



**THE UNIVERSITY OF TOLEDO
INSTITUTIONAL ANIMAL CARE AND USE COMMITTEE**

SUBJECT: Drug Dilution and Storage Guidelines

DATE: March 20, 2024

Drug Dilution and Storage Guidelines

Most of the drugs used for laboratory animals (i.e., mice, rats) need to be diluted for accurate dosing; however, this procedure may also be considered compounding. Compounding is defined as: combining, mixing, or altering ingredients of a pharmaceutical grade drug to create a medication tailored to needs of an individual patient according to the Food and Drug Administration (FDA) and Ohio Board of Pharmacy.

If you need to compound a drug for injection accuracy, aseptic techniques are to be followed. Drugs requiring dilution are to be mixed with an appropriate diluent in a separate sterile container to reach required working concentration. The compounded drugs' container must be sterile, and opaque if compounding light sensitive drugs. 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. Empty sterile containers with a rubber cap should be used which allows aseptic mixing and multi-access of your compounded drug solutions. The top of the container should be disinfected with 70% alcohol on clean gauze prior to accessing with a needle and syringe. Post compounding, containers should be stored in a dark place when not in use.

Exceptions to this guideline require IACUC approval.

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

- Name of the drug/compound with final concentration.
- Preparation date and initials of preparer.
- Expiration date as below:
 - Buprenorphine or meloxicam may be kept up to 90 days if diluted with sterile saline for injection (not phosphate buffered saline (PBS)) and stored in sterile glass tubes or bottles with rubber access stoppers. Tubes are to be secured in the dark between uses in appropriate storage when not in use.
 - Ketamine and Xylazine can be kept up to 90 days if compounded and stored in sterile glass tubes or bottles with rubber access stoppers. Tubes are to be secured in the dark between uses in appropriate storage when not in use.
 - Other commercial compounded or diluted drugs are considered expired after 30 days.
 - Test agents produced in-house are considered expired 30 days after they are prepared and stored appropriately, unless they are kept frozen below minus 20 degrees Celsius 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. Labels should clearly indicate relative dates.

References

1. Denherder, J., et al. Effects of time and storage conditions on the chemical and microbiological stability of diluted buprenorphine for injection. *J AM Assoc Lab Anim Sci.* 2017 56(4):457-461.
2. Dodulet-Devillers, A., et al. Assessment of stability of ketamine-xylazine preparations with or without acepromazine using high performance liquid chromatography-mass spectrometry. *Can J Vet Res.* 2016. 80(1):86-89.
3. Hawkins, M., et al. Drug distribution and stability in extemporaneous preparations of meloxicam and carprofen after dilution and suspension at two storage temperatures. *J AM Vet Med Assoc.* 2006. 229(6): 968-974.
4. Taylor, B., et al. Beyond-use dating of extemporaneously compounded ketamine, acepromazine, and xylazine: safety, stability, and efficacy over time. *J AM Assoc Lab Anim Sci.* 2009. 48 (6):718-26.