



## Animal Facility SOP 34.2 Survival Surgery

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### Rodent Surgery Techniques and Tips

#### I. Purpose:

Post-operative infections in rodents can and do occur. Such infections, which may not be apparent on casual observation, can cause numerous changes in physiological parameters and can endanger the results of a study. This procedure provides guidelines to be followed for successful rodent surgeries.

#### II. Scope:

These guidelines apply to all surgical procedures performed on rodents at the BSSC Vivarium in which the animals are expected to recover from anesthesia.

#### III. Definitions

**3.1 Survival surgery** is any surgery in which the animal (rodent) is not euthanized following anesthesia.

**3.2. Minor Survival Surgery** is defined as any procedure which does not expose a body cavity and causes little or no physical impairment. Minor surgeries are often performed under less stringent conditions than major surgeries but still require aseptic technique, sterile instruments, and appropriate anesthesia/analgesia. Minor surgeries include, but are not limited to, peripheral vessel cannulation, percutaneous biopsy, wound suturing, and some surgeries of the cranial cavity.

**3.3. Major Survival Surgery** penetrates and exposes the cranial, abdominal, or thoracic cavities. Any procedure that might leave the rodent with a permanent change in ability to behave in a species-appropriate manner, whether physical or physiological, would also be considered major surgery. The use of aseptic technique is mandatory in these surgeries to minimize the possibility of post-surgical infection.

#### 3.4 Procedure Location:

A designated area (116T) is required for rodent surgery. Surgery should be conducted in a low traffic, uncluttered area which promotes asepsis during surgery. Surgical tables and equipment must be made of impervious materials that can be disinfected. Cardboard and unsealed wood are unacceptable.

#### 3.4 Animal Preparation:

Animal preparation should take place in an area separate from where the surgery is to be conducted. Prepare the animal by removing hair from the surgical site. This can be accomplished via clipping of the hair using clipper blades size 40 or above, or through the use of depilatory creams (specific methods will be included in your animal use protocol).

Prepare the surgical site with a 3-step solution preparation. First scrub with disinfectant soap (e.g. chlorhexidine or betadine “sudsing” scrub), followed by a 70% alcohol wipe (these two steps should be repeated at least once), and finally iodine solution painted on the site. Minimize soaking the body of the rodent as this could lead to hypothermia and possible death.

A small amount of plain, sterile ophthalmic ointment should be instilled in each eye of the anesthetized animal prior to surgery to prevent corneal drying. Use only ophthalmic products. Do not use Vaseline/petroleum jelly.

Surgeons should wash their hands with an antiseptic surgical scrub prior to donning sterile gloves. Sterile gloves and a surgical mask must be worn by the surgeon and any assistants working in the immediate surgical field. Wearing a clean lab coat or clean scrub suit is mandatory.

### **3.5 Surgery:**

The animal should be maintained in a surgical plane of anesthesia throughout the procedure. Monitoring of anesthetic depth is critical. Periodic observation of respiration, mucous membrane color, and toe pinch (pain) reflex every 15 minutes are recommended. If an animal responds to any surgical manipulation despite appearing at a surgical plane of anesthesia as assessed by other methods, anesthesia levels must be altered to bring the animal back to a surgical plane.

For surgical procedures, supplemental heat must be provided to the animal to prevent hypothermia. Water circulating blankets are recommended. Heating pads should be avoided, unless they are specifically made for animal surgical purposes, as they can cause severe thermal burns to anesthetized animals. Other options such as microwaveable heating pads, microwaved fluid bags are also appropriate for short term procedures. Heating lamps are liable to cause burns and should not be used. Begin surgery with sterile instruments, supplies, and wound closure materials. All instruments and materials used in the surgical procedure must be handled aseptically. Surgical instruments may be used for more than one animal but must be carefully cleaned and disinfected between animals.

- a. Alternating two or more sets of instruments is one way to allow adequate time for instruments to soak in a disinfectant or sterilant solution. Alcohol is not considered a sterilant.

b. A glass bead sterilizer can be used to sterilize the tips of the surgical instruments between animals.

C. Draping the surgical site with sterile drapes to avoid contamination of the incision, instruments, and supplies is preferred. Sterile drape should cover all exposed parts of the rodent's body (tail, feet, etc.) Sterile cloth (tightly woven linen), plastic, or paper can be utilized to prevent contamination of the instrument tips and exteriorized tissues.

d. Monitor and evaluate the animal's vital signs and anesthetic depth during surgery every 15 minutes. Close surgical wounds using appropriate techniques and materials.

Closure of the skin with non-capillary (monofilament), non-absorbable material is essential to reduce the risk of postoperative infection.

### **3.6. Post-operation**

1. Move the animal to a warm, dry area in its own cage and monitor vital signs at least every 15 minutes until the animal can make normal postural adjustments.
2. Provide analgesics as approved in your protocol. Record on the "Rodent Anesthesia &/or Surgery Report" form.
3. Administer warmed subcutaneous fluids as necessary to replace fluid loss, provide heat during recovery, and offer highly palatable and moist foods on floor of the cage (wet chow).
4. Record your observations on the "Rodent Anesthesia &/or Surgery Report" form in the white Rodent Care folder in the animal rooms. Place a post-surgical card on the Cage card indicating date and time the animal was returned to the cage.
5. Animals should not be returned to group housing only after they have fully recovered from anesthesia. The postoperative card should be transferred to the cage card to facilitate post procedural monitoring. This monitoring is in addition to the monitoring specified by the approved IACUC protocol.
6. Postoperative checks should include examination of incision sites for loss of sutures, redness, discharge, and/or swelling. Also ensure the animal is eating, drinking, urinating, and defecating.
7. Readminister analgesics as required by the approved IACUC protocol.
8. Remove skin sutures, wound clips, or staples 7 days following surgery.
9. In the event of a postoperative complication (infection, lengthy recovery) contact the veterinarian Dr. Matt Terzi (443-970-8686) immediately.

**This standard operating procedure was adapted from**

<https://www.buffalo.edu/content/dam/www/research/pdf/laf/sop/2A3.pdf>

### **Post Operative Observation**

[https://docs.google.com/document/d/1INvXbkEDpDjtua-1o\\_X6vsPAZAHvf7tizJ-A4Nk0O\\_Q/edit?usp=sharing](https://docs.google.com/document/d/1INvXbkEDpDjtua-1o_X6vsPAZAHvf7tizJ-A4Nk0O_Q/edit?usp=sharing)

