



THE UNIVERSITY OF TOLEDO

SUBJECT: **Surgery Guidelines**

DATE: March 19, 2025

University of Toledo Guidelines on Surgery

1. Introduction

Successful surgical outcomes in research animals of all species (including mice and rats) require the same techniques and procedures as in any veterinary practice. Proper aseptic techniques must be employed to prevent surgical-related infections, and appropriate anesthetics and analgesics must be used to prevent or mitigate pain, distress and discomfort. Researchers performing surgical procedures in all animals must adhere to the following guidelines.

2. Principles

- a. All survival surgeries must be performed using aseptic techniques.
- b. Major survival surgical procedures on USDA-covered species must be performed in dedicated surgical facilities.
- c. A single animal may not undergo more than one major survival surgery unless the multiple procedures are required for the health of the animal or to meet the objective of a single animal research activity, justified for scientific reasons, and approved by the IACUC (See Multiple Survival Surgery policy).
- d. All surgeries must be performed by qualified, trained personnel using techniques that avoid or minimize pain (e.g., adequate anesthesia and analgesia).
- e. Research personnel must maintain adequate intra-operative (e.g., during the surgery) and postoperative monitoring records. IACUC members and veterinary staff may request copies of all such records for review without prior notice.
- f. Supplemental heat should be provided during surgery and recovery as animals lose their ability to regulate body temperature while under general anesthesia.
- g. Sterilization indicators should be used to validate that materials have been properly sterilized. Autoclave function should be verified quarterly.

via spore-kill test. Autoclaved packs may be kept up to 6 months if properly stored.

- h. Skin sutures or staples must be removed 10-14 days after surgery once the incision has healed.
- i. Non-survival surgical procedures do not require aseptic techniques or dedicated facilities, but should be performed in a clean, clutter-free area. The surgical site should be clipped. The surgeon should wear clean gloves. Instruments and surrounding area should be clean.
 - Expired materials (such as suture) may be used for non-survival surgical procedures. These expired materials should be clearly labeled as “expired/only for terminal procedures” and stored separately from in-date materials.

3. Records

- a. Surgical Records must include date, animal species and identification number (if applicable), name of the surgeon, IACUC protocol number, brief description of surgical procedure, body weight, dose, route, and time of all medications administered to the animal, notes concerning any complications encountered, euthanasia time and method (terminal surgeries only).
- b. Post-Operative Monitoring Records must include daily observations and care provided to the animal as described in the approved IACUC protocol, dose, route, and time of all medications administered to the animal, any complications encountered (e.g., delayed recovery from anesthesia, bleeding from incision site, wound dehiscence, etc.), contact information for research staff responsible for daily assessment and care. Records of postoperative observations and analgesic administration on rodents must be maintained at the cage level for ready inspection.
- c. Entries must include time, date, and initials of personnel performing the procedure.

4. Personnel Training

All personnel performing surgery must have thorough knowledge and understanding of the approved IACUC protocol procedures and must be trained by someone who possesses a knowledge of surgery policies, proper surgical technique, and familiarity with the relevant surgical procedure and with the anatomy of the species. DLAR provides basic surgical training; completion of the DLAR Aseptic Technique training session is required for all personnel that will be performing surgical procedures. It is the Principal Investigator's responsibility to provide training on the specific surgical procedure and confirm that the training is adequate. The PI must maintain training records for all members of the research team.

