

## Toxicology Submissions and Analytical Screens

In addition to performing analytical testing services for veterinary clinics and providing clinical assistance in the diagnosis of client cases, the Toxicology Laboratory also participates in various studies of interest to agriculture, industry, wildlife centers, educational institutions, pharmaceutical companies, and the veterinarian profession. Contact the laboratory for any special request or problems. The phone number for the Director of Operations is 607-253-3975; the Laboratory is 253-3974; the Clinical Toxicologist is 253-3470.

### Sample Submissions and History

It is very important that not only the proper request be made for the analysis but that Toxicology receives the proper samples for the analysis along with a complete case history. **Please note: there is no such entity as a single complete toxicology screen.** Most frequently, the samples of choice for a live animal would be heparinized whole blood, urine, vomitus, etc. For animals that have expired, the samples of choice would be all of the above and along with fresh frozen liver, kidney, and stomach contents. Other samples pertinent to a case may be submitted to aid in a diagnosis (e.g., food, water, paint chips, suspicious samples, etc.). Samples should be kept cold or frozen until and during shipping. Samples should be submitted in separate, clean, tightly sealed containers and be well labeled with identification of sample, animal name/ID, and date. **Samples submitted on gel clot blood collection tubes are not appropriate for Toxicology testing.**

**A complete history, including drugs administered to an animal, is a must. This gives laboratory personnel assurance that the proper analysis is being performed given the history of symptoms and signs observed. It also lowers the cost to the submitter to confirm drugs that were knowingly administered to an animal, and prevents doing unnecessary analysis.**

### Equine Pre-Purchase Drug Screens (includes acidic and basic drug screens):

The preferred sample for drug analysis is 20 mls of heparinized whole blood (green or dark blue top vacutainer), and/or urine. Definitely **no gel clot activation tubes** should be used (red stopper with grey swirls). Refrigerate samples and ship with ice packs. Samples can be frozen if cells are spun down and plasma transferred to a clean red top blood collection tube.

- **Reserpine:** Special analysis request; additional 10 mls heparinized whole blood required. **Additional testing costs will be charged. Check individual test name for current cost.**
- **Fluphenazine:** Special analysis request; additional 10 mls heparinized whole blood required. **Additional testing costs will be charged. Check individual test name for current cost.**
- **Special Request** is needed for (low dosage) potent narcotic analgesics, certain tranquilizers and others: These require sensitive analysis via Selected Ion Monitoring (SIM) via Capillary GC/MS. Examples are: Butorphanol, Buprenorphine, Clenbuterol, Detomidine, Diprenorphine, Etorphine, Fentanyl, Medetomidine, etc. **Additional Mass Spectroscopy fees will be charged for running these tests. Please contact the Laboratory for specific charges.**

- **Anabolic steroids in urine:** includes Stanozolol, Dianabol, Boldenone, Triamcinalone, Nandrolone, and Testosterone

**Acidic-Extracted Drugs** (including but not limited to):

Acetaminophen, Barbiturates, Bumetanide, Carprofen, Chlorothiazide, Diclofenac, Diflunisal, Firocoxib, Flufenamic acid, Flunixin, Flurbiprofen, Furosemide, Griseofulvin, Ibuprofen, Indomethacin, Ketoprofen, Meclofenamic acid, Meloxicam, Meprobamate, Methocarbamol, Naproxen, Oxyphenylbutazone, Phenylbutazone, Nabumatone, Salicylic acid, Suldiazine, Sulfadimethoxine, Sulfadimidine, Sulfafurazole, Sulfamerizine, Sulfamethoxazole, Sulfanilamide, Sulfapyridine, Sulfathiazole, Sulindac, Thiosalicylic acid, Tolmetin, Tramadol, Zomepirac

**Basic-Extracted Drugs** (including but not limited to):

Acepromazine, Amphetamine, Apomorphine, Atropine, Benzocaine, Brompheniramine, Brucine, Bupivacaine, Caffeine, Cimetadine (Tagamet), Chlorpromazine, Cocaine, Codeine, Cyproheptadine, Dextromethorphan, Diazepam, Dihydrocodeine, Dipyrone, Doxapram, Embutramide, Ephedrine, Griseofulvin, Hordenine, Hydrocodone, Ketamine, Lidocaine, Mepivacaine, Meprobamate, Methocarbamol, Methylphenidate, Methamphetamine, Metoclopramide, Pentazocine, Phenacetin, Phenothiazine, Procaine, Promazine, Phenylpropanolamine, Propoxyphene, Pyrilamine, Rantidine (Zantac), Strychnine, Tetracaine, Theobromine, Theophylline, Trimethoprim, Tropicamide, Xylazine

