IACUC Policy on Survival Rodent Surgery

References:

General: The following principles apply to survival rodent surgery:
- Appropriate attention to pre-surgical planning, personnel training, aseptic and surgical technique, animal well-being, and animals physiologic status during all phases of a protocol will enhance the outcome of surgery.
- A dedicated surgical facility is not required.
- All survival surgery will be performed by using aseptic procedures, including masks, sterile gloves, sterile instruments, and aseptic techniques.
- It is important for research personnel to be appropriately qualified and trained in all procedures to ensure that good surgical technique is practiced. Good technique includes:
  - Asepsis
  - Gentle tissue handling
  - Minimal dissection of tissue
  - Appropriate use of instruments
  - Effective hemostasis
  - Correct use of suture materials and patterns or other wound closure techniques
- Investigators should work closely with their veterinarian to assure that the challenges of multiple surgeries, for example those that occur in the production of genetically engineered mice, are adequately addressed procedures
- Protocol specific situations may require variances to the policy. These situations should be discussed with the veterinary staff under IACUC policy and should be reflected within the protocol under survival surgery asepsis.
- Surgical procedures are categorized as major and minor.
  - MAJOR SURGERY: Any surgical intervention that penetrates and exposes a body cavity or produces substantial physical or physiological impairment (such as laparotomy, thoracotomy, craniotomy, joint replacement, or limb amputation)
  - MINOR SURGERY: Any surgical intervention that does not expose a body cavity or causes little or no physical impairment (such as wound suturing, peripheral-vessel cannulation, or routine farm animal procedures such as castration, dehorning, repair of prolapses, or
outpatient procedures done in a veterinary clinical practice). Minor procedures still require aseptic technique and instruments, as well as anesthesia.

- ASEPTIC SURGICAL PROCEDURES: Surgery performed using procedures that limit microbial contamination so that significant infection or suppuration does not occur.
- STERILIZATION: The process whereby all viable microorganisms are eliminated or destroyed. The criterion of sterilization is the failure of organisms to grow if a growth-supporting medium is supplied.
- DISINFECTION: The chemical or physical process that involves the destruction of pathogenic organisms. All disinfectants are effective against vegetative forms of organisms, but not necessarily spores.

**Sterile Surgery Technique**

A. Personal Protective Equipment
   1) Clean lab coat or scrub top
   2) Mask
   3) Hair Bonnet
   4) Shoe Covers
   5) Gloves for preparing animal for surgery and disinfecting surgical area.
   6) Sterile surgical gloves during surgery. Using sterile surgical gloves allows you to touch all areas of the sterile surgical field and surgical instruments with your gloved hand.

B. Pre-Operative
   1) Prepare instruments by sterilizing prior to use. Multiple methods are available for sterilizing instruments prior to contact with animal tissues. These include autoclaving, dry heat sterilizing, ethylene oxide, or chemical agents.
      a. Autoclaving or dry heat sterilizing are preferred methods.
      b. Alcohol is not a recognized method for sterilizing instruments.
      c. When chemical sterilization is used the following must be followed:
         i. The use of chemicals classified as sterilants. Chemicals classified as disinfectants are not adequate.
         ii. The items being sterilized must allow for all surfaces to be exposed to sterilant (inside and out), impervious to moisture, and relatively smooth.
         iii. The items must be exposed to the prescribed amount of time required by the manufacturing company or the CDC.
         iv. The sterilant must be clean, mixed properly, and used within its activated shelf life.
         v. Instruments must be rinsed with sterile water or sterile saline prior to use on animal tissue.
   2) Surgery should be conducted in a disinfected, uncluttered area promotes asepsis during surgery. A separate prep area and surgery area should be
present.

a. Disinfect the surgical area by cleaning with a disinfectant. Appropriate contact time must be used.

b. Commonly used disinfectants are quaternary ammonium compounds, chlorine dioxide-based sterilant (Clidox), chlorhexidine (Nolvasan), 70% alcohol, or other antimicrobial agent. Disinfectants must be prepared and used according to the manufacturer’s recommendations.

3) Anesthetize the animal according to approved IACUC protocol methods.

4) Prepare the animal by removing hair from the surgical site. Perform this procedure in an area separate from where the surgery is to be conducted (prep area).

5) Prepare the surgical site(s) with an appropriate skin disinfectant.
   a. Alternating a surgical scrub (iodophor or chlorhexidine) with 70% alcohol will allow for good surgical site skin disinfection.
   b. Starting at the incision site, using gauze or cotton tip applicators apply the surgical scrub in a circular motion moving outwards away from the incision site. Repeat with alcohol in a circular motion from the incision site. Repeat this procedure 3 times.
   c. AAALAC recognizes a 1min rinse with alcohol as a suitable disinfectant.

6) A sterile ophthalmic lubricant should be used if the surgery will last longer than 30 min, to protect the cornea’s of the research animals.

7) Heating pads should be utilized to prevent hypothermia during surgery. Care should be used to prevent overheating or burning of animals.

8) Transfer the animal to the heated surgical area, being careful not to touch the prepped surgical site.

9) Surgeons should wash and dry their hands before aseptically donning sterile surgical gloves.

C. Operative:

1) The animal must be maintained in a surgical plane of anesthesia throughout the procedure.

