

**SURGERY GUIDELINES –
RODENTS**
IACUC Guideline
Effective Date: August 2017



Program Scope:

These guidelines apply to all surgical procedures performed on rodents.

Section 1 - Survival Surgery in Rodents

Section 2 - Non-Survival (Terminal) Surgery in Rodents

Section 1 - SURVIVAL SURGERY

Any surgery conducted on animals that are expected to recover from anesthesia is considered survival surgery.

General:

Refer to the IACUC Anesthesia guidelines for more details about rodent anesthesia. Survival surgery on rodents should be performed using sterile instruments and sutures, clean or sterile surgical gloves, and aseptic procedures to reduce microbial contamination of exposed tissues to the lowest practical level.

PROCEDURES

Pre-Operative:

1. Surgery should be conducted in an uncluttered, disinfected area that promotes asepsis during surgery. Sanitize the counter/lab bench with bleach solution, chlorhexidine, or Clidox before surgery. The use of alcohol is discouraged due to long contact time required to take effect (15 minutes). Use sterile drapes, clean absorbable pads or towels, and replace these materials after each surgery session.

All instruments and implants must be cleaned and sterilized prior to use. Before sterilization, any organic material must be removed from instruments and implants. Preferred methods are steam autoclave, glass bead sterilizer, ethylene oxide gas, or hydrogen peroxide vapor sterilization.

Chemical sterilization may also be used. The methods utilized must take into account contact time, chemical sterilant used, and items being sterilized. These agents must be used with appropriate safety precautions and ensure that the items being sterilized are compatible with the sterilant. Examples of common commercial sterilants:

- Cidex: glutaraldehyde
 - Active for 15 days once prepared
 - 10 hours of exposure required for sterilization
- Spor-Klenz: Hydrogen peroxide
 - Use immediately, do not store
 - 11 hours of exposure required for sterilization
- Sporicidin: glutaraldehyde (1.12%), phenol (1.92%), sodium phenate (0.01%)
 - Active for 28 days once prepared
 - 6.75 hours of exposure required for sterilization

Label packaged instruments and implants with date of sterilization.

2. As soon as the animal is anesthetized, shave/remove fur from the surgical site (anatomic site) the minimum amount of fur necessary in order to maintain asepsis during surgery so that instruments will not brush against areas outside of the surgical site. Perform this procedure in a location separate from where the surgery is to be conducted (i.e. a separate lab bench).
3. Administer any pre-operative analgesics per the IACUC-approved protocol.
4. Apply ophthalmic ointment (eye lube) to the animal's eyes to prevent corneal damage.
5. Disinfect the surgical site (anatomic site) with dilute chlorhexidine or betadine scrub. Three alternating scrubs each of disinfectant and alcohol (or sterile saline) are recommended. Alcohol by itself is not an appropriate skin disinfectant for surgery.
6. Surgeons should don a clean lab coat or scrub top and a mask. A surgical bonnet is also recommended. Wash and dry hands and/or apply foam or gel disinfectant before aseptically donning surgical gloves. Place a sterile drape over the non-sterile part of the animal to prevent contamination of instruments and suture from exposed fur.

Note on gloves: Sterile gloves are required if you will be touching the animal or the tips of your sterile instruments with your hands. If you will only be touching the handles of your instruments, then clean, non-sterile gloves are acceptable.

Operative:

1. Provide the animal with a heat source for the duration of the procedure. Circulating warm water blankets and heating pads are preferred over heat lamps. Always have a towel or drape between the heat source and the animal.
2. Test the depth of anesthesia by performing a toe pinch on both rear feet. If toe pinch elicits a response, adjust your anesthesia accordingly, and re-test before making your incision.
3. Monitor the animal's vital signs, such as respiratory pattern, skin/mucous membrane color, and depth of anesthesia. If the animal responds to stimuli during surgery, stop the procedure until additional anesthetic is administered and toe pinch elicits no response.
4. Handle sterile instruments aseptically to minimize contamination. A bead sterilizer may be used mid-procedure if an instrument becomes contaminated. Make sure instruments are cool to the touch prior to using on the animal. Hot instruments are extremely damaging to tissue.
5. Instruments and gloves may be used for a series of similar surgeries provided they are still clean and are re-sterilized between animals. Bead sterilizers can be used to re-sterilize instruments. Gloves should be changed if soiled; if not soiled, spray with disinfectant. A new set of autoclaved instruments should be used for every cage. Keep sterile instruments on a sterile field when not in use.
6. Close incision using appropriate techniques and materials. If thorax or abdomen has been opened, a two-layer closure should be performed.

Post-Operative:

1. Recover the animal according to the IACUC anesthesia guidelines.
2. Place Surgery Green Tag on cage. Fill in dates and initial. Remove after 7 to 14 days.
3. Monitor animal post-operatively for signs of distress or discomfort: abnormal posture or movement, inappetance, increased attention to surgical site. Contact LARC if there are recurring problems with recovery.
4. Administer post-operative analgesics per the IACUC-approved protocol.
5. Clean and dry all surgical instruments and re-assemble them to be sterilized again. Dispose of all soiled drapes, pads, towels, etc. Place all sharps in sharps disposal container.
6. Minimum required documentation: animal/cage ID, date, anesthetic and analgesic agents and doses, surgical procedure performed, and any surgical or anesthetic complications. If the protocol describes other parameters that will be recorded, these must be documented in addition to the above records.
7. Post-op animals should be monitored at least once daily for 3 days for any signs of discomfort, decreased appetite, or delayed wound healing. Document any problems and consult with LARC if complications recur.
8. Remove wound clips or skin sutures 10-14 days post operatively. Female mice that undergo surgery for embryo transplantation may have their wound clips left in until their pups have been weaned. Any other exceptions must be described in the IACUC-approved protocol.

In case of emergency, contact the LARC on-call veterinarian at 502-8687.

Section 2 - NON-SURVIVAL (TERMINAL) SURGERY

Any surgery conducted on animals that are not allowed to regain consciousness is considered non-survival surgery. This includes terminal vascular perfusion.

- Non-survival surgeries require neither aseptic technique nor dedicated facilities, provided that animals are not anesthetized long enough to develop infections.
- Non-survival surgeries not performed aseptically or in a dedicated facility must at least be performed in a clean area, free of clutter. Personnel present in the area must observe reasonable cleanliness practices for both themselves and the animals.
- No expired drugs or fluids are allowed. Pharmaceutical-grade agents (USP) must be used unless an exemption is approved by IACUC.
- The IACUC must approve monitoring parameters for this type of surgery. The protocol must also describe the length of the procedure and steps taken to minimize the possibility of infection.
- The method of euthanasia should be consistent with the AVMA Guidelines on Euthanasia and must be listed in the approved IACUC protocol.