

## IACUC Policy: Drug Dilution and Anesthetic Mixtures

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### 1.0 Purpose

To provide guidance regarding the formulation, safety, and efficacy of diluted drugs and mixtures of drugs/compounds which are stored in the laboratory (for later or repeated use) in laboratory animals.

### 2.0 Applicability

This policy is applicable to all persons responsible for conducting animal research, teaching, training, breeding, and related activities involving live vertebrate animals and conducted at or under the auspices of USA.

### 3.0 Policy/Procedures

Compounds/drugs used in laboratory rodents may need to be diluted for accurate dosing. Additionally, drugs, such as ketamine and xylazine, are frequently combined into an “anesthetic cocktail” and stored for later use. Drugs requiring dilution are to be mixed with an appropriate diluent (sterile saline or water for injection, not phosphate buffered saline (PBS)) in a separate rubber-stoppered sterile container to reach required working concentration. Aseptic techniques are to be followed. Eppendorf tubes or screw cap test tubes do not provide a secure aseptic access barrier for extended storage and cannot be used for this purpose. The top of the container should be disinfected with 70% alcohol on clean gauze prior to accessing with needle and syringe. Post-dilution, containers should be stored in a dark place when not in use. DEA-regulated compounds must be stored as per the IACUC Policy: *Guidelines for Use and Safe Storage of Commonly Used Drugs and Controlled Substances*.

<https://www.southalabama.edu/departments/research/compliance/resources/iacucdrugguidelines.pdf>

**Exceptions to this policy require IACUC approval.**

The label on the container of the compounded drug must include:

- Name of the drug/compound with final concentration;
- All components of the solution, including diluent;
- Preparation date and initials of preparer;
- Expiration date as below:
  - Commercially available veterinary or human drugs may be kept up to 6 months\* or the earliest expiration date of any single compound used in the dilution/mixture, whichever represents the earliest expiration date;
  - Other commercially compounded or pharmaceutical grade compounds are considered expired 30 days after mixing/reconstitution;

- Test agents produced in-house are considered expired 30 days after they are prepared and stored appropriately, unless they are kept frozen below 20 degrees in a freezer safe container, in which case they expire one year from the preparation date or 30 days after they are thawed (whichever comes first). Alternatively, test agents in solution for not more than 30 days could be freeze-dried in a solid form for stability and longer shelf life.

Anesthetic mixtures and diluted medications must be stored in ways that mirror the components' manufacturers' recommendations. For example, if one component needs to be stored to protect from light exposure, the newly mixed mixture must also be protected from light. Labels must clearly indicate all dates.

#### **4.0 Enforcement**

This policy is under the authority of the IACUC and communicated through the Office of Research Compliance and Assurance. The IACUC has the authority to enforce the provisions of this policy, and if necessary suspend research, or implement appropriate sanctions.

#### **5.0 Related Documents**

1. Taylor BJ, Orr SA, Chapman JL, and Fisher DE, Beyond-use dating of extemporaneously compounded ketamine, acepromazine, and xylazine: safety, stability, and efficacy over time. JAALAS 48:718-726, 2009.
2. Papich MG. Drug compounding for veterinary patients. AAPS J 7:E281-E287, 2005
3. Kohn DF, Benson GJ, Wixson SK, White WJ. Anesthesia and Analgesia in Laboratory Animals; Academic Press, New York, 1997; Chapter 15.
4. WHO: World Health Organization Best Practices for Injections and Related Procedures Toolkit. [www.ncbi.nlm.nih.gov/books/NBK138495/](http://www.ncbi.nlm.nih.gov/books/NBK138495/)
5. UC Davis: Guidelines for Use of Anesthetic Mixtures and Diluted Drugs in Laboratory Animals
6. University of Toledo: Drug Dilution and Storage Guidelines

*\*In the case of published data indicating a particular mixture or dilution is stable for longer than 6 months, that published time period may be used provided the reference is readily available at all times.*