

University Animal Care Committee Standard Operating Procedure		
Document No: 7.4	Subject: Rodent Post-operative Care (Mice)	
Date Issued: July 23 rd , 2015	Revision: 3	Page No: 1

Location: Queen's University

Responsibility: Principal Investigators, Research Staff, Veterinary Staff

Purpose: The purpose of this Standard Operating Procedure (SOP) is to describe the common protocol for post-operative care of rodents (Mice).

Introduction and Definitions: It is the researcher's responsibility to ensure that adequate post-operative / post-anesthetic care is provided. The individual providing post-operative care must be trained appropriately. It is important to note that these guidelines are **MINIMUM STANDARDS ONLY**.

An uneventful recovery and a healthy animal are desirable both from the researchers' perspective and from the standpoint of animal welfare. Healthy animals provide more reliable data and decrease cost of treatment. The type of care required during the recovery period depends on two major factors. The first is the stage of recovery; more intensive care is required until the animal regains full consciousness. The second is the degree of invasiveness of the surgical procedure and the probability of post-operative complications. Post-operative care begins immediately following surgery and can extend up to 10 days or longer. These factors must be considered together when formulating a plan for recovering an animal from anesthesia.

The goals of this SOP are to provide guidance:

- for a rapid, smooth and minimally painful recovery
- to reduce the likelihood of complications; and
- to identify and correct, as quickly as possible, any complications that arise.

Abbreviations: Animal Care Services **ACS**, Principal Investigator **PI**, subcutaneous **SC**, intravenous **IV**, intraperitoneal **IP**, intramuscular **IM**, per os **PO**, per rectum **PR**

1. Materials:

- Heat source
 - Oxygen/induction chamber
 - Paper towel, large gauze
 - Clean recovery cage
 - Eye lubricant and sterile swabs
 - Sterile lactated Ringers solution or sterile 0.9% sodium chloride
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- Nutra-gel or moist chow
- Weight scale
- Surgical sheets/forms, cage cards

2. Procedures:

- Weigh and record the animal's weight on the day of surgery. Record the surgical procedure, all injections and any other standard procedure on the cage card. This information must also be included in the surgical sheets/forms (if used). Calculate the animal's 15% BW loss and record this on their animal cage card for quick access later on.
 - Pre-operative warming has shown to reduce perioperative hypothermia in surgical patients, (see link in references for full article).
 - Provide surgical analgesics as indicated in the protocol (typically for 72 hours post-surgery). It is recommended the initial dose is given shortly before surgery, for pre-emptive analgesia. Surgical patients can develop a heightened sensitivity to pain if it is left untreated. Neuropathways communicate pain sensations from the surgical site to the brain. Once that pathway is well worn, post-surgical pain can become more challenging to alleviate. Pre-emptive pain management helps patients avoid this scenario.
 - Once the surgical procedure is complete and anesthesia has been discontinued (if recovery surgery), administer 30ml/kg of room temperature Lactated Ringer's solution or 0.9% sodium chloride SC. Place the animal on a paper towel or gauze in a clean, dry cage free from other animals. The paper towel will prevent the animal from inhaling bedding during recovery.
 - Place half the cage on top of a heat source to facilitate maintenance of average normal body temperature (normal temperature is between 35.5 – 38.0 degrees celsius); alternatively, suspend a heat lamp above half of the recovery cage.
 - Observe the following every 5 minutes until the animal regains its righting reflex. Do not leave the animal unattended.
 - Respiration: ensure that the animal continues breathing and does not show signs of respiratory distress such as increased (laboured) respiratory rate or rapid shallow breaths. If this occurs, place the animal in the induction chamber with just the oxygen flowing until normal rate and depth of breathing occurs.
 - Coloration of eyes for albinos (the eye colour should remain red – opaque
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or blue-tinged indicate distress).

