

SUGGESTED ANESTHETICS FOR RODENTS

<u>Drug</u>	<u>Mice</u>	<u>Rats</u>
Isoflurane/Sevoflurane	1-5% Inhalant	1-5% Inhalant
Ketamine + Dexmedetomidine*	50-75 mg/kg IP+ 0.5 mg/kg IP	60-80 mg/kg IP+ 0.25 mg/kg IP
Ketamine + Xylazine*	90-120 mg/kg IP+ 5-10 mg/kg IP	40-80 mg/kg IP + 5-10 mg/kg IP
Ketamine + Xylazine + Acepromazine	100 mg/kg + 20 mg/kg + 3 mg/kg IP	31.25 mg/kg + 6.25 mg/kg + 1.25mg/kg IP
Fentanyl-fluanisone-midazolam**	3.13 mg/kg +104.8 mg/kg + 52.42 mg/kg IP or SC	

*Reversal agents: Dexmedetomidine can be reversed with Atipamezole. Xylazine can be reversed with Yohimbine.

**Shown to provide more stable conditions for physiologic studies and to be superior to Urethane-alpha-chloralose combo and TBE (Jong 2002)

Note: Local anesthetics: Used for local or regional anesthesia in rodents; ex. lidocaine, bupivacaine and mepivacaine. Their use may allow reduced levels of general anesthetics, which may speed recovery and minimize mortality.

Note: gas anesthesia is the preferred method of anesthesia.

Alternative Anesthetics for Rodents

<u>Drug</u>	<u>Mice</u>	<u>Rats</u>
Pentobarbital (Nembutal) ¹	40-90 mg/kg IP	30-60 mg/kg IP
Tribromoethanol (1.2% w/v) ²	125-300 mg/kg IP	300 mg/kg IP
Alpha-Chloralose (5%) ³	114 mg/kg IP	55-65 mg/kg IV
Chloral hydrate (5%) ⁴	300-450 mg/kg IP or to effect	200-400 mg/kg IP or to effect
Ethyl carbamate (Urethane) (50%) ⁵	1500 mg/kg	1000-1500 mg/kg IP (50% w/v conc.)

¹Provides minimal analgesic effect; may cause significant cardiovascular depression and hypotension.

²TBE is replaced with inhalant anesthesia for routine procedures and its use is recommended only for acute terminal studies when administered IP. When TBE is exposed to light, heat (>4°C), or is improperly stored, it decomposes into hydrobromic acid and dibromoacetic acid, which are toxic metabolites that are potent GI irritants. Proper storage of TBE at 4°C under dark conditions is crucial to avoid decomposition and subsequent mortality. Dosage adjustments may need to be made depending on the particular strain of mice being studied. Not recommended in rats.

³This drug should only be used for long non-survival surgery, primarily physiologic experiments. This drug should not be used alone for surgical procedures due to poor analgesic properties. A 2nd dose of 40 mg/kg IV may be given to maintain anesthesia. Once administered, it is transformed into trichloroethanol, the same active compound that is transformed from chloral hydrate.

⁴This drug is shorter acting than alpha-chloralose and should only be used for non-survival surgery. It is a good hypnotic with minimal analgesic properties. Dosages sufficient to provide surgical anesthesia and analgesia approach lethality. Most frequently a 2nd dose of 40 mg/kg IP is given to maintain anesthesia.

⁵Strict precautions should be taken (e.g. gloves, face masks, mixing under a fume hood) to protect personnel due to its mutagenic and carcinogenic potential. The use of urethane should be limited to exceptionally long non-survival procedures which require long duration cardiac stable anesthesia and preservation of autonomic reflexes.

Note: ¹⁻⁵These drugs should not be used if a pharmaceutical grade anesthetic can be used. **Scientific justification and ACUC approval is required.**

The NINDS/NIDCD veterinary staff is available for designing appropriate anesthetic and analgesic regimens for laboratory animals as well as assistance with training and/or the administration of anesthetic agents.

References:

Flecknell PA. Anesthesia of common laboratory species. Academic Press Limited, London. 1996

Hawk CT, Leary SL (eds). Formulary for Laboratory Animals. Iowa State University, Ames, Iowa, 2005.

Fish, RE, Brown MJ, Danneman PJ, Karas AZ (eds). Anesthesia and Analgesia in Laboratory Animals. ACLAM Series, New York: Academic Press, 2008.