Guidelines for Use of Tribromoethanol (TBE) in Rodents

TBE is an injectable anesthetic agent used in rodents. It was once manufactured specifically for use as an anesthetic by Winthrop Laboratories under the trade name Avertin, but this product is no longer commercially available. Investigators who wish to use TBE as an anesthetic must make their own solutions from a non-pharmaceutical grade chemical.

Please note that this anesthetic may not be used unless an investigator has described it in an animal care and use protocol, provided scientific justification for using this anesthetic rather than a pharmaceutical-grade anesthetic, and received IACUC approval for its use. See Policy for Use of Non-Pharmaceutical Grade Compounds in Research Involving Live Vertebrate Animals.

Uses: TBE is appropriate for short procedures involving laboratory rodents, especially surgical procedures. It is best used in situations where it will be administered only once to a particular animal subject. Repeated use of TBE on an animal can be associated with an increase in morbidity and mortality.1,2

Disadvantages of TBE:

- TBE is an irritant, especially at high doses, high concentrations, or with repeated use. Adhesions are sometimes seen in the abdominal cavity following IP injections.3,4
- TBE degrades in the presence of heat or light to produce toxic by-products. Degraded solutions can be both nephrotoxic and hepatotoxic. Administration of degraded TBE solutions has been associated with death, often 24 hours after surgery.3,5
- TBE can cause intestinal ileus (slowing of gut motility and subsequent death of the animal) several weeks after injection. This is more common when TBE is stored in the presence of light or heat, stored at higher concentrations than recommended doses, or administered at concentrations higher than recommended.3,6,7

Chemicals: Two chemicals are needed to produce a solution of TBE.

- 2,2,2-tribromoethanol
- Amylene hydrate (tertiary amyl alcohol).

Compounding:1

- Ingredients
  - 2.5 g 2,2,2-tribromoethanol
  - 5 mL 2-methyl-2-butanol (amlene hydrate, tertiary amyl alcohol)
  - 200 mL distilled water – neutral pH

- Instructions
  - Dissolve 2.5 g tribromoethanol in 5 mL amylene hydrate. This requires heating to approximately 40°C (104°F) and vigorous stirring.
  - Add distilled water, stirring continuously, up to a final volume of 200 mL.
Filter sterilize through a 0.5 micron (or smaller) filter (e.g., Millipore)

Aliquot the final solution into appropriate containers – empty, sterile blood collection tubes or brown injection bottles with appropriate caps.

Label each container with:
- Name of the principal investigator indicated on the IACUC-approved animal care and use protocol for which the TBE solution will be used
- Name and concentration of the compound
- Date compound was prepared
- Compound expiration date

Refrigerate the aliquots and protect them from light. Even when refrigerated and wrapped in foil, TBE is stable for up to two weeks.

Notes
- As prepared above, the solution contains 12.5 mg Tribromoethanol/mL. *Do not attempt to make a more concentrated solution* – the solution is irritating and can cause peritonitis and death at higher concentrations.
- Tribromoethanol degrades to dibromoacetaldehyde and hydrobromic acid. If the pH of the solution is less than 5, it should be presumed to have degraded.

**Dosage/Use:** Mix the contents of a container by swirling prior to administration. The solution is administered by IP injection at a dose of 250 mg/kg body weight. Induction requires only a few minutes and the righting reflex returns approximately 40-90 minutes. Surgical anesthesia lasts for 15-45 minutes with a sleep time of 60-120 minutes.

**Warnings:** Do not administer non-sterile solutions, outdated solutions, more concentrated solutions, or higher doses than recommended above. Store the solutions under refrigeration and in the dark. Containers should be wrapped in foil. Replace refrigerated TBE solutions at least every 14 days.

*A TBE solution may not be used more than 14 days after it has been prepared.*

**References:**