- o Color and moisture of the mucous membranes – these should be pink and moist with a capillary refill time of < 2 sec.
 - o Temperature: palpate the extremities (feet or tail) and/or take a rectal temperature to ensure that temperature does not go outside of physiologic parameters.
- Until the blinking reflex has returned, ensure eye lubricant is instilled.
 - If recovery is >5 minutes turn animal every 5 minutes. This stimulates the animal and also alternates the side of the chest (and lung) which the animal is laying on, thereby facilitating respiration.
 - Put a measured amount of food or Nutra-gel at the bottom of the cage. Alternatively, moist chow can be provided during the post-operative period to encourage appetite and facilitate hydration. Nutra-gel must be changed daily. **Moist chow: fill a small bowl or petri dish ¾ full with warm water and top up with a few (2-3) food pellets. Let sit for 10 minutes to allow water to be absorbed before placing in the animals cage.**
 - Animals should only be returned to an animal room or to their cage mates once they have recovered their righting reflex and are ambulatory.
 - Examine animal daily for signs of grooming, general appearance, posture and locomotor activity. If any signs of dehydration occur (ruffled coat, sunken eyes, prolonged skin tenting), administer 30-60 ml/kg of sterile Lactated Ringer's solution or sterile 0.9% sodium chloride SC daily until the animal's condition improves.
 - Ensure the animal is eating, drinking and eliminating normally.
 - Measure and record post-operative body weight daily, for a minimum of three days.
 - All procedures and drugs must be recorded on cage cards. Surgical sheets or forms are recommended, easily accessible by the Veterinary team (e.g. stored in the anteroom or treatment room). However, if all the information found in the book is recorded on the cage card, the Principal Investigator can forego this secondary documentation. General parameters to be recorded for rodent surgery includes: Surgery (on front of cage card), baseline and post-op Day 1, 2, 3 weight, anaesthetics (dose, rate, frequency), all pre-operative and post-operative analgesic and fluids (dose, rate, frequency).
 - Any irregularities in recovery must be brought to the attention of the clinical veterinarian. Continued weight loss, dehydration and lethargy are NOT acceptable. Refer to the Humane Interventions within the Animal Use Protocol (and the veterinarians) for guidance.
 - Monitor the animal daily for signs of surgical complications such as (but not limited to) pain, paralysis, or seizures.
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- Examine the surgical site daily for signs (such as redness, swelling or discharge) of inflammation, infection, and/or dehiscence for at least 5 days. Apply antibiotic ointment to incision as required.
- Remove the sutures or staples after 7 to 10 days, or as per protocol.

- **It is important to remember that the above represents minimum standards only.**

- **Animals experiencing complications require more frequent monitoring and care.**

References:

- <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC10744774/>

SOP Revision History:

Date	New Version
July 23 rd 2015	SOP Created
February 28 th 2019	Triennial Review
May 23 rd , 2019	Update
December 6 th , 2021	Triennial Review
June 3 rd , 2024	Triennial Review – updated format and added pre-warming patients, Nutra-gel, surgical log sheets and sterile injections.

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SX LOG: STUDENT AND LAB NAME: _____ CONTACT #: _____ PROTOCOL #: _____

ID:	DATE	WEIGHT	Analgesia (name) Dose Time	Analgesia (name) Dose Time	Eating	Drinking	NOTES (RECOVERY STATUS - <u>BAR?</u> , URINE, FECES, STAPLE/SUTURES INTACT, WOUND)
SURGERY					3-4 food pellets in cage	SC fluids? <input type="checkbox"/>	
DAY 1 POST							
Day 2 POST							
DAY 3 POST							
ID:	DATE	WEIGHT	Analgesia (name) Dose Time	Analgesia (name) Dose Time	Eating	Drinking	NOTES (RECOVERY STATUS - <u>BAR?</u> , URINE, FECES, STAPLE/SUTURES INTACT, WOUND)
SURGERY					3-4 food pellets in cage	SC fluids? <input type="checkbox"/>	
DAY 1 POST							
Day 2 POST							
DAY 3 POST							
ID:	DATE	WEIGHT	Analgesia (name) Dose Time	Analgesia (name) Dose Time	Eating	Drinking	NOTES (RECOVERY STATUS - <u>BAR?</u> , URINE, FECES, STAPLE/SUTURES INTACT, WOUND)
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SURGERY					3-4 food pellets in cage	SC fluids? <input type="checkbox"/>	
DAY 1 POST							
Day 2 POST							
DAY 3 POST							