Procedure: IACUC-53
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UC Davis
Institutional Animal Care and Use Committee (IACUC)

Title: Use of Anesthetic Mixtures and Diluted Drugs in Laboratory Animals

I. Purpose:

To provide guidance regarding the formulation, safety, and efficacy of in house (research and clinical) prepared (extemporaneously compounded) anesthetic mixtures and diluted drugs for use in laboratory animals.

II. Background:

In house compounded injectable anesthetic combinations and diluted stock medications are commonly used in laboratory animals. However, the stability and efficacy of many of these compounds is not well established. It is essential to ensure that all drugs used are safe and efficacious.

III. Policy:

Researcher prepared anesthetic mixtures and diluted medications must be prepared with sterile, pharmaceutical grade compounds, must be combined using sterile technique, and must be stored in a sterile vial in a cool place and away from light. Individuals preparing compounds must be trained on this policy.

Anesthetic mixtures and diluted medications in sterile vials must be labeled with:
1) the name(s) of each active drug component
2) final concentration(s) of each active drug component
3) preparation date
4) expiration date
5) the initials of the person preparing the compound

Additionally, 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.

Due to concerns with stability, expiration dates (use-by date) in the case of anesthetic mixtures (e.g., ketamine + xylazine) should be 30 days from the date of mixing the anesthetic mixtures or diluted medications, or the earliest expiration date of any single compound used, whichever represents the earliest expiration date of any of the compounds included.

Diluted drugs prepared aseptically and stored in sterile vials under refrigeration should be discarded within 30 days or the expiration date of the original stock, whichever is earlier.

A. In the case of published data indicating a particular mixture or dilution is stable for longer than 30 days, that published time period may be used provided the reference is readily available at all times.

Individual use vials of fluids must be used per manufacturers' instructions. For multiuse vials with rubber stoppers, a new needle and syringe must be used for each withdrawal of solution. It is strongly recommended that the rubber stopper be wiped with a solution of at least 70% isopropyl alcohol or ethanol before each use. Multidose vials can be used repeatedly up to the manufacturer's guidelines on maximum number of punctures or expiration date, whichever comes first.

In addition, if the user notices any cloudiness, bacterial/fungal growth inside the vial, and/or any abnormal/unexpected change in coloration, it should not be used and instead should be discarded immediately. Always check the vials for any potential evidence of contamination.

Contact Environmental Health & Safety (hazwaste@ucdavis.edu or ehshelp@ucdavis.edu; (530) 752-1493) for proper disposal of expired, controlled, and hazardous substances.

IV. Resources:

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. J AALAS 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/

5. Texas Tech University Health Sciences Center El Paso. Multi-Dose Medication Vials-Use, Handling, and Expiration https://elpaso.ttuhsc.edu/opp/_documents/EP-4/ep-4-09.pdf

6. Centers for Disease Control and Prevention. Injection Safety for Healthcare. https://www.cdc.gov/injectionsafety/PDF/Injection-Safety-For-Healthcare-P.pdf

7. UC Davis PPM 290-70 Controlled Substances https://ucdavispolicy.ellucid.com/documents/view/313

8. Use of Non-Pharmaceutical-Grade Compounds in Animals https://research.ucdavis.edu/wp-content/uploads/IACUC-09.pdf