5. Procedures

Species	Procedure
Mouse and Rat	<p><u>Aseptic technique</u> is used for Survival Surgery.</p> <p><u>Surgery Area:</u> All hard surfaces (table, stereotaxic apparatus, etc.) in the immediate area of the surgery are disinfected before use. A dedicated space for survival surgery is recommended.</p> <p><u>Instrument Prep:</u> Instruments, sutures, wound clips, and implanted devices are sterilized in an autoclave or chemical sterilant prior to surgery, and a sterile field is maintained during surgery. Instruments are re-sterilized between rodents using a glass bead sterilizer. A new sterile surgical pack will be used every five (5) procedures.</p> <p><u>Surgeon Prep:</u> The surgeon wears a mask, cap, sterile surgical gloves, and disposable gown. The surgeon washes hands before donning gloves.</p> <p><u>Patient Prep:</u> If hair is present over the incision site, it is removed with clippers or depilatory cream to include an area approximately twice as large as the intended surgery site. Skin is disinfected using three alternating rounds of surgical disinfectant scrub/solution (povidone-iodine or chlorhexidine) with 70% isopropyl alcohol or sterile saline rinses. Care is taken to avoid over-wetting fur outside of the surgical area as this will increase hypothermia. Ophthalmic ointment should be placed in both eyes of anesthetized rodents. Sterile drapes are used to drape off the incision area. A source of supplemental heat (e.g., recirculating hot water pad, microwaveable gel pack) is used to prevent hypothermia.</p>

	<p><u>Signs of adequate anesthesia:</u> Surgery is not performed until rodents are unresponsive when their rear toes or tail are pinched.</p> <p><u>Recovery:</u> Rodents are placed in a clean cage with a paper towel placed on the bedding. The cage is placed in the incubator or provided supplemental heat. The rodents are directly observed at least once every 15 minutes until responsive to stimulation. They are not returned to the animal housing room until they are fully recovered from anesthesia (ambulating normally, able to eat, drink, and groom). Wet feed is given and food pellets placed on the floor of the cage to encourage animals to eat.</p> <p><u>Post-operative monitoring:</u> A Surgery Notification card is placed at the front of the cage card holder. Pain level, activity, and incisions are checked daily for a minimum of seven (7) days. Ensure incisions are closed and not infected (swelling, discharge, redness). Additional analgesic drugs are given for pain control. Sutures and wound clips are removed 10-14 days after surgery. The Attending Veterinarian (AV) is notified if post-surgical complications occur.</p>
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USDA-covered species (including Rabbits, voles, and other covered species)	<p><u>Aseptic technique is used for Survival Surgery.</u></p> <p><u>Surgery Area:</u> Surgery is done in a dedicated operating room.</p> <p><u>Surgeon Prep:</u> The surgeon wears a mask, cap, sterile surgical gloves, and sterile gown. The surgeon performs a thorough surgical hand scrubbing before donning gloves.</p> <p><u>Patient Prep:</u> The hair over incision areas is removed in an area approximately twice as large as the intended surgical site. A skin prep is done using at least three alternating rounds of surgical disinfectant scrub (povidone-iodine or chlorhexidine) with 70% isopropyl alcohol or sterile saline rinses. Sterile drapes must be used to protect the surgical field. Ophthalmic ointment should be placed in both eyes of anesthetized animals. A source of supplemental heat (e.g., recirculating hot waterpad) will be used to prevent hypothermia.</p> <p><u>Instrument Prep:</u> Instruments, sutures, wound clips, and implanted devices are sterile, and a sterile field is maintained during the procedure. Instruments are autoclaved between animals.</p> <p><u>Signs of adequate anesthesia:</u> Surgery is not performed until the animal is unconscious with good muscle relaxation, absent jaw tone, and the palpebral reflex is absent. Respiratory and heart rates are stable, and these do not increase in response to surgical stimulation.</p> <p><u>Monitoring frequency during procedure:</u> Record heart rate, respiration rate, and % anesthetic gas (if being used) every 10 – 15 minutes.</p> <p><u>Recovery:</u> Animals are monitored and vital signs (such as temperature, heart rate, respiratory rate, and capillary refill time) recorded at least once every 10-15 minutes. Animals are not left unattended. Monitoring continues until animals can maintain sternal recumbency. Animals are kept warm during recovery.</p> <p><u>Post-operative monitoring:</u> Pain level, activity, appetite, water consumption, general body condition, attitude, and incisions are checked daily. Ensure incisions are closed and not infected (swelling, discharge, redness). Additional analgesic drugs are given for pain control. Sutures and wound clips are removed 10-14days after surgery.</p>
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