

Anesthesia Guidelines – Rodents
IACUC Guidelines
Effective Date: November 2022

Applicability: All surgical anesthesia. Non-surgical anesthesia (15 minutes or longer).

1. **Acclimation period and health observation:** To avoid stress following vehicle transportation, animals should be acclimated for at least 2 days before general anesthesia and 4 days before major survival surgery. A pre-anesthetic health observation should be performed prior to the procedure. This involves reviewing the animal's general appearance, activity, respiration, and body weight or body condition score.
2. **Fasting:** If rodents must be fasted rodents prior to anesthesia, the rationale for fasting must be approved in the protocol.
3. **Provide heat:** Rodents can quickly become hypothermic under anesthesia that is longer than 5 minutes and during recovery from anesthesia. Preferred heat sources during and after procedures include circulating warm water blankets, chemical heat packs, and electric heating pads with temperature setting capability and digital readout, and insulating methods (e.g. Saran wrap). All require careful monitoring, as rodents can easily overheat. Always place an insulating layer such as a towel between the animal and the heat source. Depending upon the species and procedure, monitoring of body temperature may be indicated.
 - Use of heat lamps is discouraged as they may cause animals to overheat and/or other thermal injuries
 - Use of electric (low/med/hi) heating pads is discouraged in surgery as they can cause the animal to overheat and may cause thermal burns. However, heating pads may be acceptable during anesthesia recovery by placing them partially under cages so that approximately 50% of the cage is on the heating pad. This allows the animal to move away from the heat as it recovers from anesthesia.
4. **Procedure location:** All anesthetic and surgery procedures should be performed outside of the housing room or under a hood. The location should be uncluttered, organized, and dedicated to surgery use when surgery is being performed.
5. **Administering the Anesthetic:** Rodents may be anesthetized with injectable or inhalant agents, or with a combination of the two. An adequate, even depth of anesthesia should be maintained throughout the procedure. For inhalants, this can be accomplished by adjusting the vaporizer as necessary. For injectables, supplemental doses of the agent can be administered as needed: Refer to the LARC Veterinarians' Anesthesia and Analgesia Recommendations for UCSF Laboratory Animals and [Preparation of Ketamine Anesthesia Cocktail Guidelines](#). Anesthetics used must follow the approved IACUC protocol. For

appropriate anesthetic usage refer to the [EH&S Isoflurane Procedure for Safe Use Guidance](#).

6. **Apply eye ointment:** Eye ointment is strongly recommended for all animals undergoing any length of anesthesia. For anesthesia/sedation lasting longer than five minutes, eye ointment is required to prevent corneal damage due to loss of blink reflex.
7. **Monitoring Anesthesia:** Before surgery is started, ensure that the animal is adequately anesthetized by testing the pedal withdrawal reflex (foot pad pinch on both hind feet). If the foot pad pinch causes a response, supply additional anesthesia and re-test before starting the procedure, there should also be a lack of eye blink reflex. During anesthesia monitor respiratory rate and depth, which should be visualized by the chest moving up and down in a slow and regular rhythm and adequate oxygenation should be observed by pink mucous membrane color. Anesthetic depth must be rechecked regularly for the duration of the procedure. Adjust anesthetic depth accordingly if the animal is responsive to painful stimuli, demonstrates an increase in respiration rate, or, conversely, has lack of color of the ears, tail, gums, or foot pads.
8. **Stay in the room to monitor** anesthetized animals until they are fully recovered from anesthesia. Do not immediately return recovering animals to a cage containing un-anesthetized animals. Animals should be placed in a separate recovery cage with half the cage on a heat source, and observed every 10-15 minutes until awake and ambulatory. Animals may then be returned to standard housing.
9. **Post-procedure monitoring:** Monitor animals for signs of distress or discomfort during and after recovery, and administer analgesics per the approved IACUC protocol. Animals experiencing post-procedural complications that cannot be alleviated should be euthanized using approved guidelines. Record any complications, and contact LARC if problems recur.
10. **Fluid administration:** Administration of warmed (i.e. body temperature) fluids can help animals maintain blood pressure and speed up recovery from anesthesia or surgery. Fluids may be given IP, intravenously, or subcutaneously. Contact LARC staff for questions about fluid administration.
11. **Record keeping:** is required for anesthesia/sedation procedures lasting longer than 15 minutes from the administration of the anesthetic/ sedative agent(s), and for any survival surgery. Refer to [IACUC Policy Surgery and Anesthesia Recordkeeping](#), [Mouse Surgical Record Template](#), [Rat Surgical Record Template](#), [Sample Mouse Surgical Record](#), and [Sample Rat Surgical Record](#).
12. **Neonatal rodent anesthesia:** Refer to the IACUC Standard Procedure, [Hypothermia/Cryoanesthesia In Neonatal Rodents](#)
13. **In case of emergency:** the LARC on-call veterinarian can be reached at 415-502-8687.