



# Florida State University

## Guidelines for Survival Rodent Surgery

Both the *Guide for the Care and Use of Laboratory Animals* (PHS/NIH) and the Animal Welfare Act (USDA) stipulate that survival surgery for rodents be conducted in a humane and appropriate manner. All peri-operative care (pre-operative, intra-operative and post-operative) care of the animals should be in accordance with established veterinary practices.

**NOTE: Any deviations from the following guidelines must be submitted in either a protocol or significant change, reviewed and approved in advance by the FSU ACUC.**

### Items of note with regard to rodent survival surgery:

- All survival surgery will be performed using aseptic procedures. This includes use of sterile gloves, sterile instruments and aseptic techniques. All surgical instruments, implantable devices and equipment that will contact the surgical site must be sterilized before use. Any parenteral solutions to be used during surgery (e.g. anesthetics, pharmacologic agents, biologic substances) must be prepared and maintained in a sterile manner.
- All personnel performing surgery must be appropriately trained such that all aseptic procedures are followed routinely and that good surgical technique is practiced. Surgery training and practice surgeries must be done under the supervision of the LAR veterinarians or a protocol's principal investigator or senior experienced lab personnel.
- While use of a dedicated surgical facility is not necessary, the surgical area should be uncluttered and disinfected prior to performance of any procedure. If performing rodent survival surgery in a laboratory, do so in an isolated area away from the flow of traffic and where contamination from other lab activities will be minimized.
- Instruments and gloves may be used for a series of animals during the same surgical session provided they are kept clean and disinfected between animals.

### Personal Protective Equipment (for the benefit of both human and animal):

1. Clean lab coat or disposable gown
2. Sterile gloves
3. Surgical Mask (*recommended, but not required*)

### General and Pre-operative Essentials:

1. The physical area where surgery will be performed must be prepared by removal of all extraneous items not immediately needed for surgery and the surface disinfected. Animals are to be in good health. Rodents should be alert, exhibit normal behavior and have good coats, clean eyes and be of normal weight. Should the animal not appear healthy, contact the LAR veterinarians for a physical assessment before proceeding with surgery.
2. Withholding food and/or water is usually not necessary for rodents. If such is dictated by the surgical procedure, consult with a LAR veterinarian for the length of time needed.
3. If necessary, anesthetize the animal before skin preparation. Prepare the surgical site on the animal by clipping or shaving of hair. Fur removal should be done in an area away from the surgery 'table' to avoid contamination with hair clippings. If necessary, vacuum or use tape to remove hair clippings that cannot be brushed away. This will reduce contamination of the surgical incision.
4. Prepare the surgical site with appropriate skin disinfectants. The surgical incision site must

be scrubbed with either a povidone- iodine scrub (e.g. Betadine®) or a chlorhexidine scrub (e.g. Nolvasan®). Scrub should be applied either working from the center outward in a circular fashion or from the center to one end, taking care never to backtrack. Surgical scrub should be wiped off with 70% alcohol. This process should be repeated three times (more if the animal is very dirty). Try not to soak the animal as this may lead to hypothermia.

5. If not done prior to skin disinfection, position and fix the animal into place. If using a stereotaxic apparatus, only blunt ear bars may be used to avoid trauma to the ear drum.
6. Any animal that will remain anesthetized for 30 minutes or longer should have a bland ophthalmic ointment (e.g. Paralube® or Lacrilube®) instilled into the eyes to avoid corneal drying.
7. Provide any pre-operative analgesic or antibiotic if stipulated in the animal use protocol.
8. Surgeons must wash hands prior to donning sterile gloves. Drape the animal or surgical site with a sterile drape if desired. Use of a sterile drape to protect the surgical site is also useful for providing a sterile surface upon which sterile instruments may be placed.

### **Intra-operative Essentials**

1. All animals must be checked and in a surgical plane of anesthesia prior to making any incision. All animals must be maintained in a surgical plane of anesthesia throughout the procedure. Monitor the patient using species appropriate techniques (e.g. tail pinch, toe pinch, palpebral response, respiratory rate, heart rate, mucous membrane color) for plane of anesthesia and viability.
2. Maintain body temperature by use of drapes, re-circulating warm water pad, warm water bottles, etc.). Use of dry electric heating pads is discouraged as these may cause thermal injury to animals. Additionally, use of heat lamps are discouraged during surgery due to the tendency to dry out the corneas and manipulated tissues.
3. Begin surgery with sterile instruments. Instruments must be sterilized using an appropriate technique. Instruments may be used for more than one animal, but must have any gross contamination with organic matter removed before disinfection via an appropriate method. To allow for appropriate disinfection contact time, have two (2) or more surgical packs of instruments sterilized before starting a group of animals.
4. If at any time in a procedure gloves or an instrument becomes contaminated, stop and discard the contaminated item and replace with sterile or disinfected items.
5. Practice good surgical technique. Use gentle tissue handling, minimize any tissue dissection to avoid tissue trauma and dead space, use instruments appropriately and provide effective hemostasis.
6. Close surgical incisions with the appropriate suture and suture pattern or wound clips. Use a layered closure if appropriate for the surgical incision.

### **Post-Operative Essentials**

1. Move animal to a warm and dry area for recovery. Use of a re-circulating warm water pad is recommended. Regardless of heat source, ensure the animal can relocate to an area of the cage away from the heat source. **Unconscious animals must not be left unattended. All animals must be monitored until they are able to achieve and maintain sternal recumbency.**
2. Return the animal to its usual housing area only after it has fully recovered from anesthesia. NEVER place an anesthetized animal in a cage with an awake animal.
3. Administer any analgesic as described in the animal use protocol. **Analgesia must be administered as described in the animal use protocol unless otherwise scientifically justified and approved by the ACUC.** If significant blood loss occurred during surgery or if surgery was prolonged, administer an appropriate amount of warmed sterile saline or lactated ringers solution (1-2 ml/mouse; 1-2 ml/100 grams body weight rat)

4. Daily brief entries as to the animal's condition should be made for 7-10 days following the procedure or until sutures are removed, the animal dies, the animal is euthanized or an incision has healed (whichever event occurs first). Sutures or staples must be removed unless exempted in the ACUC approved protocol.
5. Remove skin sutures/staples at 7-10 days after surgery.

***NOTE: Any deviations from the preceding must be submitted in either a protocol or significant change, reviewed and approved in advance by the FSU ACUC.***

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