2) Drape the surgical area with a sterile drape: precut drapes, sterile gauze, or clear drapes are all acceptable.

3) Begin surgery with sterile instruments and sterile surgical gloves. A sterile field must also be maintained for the sterile instruments, this can include the inside of the autoclaved instrument holder, a sterile drape, or the inside of sterile gloves packaging. Sterile instruments and gloves must not touch anything outside the sterile field, otherwise they will be considered non-sterile. Sterile gloves will allow the surgeon to manipulate tissues with sterile gloved hands or instruments.

4) Instruments and gloves may be used for up to 5 similar surgeries provided they are maintained clean and disinfected between animals. Instrument tips can be sterilized within a bead sterilizer requires 10-15 sec within heated beads. Instrument must be allowed to cool for approximately 30-60 sec prior to reuse. Sterile surgical gloves can be disinfected with alcohol as long as they have not touched anything non-sterile. Note, that the surgeon cannot touch the alcohol
container unless it is also sterile. Please use a second person to help with spraying alcohol on surgical gloves or pick up the alcohol container with sterile gauze, discarding the gauze once used, or change sterile gloves between animals.

5) Monitor and maintain the animal's vital signs, i.e. respirations, heart rate, and temperature.

6) Close surgical wounds using appropriate techniques and materials. Note needles and suture material must also remain sterile.
   a. WOUND CLOSURE SELECTION
      i. Suture gauge selection: Use the smallest gauge suture material that will perform adequately.
      ii. Cutting and reverse cutting needles: Provide edges that will cut through dense, difficult to penetrate tissue, such as skin.
      iii. Non-cutting, taper point or round needles: Have no edges to cut through tissue; used primarily for suturing easily torn tissues such as peritoneum or intestine.

D. Post-Operative:
   1) Move the animal to a warm, dry area and monitor it during recovery. Return the animal to its routine housing only after it has recovered from anesthesia (e.g., the animal can maintain itself in sternal recumbence).
   2) Provide analgesics as appropriate and approved in your IACUC protocol.
   3) Place a postoperative tag behind the cage card, noting the date and contact information for the surgeon.
   4) Generally, remove skin closures 10 to 14 days post-operatively.
   5) Maintain a surgical record. Examples of surgical records are found at the end of the policy.

Alternative “Tips Only Technique”

Using clean exam gloves and a “tips only” technique restricts the surgeon to using only the sterile working ends of the surgical instruments within the surgical field. The gloved hands must never touch the sterile ends of the instruments, the suture, suture needle, or any part of the sterile surgical field. This technique is useful when working alone or manipulating non-sterile objects. All techniques described above are applicable except for the following:

A. Personal Protective Equipment
   1) All PPE is the same as above with the exception of use of sterile gloves. Clean exam gloves can be used in its place.

Pre-Operative
   1) Instrument tips can be sterilized within a bead sterilizer, requires 10-15 sec within heated beads. Instrument must be allowed to cool for approximately 30-60 sec prior to reuse. Once sterilized, remove instruments from bead sterilizer and place sterile tips on sterile gauze or other sterile field. Do not place the
instrument tips on the surgery table or other non-sterile field. Place all sterile equipment such as scalpels and suture material on to the sterile field as well, opening them in a manner that prevents contamination.

2) Changing to new clean exam gloves is necessary after animal has been prepped for surgery.

Operative
1) Sterile drapes must be handled by the edges to prevent contamination.
2) Remember that only the sterile tips of the instruments can come into contact with the sterile field.

All further steps are the same as above, including post-operative procedures.

NON-Survival Rodent surgeries

An animal is euthanized before recovery from anesthesia. At minimum the surgical site must be clipped, surgeon should wear gloves, and the instruments and surrounding area should be clean.
Surgical Form
(short form)

Date:_________ Procedure: ___________________  Survival Surgery: □ Yes □ No

Surgery Start Time:_________  Surgery End Time:_________

Drugs/Medications (please list dosage):

Post Surgery (Recovery)- IF SURVIVAL, Animal Health Description:
Surgical Form
(Long form)

Date: ______ Cage Card ID: _______ PI Name: _______ Protocol: _______

Survival Surgery: ☐ Yes ☐ No

Sex: ☐ Male ☐ Female

Species: ☐ Mouse ☐ Rat ☐ Other: ________________  Strain: ________________

Surgical Procedure(s):

Pre Surgical Evaluation

Overall Health of Animal ☐ Good ☐ Average ☐ Poor

Comments:

Pre-Anesthetics/Analgesics/Other Drugs-Time administered and dosage:

Surgical Evaluation

PROCEDURE DETAILS PLEASE SEE PROTOCOL

Start Time: _____ am/pm  End Time: _____ am/pm  Surgeon Name: _______

Heat Source Present: ☐ Yes ☐ No  Fluids Given: _______________________

Sutures Used: ____________________  ☐ Absorbable  ☐ NonAbsorbable

Anesthesia during Surgery: ☐ Isoflurane ☐ Avertin ☐ Ketamine/Xylazine

☐ Other: ____________________  Dosage: _______

NOTES (complications/other):

Post-Surgical Evaluation for Survival Surgeries

Overall Health of Animal ☐ Good ☐ Average ☐ Poor

Comments:

+/- Medications/Dosage:

Additional Health Monitoring (Date/Time/Health of Animal):