1. Purpose

This document provides guidance for the provision of post-operative care to rodents.

1. Scope

This applies to all individuals providing post-operative care to rodents.

1. Guidance

The NRC *Guide for the Care and Use of Laboratory Animals*: states that an integral component of medical care is prevention or alleviation of pain associated with procedural or surgical protocols. Pain is a stressor and can lead to unacceptable levels of stress and distress in animals. Fundamental to the relief of pain is the ability to recognize its clinical signs in specific species, as species vary in their response to pain.

The NIH guidelines state that in general, unless the contrary is known or established, it should be considered that procedures that cause pain in humans may also cause pain in other animals.

1. Responsibilities

The surgeon and research staff are responsible for:

1. Reading and following all of the post-operative care instructions in the IACUC protocol and this policy.
2. Administration of analgesics, provision of supportive care and implementation of humane endpoints.
3. The surgeon or an assigned lab member must visually observe the animal(s) daily (at least once every 24 hours or more often as specified in the protocol), for a minimum of the first 3 days (for minor surgery) and 5 days (for major surgery) See IACUC Policy [Rodent Survival Surgery Requirements](https://www.montana.edu/orc/iacuc/policies/rodent-survival-surgery-requirements.html) starting the day after surgery (day 0 is the day of surgery). Daily observations must be performed if any animal in the cohort develops post-operative complications and must continue until all animals are stable. Observations must be documented in a post-operative log maintained in the animal housing room. If due to an emergency, the person assigned to observe the animals is unable to do so, they must arrange for another laboratory member to check the animals or promptly alert the ARC staff with a request that they check the animals.
4. The ARC Director and/or the AV must be notified in a timely manner if animal health problems (e.g., removal of sutures or infection of the incision) or unalleviated signs of pain or distress are observed. Food and water consumption of an individual animal as well as fecal and urinary output may be difficult to evaluate when rodents are group housed. If you are not sure if the animal is eating and drinking, weigh the animal and compare to pre-operative weight. Body weight is a sensitive indicator of dehydration or poor appetite.
5. Post-Operative Care of Rodents
   1. Provision post-operative care, including nursing support, can assist with control of pain and promote well-being of the animal. After surgery, animals should be housed in a clean, dry, and comfortable area, where they can be frequently observed by trained personnel.
   2. If animals have a surgical incision along the ventral thorax or abdomen, providing shredded paper towels for bedding or placing a paper towel on top of wood chip bedding allows for better observation of hemorrhage and reduces risk of adhesion of bedding particles to the surgical site. Nesting material from the home cage should be added to the post-op cage to provide a familiar and supportive environment.
   3. Rodents that have undergone survival surgery should not be placed in a cage with cage mates that have not had surgery. Animals that have not had surgery may attack and kill animals that have had surgery during recovery from anesthesia.
   4. Animals undergoing survival surgery may overgroom the surgical incision area of cage mates, resulting in removal of sutures and infection of the incision site. Therefore, it may be necessary to house animals that have undergone thoracic or abdominal surgery individually for at least 3 days after surgery. Depending on the type of surgical procedure, the social history, strain, sex and age of the animals, animals that have been successfully housed together prior to surgery and that have had the same surgery may be housed together after surgery. However, adult male mice that have been housed together prior to surgery and are separated for more than 24 hours should not be co-housed due to the tendency to fight upon reintroduction.
   5. The clean recovery cage should be set on a heating pad prior to the start of the surgical procedure so that it is warm when the animal is placed in the cage after surgery. During the immediate post-operative recovery period, the animal must be observed until it is completely alert and mobile. The recovery cage should be arranged such that one half of the cage is on a heating pad, allowing the animal to move away from the heat if it so desires. The cage should remain on the heating pad until the animals have had time to recover from hypothermia induced by exposure to anesthesia. In some cases, this may require that the cage be left on the heating pad set on low overnight. Animals must never be placed in direct contact on an electric heating pad designed for domestic use by humans.
   6. A small number of food pellets should be placed on the floor of the cage if the rodent may experience discomfort or difficulty reaching the food hopper.
   7. A gel cup or other fluid supplement should be placed on the cage floor if the rodent may experience discomfort or difficulty reaching the standard water source.
   8. Supplemental fluid injections should be provided during the post-operative period if signs of dehydration or excessive blood loss are observed. A new needle should be used for each animal to prevent cross contamination. Adult mice may be given 1 ml of warmed sterile saline subcutaneously twice per day. Adult rats may be given 2.5 ml of warmed sterile saline subcutaneously per day.
   9. NOTE: Vials of sterile saline do not contain preservatives. Vials used for hydration support or to dilute medications should be dated when first opened and SHOULD BE DISCARDED after 3 days. The lack of preservatives in these solutions can enable bacterial growth and subsequent infection if injected into animals. Open vials that do not display an "open" date written on the label should not be used and should be immediately discarded. All drugs administered parenterally should be mixed fresh (within 3 days of use) to reduce risk of contamination.
   10. Non-absorbable sutures or wound clips (if applicable) should be removed 7 – 14 days after surgery if the wound has healed.

VI. Documentation

A written survival surgery/post-operative care log must be maintained in the animal housing room after surgery and be available for review by the AV and/or the IACUC. The log should include the following information:

* + - * 1. Surgery date
        2. Approved protocol number
        3. Name of surgeon
        4. Animal identification
        5. Type of surgery
        6. Anesthetics and analgesics or other medications provided (e.g., antibiotics) including volume and dose (in mg/kg), time given, route of administration
        7. General Attitude (e.g., bright alert, responsive, quiet but responsive)
        8. Surgical complications (describe and give corrective actions)
        9. See IACUC Guideline for [Recognizing Signs of Pain and Distress in Rodents](https://www.montana.edu/orc/iacuc/policies/pain-and-distress-recognition-in-rodents.html)