

Malicious Poisonings

Unfortunately, the Toxicology Section receives calls on a regular basis about possible malicious poisoning. In many instances, there is no evidence to support a client's suspicion of foul play. However, in other cases, various adulterated food items such as pet food or meats are found in the animal's environment. A recent Bay Area high profile case involved someone placing approximately 100 strychnine-laced meatballs in areas accessible to dogs. One dog died following consumption of at least one of the meatballs. Other cases have involved the use of anticoagulant rodenticides such as brodifacoum, cholinesterase-inhibiting insecticides such as methomyl and disulfoton, drugs such as aspirin and caffeine, ethylene glycol, and cyanide. Interestingly, we have detected the sugar substitute, xylitol, in several "bait" samples. Apparently, xylitol is used as a poison for coyotes and perhaps domestic dogs as well. Dogs are uniquely sensitive to xylitol and develop severe hypoglycemia and liver damage following ingestion.



Group of meatballs laced with the anticoagulant rodenticide, diphacinone.

In suspected cases of malicious poisoning, it is critical to collect and maintain appropriate samples for testing and good records pertaining to the case. Law enforcement or other government agencies often become involved in a majority of confirmed malicious poisoning cases. These cases can also end up in court, so it is incumbent on veterinarians to perform thorough history taking and case work up. Critical antemortem samples for toxicologic analysis include possible source material (e.g. baits), stomach contents (vomit), and urine. Visual inspection of source material or stomach contents often reveals the presence of foreign material which can help in the selection of appropriate toxicology tests to perform. If an animal dies, a thorough necropsy is recommended and stomach contents, liver, kidney, brain, fat, and urine should be collected (all tissue samples should be fresh and not formalin-fixed), placed in individual sample containers, and refrigerated or frozen pending analysis.

Testing for Unknowns

In potential poisoning cases in which a history of exposure to a known specific toxicant is unavailable, clients often ask, "What toxicology testing is available?" Unfortunately, there is no single test that can detect all potential toxicants. The clinical signs exhibited by an animal can help to narrow down the list of possibilities (e.g., seizures, liver failure, acute renal failure, coagulopathy), however, in a large number of cases, animals are found dead with no clinical signs noted. Thus, gross and histopathologic examination becomes extremely useful. CAHFS offers several analytical screening tools that can often reveal the presence of a toxicant. These screens are based upon either gas chromatography-mass spectrometry or liquid chromatography-mass spectrometry. Each method

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We're on the Web
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Testing for Unknowns (cont'd)

detects different classes of chemicals so in many situations it is recommended that both screens be run. If a chemical is detected, it frequently needs to be "confirmed" as being present. This often involves running a specific and sensitive test for the compound of interest. The screens are not as sensitive as more targeted testing; therefore, low concentrations of a chemical might be overlooked. A "negative" result does not rule out exposure to a poison, but the number of "positive" results we have found makes the screens a useful diagnostic tool. One example of the utility of screening methods involved the death of one dog and the sickness of another in one family. The owners noted that the deceased dog was lethargic and "out-of-it" before it was presented to their veterinarian and died. The other dog exhibited dilated pupils, abdominal pain, and pacing soon after the first dog was examined. A quick human "bedside" test for illicit drugs performed at the veterinary clinic on urine from the second dog was positive for methadone. Subsequent testing by CAHFS could not detect methadone. However, mass spectrometry screening of stomach contents detected doxylamine, an antihistamine sedative which is used as a sleep aid and found in cold and cough relief products. The clinical signs exhibited by the dogs could have been due to adverse effects from the drug. Fortunately, the one dog made an uneventful recovery.

Tremorgenic Mycotoxin Intoxication

A German Shepherd dog (GSD) presented to a veterinary clinic with hyperthermia and seizure-like activity including muscle fasciculations. Apomorphine, diazepam and later phenobarbital were administered IV for induction of vomiting and control of seizure activity.* Cool baths were given in an attempt to lower the body temperature. The dog was hospitalized overnight and given supportive care. Vomitus and urine were submitted to CAHFS for toxicology testing. Several hours after presentation, the mother of the GSD presented to the clinic with similar, but less pronounced symptoms. After vomiting on her own, charcoal was administered orally. Within two hours her symptoms had resolved and no further treatment was needed. Based on the possibility of having access to a compost/garbage pile, the vomitus was tested and found to be positive for penitrem A and roquefortine C. Penitrem A is a neurotoxic mycotoxin produced by *Penicillium spp.* Roquefortine, another mycotoxin produced by *Penicillium spp.*, is often found in combination with penitrem A. These mycotoxins are most often found in moldy food (e.g., moldy dairy products), moldy walnuts, or decomposing organic matter such as compost. Recovery in most cases occurs within 48 hours but some signs can persist for up to two weeks. In this case both dogs recovered.

*Due to the potential risk of aspiration, any attempts to remove the offending material (induction of emesis) and administration of charcoal in symptomatic patients should be approached with extreme caution.

Ivermectin Toxicosis

A 4-month-old dog presented to the UCD Vet Med Teaching Hospital with an acute onset of blindness. The dog was being treated with ivermectin for demodicosis. A serum sample was submitted for a macrolide endectocide screen which includes ivermectin, abamectin, moxidectin, and selamectin. A high level of ivermectin was detected (1900 ppb). In another case, an Australian Shepherd became acutely blind after possibly ingesting a horse dewormer paste. The night before, the owner had dewormed her horses with an apple flavored ivermectin paste. Serum was submitted for testing and a very high concentration of ivermectin was detected (9400 ppb). Ivermectin toxicosis was confirmed in both of these cases and after several days both dogs had recovered. Clinical signs of macrolide intoxication are primarily neurologic and include weakness, disorientation, ataxia, hyperesthesia, hypersalivation, tremors, seizures, blindness, and depending on the dose, coma. Clinical signs can persist for several days to weeks. High concentrations of macrolide endectocides can be excreted in the feces in the active form. Toxicosis has occurred in dogs that ingest the feces of large animals which have been treated with macrolides. Therefore, large animal owners should be made aware of the potential for secondary toxicosis. It is also important to note that dogs which carry the MDR1 gene mutation such as Collies and other herding breeds are more sensitive to the effects of ivermectin. Antemortem determination of serum concentrations can confirm intoxication. Brain concentrations are used to confirm intoxication on postmortem examination.

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