**Anticoagulant/Rodenticide Screening:**

includes Brodifacoum, Bromadiolone, Chlorophacinone, Dicoumarol, Difenacoum, Diphacinone, Flocoumafen, Warfarin

**Mycotoxin Multiresidue Screen:**

includes Aflatoxins (B1, B2, G1, G2), Ochratoxin A, Zearalenone, T-2 Toxin, Diacetoxyscirpenol (DAS), and Deoxynivalenol (DON, Vomitoxin)

## Sample Collection for Suspected Toxicology Cases

It is good practice to follow the guidelines presented here for collection of samples suitable for toxicological analysis even if, at the time of the necropsy, a toxin is not suspected. These general instructions assume that the prosector will also collect a complete set of formalin-fixed tissues for histopathology, which is relevant to most toxicological investigations.\*

**The classic necropsy fresh/frozen sample set for toxicological investigation includes:**

- Brain
- Liver—without gall bladder
- Kidney
- Fat
- Urine
- Aqueous humor or intact eyeball
- Skin (site of exposure)
- Heart blood (collected into heparinized tube/green top vacuum blood collection tube)
- Collect these last
  - Stomach/rumen content
  - Intestinal content/feces

Each tissue type should be placed in a separate, clean, labeled container.

If a particular toxin or class of toxins is suspected of being involved in animal morbidity or mortality, you may want to collect various other samples, depending on possible routes of exposure:

- Environmental samples (paint, soil, etc)
- Feed samples
- Water samples
- Heparinized whole blood (20 mLs or more, green-topped blood collection tubes) from live animals
- Urine from live animals

You may also want to consult with the laboratory or toxicologist about any special sampling requirements. It is especially important to contact the laboratory in advance of sending any samples for a case which may be involved in litigation or forensic investigation, requiring chain-of-custody handling. The Toxicology section of the Animal Health Diagnostic Center can be reached at: 607-253-3974 (lab) or 607-253-3470 (toxicologist).

In most cases, toxicology samples should be stored frozen until tested.

**The goals of any toxicology investigation should be to:**

- Identify the source(s) of the toxicant
- Identify factors contributing to morbidity/mortality
- Assess the level of contamination
- Assess possible interventions
- Assess any risk to the food chain

**Some obvious questions to consider:**

1. Are feed and chemical storage containers on the premises labeled properly?
2. Are feeds stored with chemicals?
3. Is feed stored appropriately to prevent spoilage?
4. Is there any visible mold on or in feedstuffs, or do feedstuffs smell moldy?
5. What are the potential environmental, facilities, or home environmental risks? Are there any recent obvious changes in the environment or management?
6. Do the animals have access to trash, building materials, medicines, including those intended for other species, toxic plants, or substances provided by non-caretakers?

**Sample handling:**

- Always wear appropriate personal protective equipment when performing necropsy exams or collecting potentially hazardous samples. Wearing gloves may also be important in protecting sample integrity.
- Change gloves between samples (this is particularly important to assess differences in contaminant concentrations)
- Order of collection – sample from least contaminated to most
- Adequate sample amount (may be 250 g +)
- Appropriate containers depend on analyses required
  - Glass (not ideal for shipping; may require secondary packaging)
  - Plastic
  - Aluminum foil
  - Call the laboratory to determine the proper container
- Separate containers for tissues (zipper-lock bags usually work well)
  - Properly label with: Date/time, collector, animal, tissue
  - Collect GI content last
- Proper storage
  - Freezing in most cases
  - Some analytes require rapid transport to the laboratory

\* For general instructions for collecting samples from a field necropsy, use the ADHC Field Necropsy Kit available from our diagnostic supply center (607-253-3935) or go to <http://www.diaglab.vet.cornell.edu/test/feeman/NecroKit.pdf> to view or print a copy of the complete instructions.