



Cornell University  
Cornell Center for Animal Resources and Education

CARE201.01 Rodent Surgery

The intent of this standard operating procedure (SOP) is to describe procedures for rodent surgery. This SOP is intended for use by personnel who will be performing surgery on rodents, or assisting in those procedures. This SOP is approved by the Cornell Institutional Animal Care and Use Committee (IACUC) and by the Cornell Center for Animal Resources and Education (CARE). Any exemptions must be approved by the IACUC prior to their application.

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### 1. Introduction

- a. **This document outlines pre-, peri-, and post-operative procedures performed when doing surgical procedures on rodents. These are basic guidelines and should be used in accompaniment with training.**

### 2. Materials

- i. Sterile isotonic solution for injection (e.g., saline 0.9%).
- ii. Analgesics
- iii. Anesthetics
- iv. Electric razor
- v. Gauze
- vi. Antiseptic detergent (e.g., chlorexidine, hibitane)
- vii. 70% Alcohol
- viii. Povidine solution
- ix. Sterile surgical instruments
- x. Sterile gauzes
- xi. Suture material or skin staples
- xii. Dry bead sterilizer or cold sterilization agents (e.g., glutaraldehyde) and 70% alcohol (as a rinsing agent)

### 3. Procedure

**Note:** Perform Preoperative procedures in the same room as the surgery but at a safe distance from the surgical environment in order to prevent its contamination with hair.

#### a. Preoperative Care

- i. Administer analgesics according to [CARE SOP 102 “Analgesia”](#).
- ii. Anesthetize the animal according to [CARE SOP 101 “Rodent Anesthesia”](#) (may be done after step 1.b.iii.). Apply ophthalmic ointment in both eyes to prevent corneal desiccation.
- iii. Administer 0.2–0.5 mL/10 g body weight of isotonic fluids subcutaneous for surgeries exceeding 30 minutes.
- iv. Shave surgical area and remove hair.
- v. Wash the skin with antiseptic soap, gauze and water.
- vi. Bring animal into surgical area.
- vii. Apply 70% alcohol with gauze, swabs or spray. Be careful not to wet a lot of the animal (heat loss).
- viii. Apply providine with gauze, swabs or spray.
- ix. For long incisions and/or long surgeries, repeat steps 7 and 8 twice.
- x. Surgeon's preparation:
  - Wear a surgical mask and a clean gown
  - Wash hands
  - **Use aseptic technique.** Wear sterile or alcohol aseptized gloves. The surgeon must avoid touching non sterile surfaces.
- xi. Cover the animal with a sterile drape:
  - For surgery involving long incisions or prolonged surgical time, and,
  - To prevent sutures from coming into contact with hair and skin around the surgical area. For minor incisions, the drape can be placed only when suturing the wound.

**Note:** Surgical drapes must be sterile for the first animal, and may then be transferred to the following animal during serial surgeries. The top surface of the drape must never come in contact with non aseptic areas, and must not be soiled.

#### b. Surgical Principles

- i. Ensure that all the available materials are at hand.
- ii. Begin surgery with clean and sterile surgical instruments.
- iii. Designate a sterile area on the working surface for the sterile material (instruments, suture material, drapes, gauze, etc.).

- iv. Prior to surgery, verify depth of anesthesia by loss of animal's pedal withdrawal reflex.
- v. Use a scalpel blade or scissors to make the smallest possible incision.
- vi. Avoid contact of tissues with fingers by using the tip of instruments.
- vii. Close the different tissue layers separately, such as peritoneum/abdominal muscles layer together, and subcutaneous tissue and then skin. For some surgeries, subcutaneous tissue may need to be sutured independently from the skin to prevent dead space.
  - Peritoneum/abdominal: Catgut, Vicryl, PDS, or Polypropylene; size 3-0 or 5-0.
  - Subcutaneous tissue: Catgut, Vicryl, PDS; size 5-0.
  - Skin: Polyamide-nylon, PDS, Vicryl; size: 3-0 or 5-0 or staples.

**ATTENTION: skin sutures must be removed after 10 days.**

- viii. Disinfect the instruments between each animal by dipping them in a dry heat bead sterilizer for approximately 5–10 seconds or in liquid sterilizing solution (e.g., glutaraldehyde or equivalent) for a few minutes (>5 minutes) and then rinsed with 70% alcohol. For liquid sterilization, it is recommended to use two alternating surgical kits in order to increase contact time with the solution.
- ix. Dipped suture material in 70% alcohol between each animal.

### **c. Surgical Monitoring and Supportive Care**

- i. Surgeries exceeding 15 minutes for mice or 30 minutes for rats require a contact heat source to prevent hypothermia.
- ii. Adjust the depth of anesthesia according to monitored parameters (presence of reflexes, the respiratory rate and breathing pattern, and when available, the heart rate).
- iii. In the case of respiratory arrest, stop anesthesia, administer oxygen and compress the thorax rapidly.

### **d. Postoperative Care**

- i. Postoperative care begins immediately following surgery and extends up to 10 days.
- ii. Observe the animal until it regains righting reflexes. Observe respiration and coloration of the eyes (for albinos), mucous membranes and skin.
- iii. Prevent heat loss and maintain the animal in contact with a heat source, if necessary. Administer oxygen if necessary.
- iv. Repeat analgesics post-surgically and for the next few days (usually for 72 hours), according to [CARE SOP 102 "Analgesia"](#).

- v. For surgeries exceeding 60 minutes, administer 0.2–0.5 mL/10 g body weight of isotonic fluids SC immediately. Fluids can be administered on the following days, to maintain the preoperative body weight.
  - vi. Examine the wound daily (for at least 5 days) and for invasive surgeries, measure body weight daily.
  - vii. Remove the sutures after 10 days.
4. Safety  
N/A
5. Contingencies  
N/A
6. References
- a. CARE SOP 101: Rodent anesthesia  
<http://www.research.cornell.edu/care/documents/SOPs/CARE101.pdf>
  - b. CARE SOP 102: Analgesia  
<http://www.research.cornell.edu/care/documents/SOPs/CARE102.pdf>

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