

Guidelines for Rodent Survival Surgery

I. Pre-surgical planning

- A. Assemble all necessary supplies.
- B. Review the IACUC approved Animal Activity protocol for anesthetic method, analgesics.
- C. Use a healthy rodent. Make a pre-surgical evaluation of your patient.
- D. A 48 -hour acclimation period is recommended.
- E. Preoperative fasting is not required for rodents.

II. Preparation of Surgical Facilities and Instruments

A. Surgical Facilities

1. The Guide states, *“For most rodent surgery, a facility may be small and simple, such as a dedicated space in a laboratory appropriately managed to minimize contamination from other activities in the room during surgery”*.¹
2. The procedural area should be:
 - a. Clean and uncluttered
 - b. Dedicated solely to surgical procedures when in use
 - c. Away from laboratory traffic
3. Prior to surgery:
 - a. Clean and disinfect the procedural area
 - b. Place a clean, absorbent pad over procedural area

B. Surgical Instruments

1. Instruments must be sterilized prior to surgery by an appropriate means.
 - a. Autoclave (recommend)
 - b. Hot bead sterilizer
 - c. Chemical sterilization
 - i. **Alcohol is not an instrument sterilant.**
 - d. Gas sterilization (ethylene oxide)
2. When performing surgeries on multiple animals during a single session, instruments must be sterilized between animals.
3. **Autoclave sterilization**
 - a. ideal method for initial sterilization of instruments
 - b. recommend double wrapping of packs
 - c. when packing, place sterilization indicator inside pack (commercial strips or piece of autoclave tape)

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4. Hot Bead sterilizer

- a. Remove all organic matter (e.g. blood, tissue) from instruments
- b. Wait until the “STERILIZE” light illuminates (Sterilizer takes approximately 30 minutes to reach minimum decontamination temperature (450° F). Glass beads will continue to heat up and stabilize at approximately 500° F)
- c. Gently insert the instrument at least one (1) inch into the glass beads
 - i. One (1) micro dissecting instrument should be allowed to stand for at least 15 seconds
 - ii. Larger instruments should stand for at least 1 minute
 - iii. If inserting more than 1 instrument, it is recommended that decontamination time be doubled
 - iv. **NOTE:** Do not place more two (2) instruments in glass bead well at a time. Overloading the sterilizer will drop the temperature and decontamination cannot be assured
- d. Remove instruments from sterilizer
 - i. Make sure that no glass beads are attached or stuck to your instruments (Failure to detect beads could have an adverse effect on the surgical site)
 - ii. Tap instrument lightly on the side of the bead well to remove beads
 - iii. Place instruments on a sterile surface to allow to cool before using
- e. **NOTE:** Only the tips of the instruments are sterilized. The handles are considered contaminated.²

5. Chemical Sterilization (Cold Sterilization)

- a. Must use chemicals classified as “sterilants” (Disinfectants, such as alcohol, are not adequate)
- b. Sterilant should be clean and fresh
- c. Place instrument in the “open” position and completely immerse in sterilant (all surfaces must be exposed to the sterilant)
- d. **Leave instrument in sterilant for recommended contact time for sterilization**
- e. Remove instruments and rinse with sterile saline or sterile water

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6. Gas sterilization (ethylene oxide)

- a. Consult with the LAF veterinary staff

III. Preparation of the Animal

- A. Preferably, animals should be prepared for surgery in a separate location from the procedural area. If a separate location is not available, place a fresh absorbent pad over the procedural area after animal prep.
- B. Remove hair from surgical site (e.g. clippers, depilatory cream)
- C. Perform a surgical scrub of the incision site using an appropriate disinfectant (e.g. Betadine, Chlorhexidine, alternating with alcohol.

Alcohol alone is not adequate)

1. Apply the disinfectant using a cotton gauze or swab in a circular pattern, starting with the interior of the surgical site working outward (**NOTE:** Dispose of gauze after one pass. Do not reapply gauze to surgical site)
 2. Remove disinfectant with alcohol and clean gauze
 3. Repeat three (3) times.
- D. Drape animal with sterile drape to avoid contamination of the incision site.
 - E. Place lubricating ophthalmic ointment in animal's eyes to prevent drying.

IV. Preparation of the Surgeon

- A. Wash hands with appropriate antiseptic soap.
- B. Wear mask, sterile gloves and scrub shirt/lab coat.
- C. Long hair should be pulled back.
- D. **NOTE:** If performing surgeries on multiple animals in one sitting, one (1) pair of sterile gloves can be used at the start, provided that gloves are disinfected (by wiping with appropriate disinfectant) between animals.

V. Intra Operative Monitoring

- A. Monitor animal regularly during the procedure
 1. Withdrawal reflex (toe pinch)
 2. Mucous membrane color (should remain pink)
 3. Respirations
 4. Body temperature
- B. Written records for individual animals should be maintained for surgeries; should contain:
 1. Surgeon's name
 2. Animal identification
 3. Drugs (including dosages, routes of administration and time given)

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4. Surgery start/stop time
5. Parameters monitored and any complications noted
6. Analgesics given (dosages, route, time given)

C. Animals should not be left alone during surgery. Continuously monitor the patient.

VI. **Wound Closure**

- A. Apply enough tension to join edges, do not force edges together as painful swelling will occur.
- B. Avoid “wicking” type sutures like silk on the skin. (in animals, this material absorbs contaminants from the cage and “wicks” them under the skin)
- C. Ligate with square knots to minimize suture failure.

VII. **Post-operative Monitoring**

- A. Animals should be monitored until fully conscious.
- B. To minimize hypothermia, cages can be placed on a circulating water blanket or heating pad.
- C. Once conscious, animals may be returned to the LAF facility. Animals should be observed at least daily to ensure there are no complications.
- D. Wound clips and sutures should be removed in 7 – 10 days if surgical wound appears normal.

VIII. **“Tips Only” Technique**

This technique should only be used in minor procedures (i.e. procedures not opening a body cavity)

- A. The tips of the surgical instruments remain sterile throughout the procedure. Only the sterile tips of the instruments enter the surgical site.
- B. Handles of the instruments are considered “contaminated”.
- C. This technique does not require the surgeon to wear sterile gloves, clean exam gloves are acceptable.

¹ National Research Council, 1996, *Guide for the Care and Use of Laboratory Animals*, National Research Council, p. 78, National Academy Press

² Guidelines from the Operating Manuel for the Germinator 500 dry bead sterilizer.

³ NIH Guidelines (http://oacu.od.nih.gov/ARAC/documents/SurvSx_101007F.pdf)