

University of Louisville
Institutional Animal Care and Use Committee
Policies and Procedures

Use of Postoperative Analgesia

Policy: Postoperative analgesia must be administered for *at least* 48 hours following completion of survival surgery unless scientific justification to withhold analgesia is provided by the investigator and approved by the IACUC. Recommended analgesics for rodents can be found in the IACUC's guidelines (see: Recommended Rodent Anesthetics and Analgesics); Comparative Medicine Research Unit (CMRU) veterinarians are available for consultation for recommended analgesics for other species.

Rationale: All personnel involved in animal research have the ethical and legal responsibility to reduce or eliminate pain and distress whenever it does not interfere with study objectives. The IACUC is ultimately responsible and accountable for ensuring humane use of research animals under their oversight including proper use of postoperative analgesia. Additionally, unrelieved pain can cause a variety of physiologic, metabolic, and inflammatory changes that may confound research (1).

As stated in the *IRAC Principles*²:

- IV. Proper use of animals, including the avoidance or minimization of discomfort, distress, and pain when consistent with sound scientific practices, is imperative. Unless the contrary is established, investigators should consider that procedures that cause pain or distress in human beings may cause pain or distress in other animals.
- V. Procedures with animals that may cause more than momentary or slight pain or distress should be performed with appropriate sedation, analgesia, or anesthesia.

The *Guide for the Care and Use of Laboratory Animals*³ states that “the proper use of anesthetics and analgesics in research animals is an ethical and scientific imperative.” Additionally, analgesia is imperative due to the fact that some species may mask signs of pain until it is severe. Rodents show a variety of responses to pain, many of which are very subtle and often missed. Thus, it is critical to proactively treat for potential post-operative pain. The *Guide* further states that “the Attending Veterinarian (AV) should provide guidance to investigators and all personnel involved in the care and use of animals to ensure appropriate husbandry, handling, medical treatment, immobilization, sedation, analgesia, anesthesia, and euthanasia. In addition, the AV should provide guidance and oversight to surgery programs and perioperative care involving animals.” The UofL AV performs these duties alongside CMRU veterinarian delegates. This may take place during *Proposal* review, personal discussions with the PI or designated research staff, and following study initiation.

Procedures, Guidelines, and Exceptions:

1. Pain-relieving methods, including non-pharmacological means, must be described in *Proposals* where pain is expected.
 - a. Deviations from the recommendations in this policy must be described and justified in the *Proposal* to show that analgesic recommendations have been considered.
 - b. Justification must describe how specific analgesics or classes of analgesics (i.e., NSAID, opioid, local anesthetic) would interfere with specific study goals. Consideration must be given to the moral

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and physiological consequences of unrelieved pain or distress. Justification should also consider the use of control animals to account for variables produced by analgesics.

2. The selection of appropriate analgesics should reflect professional veterinary judgment, and should be considered for all surgical manipulations (2). The need for postoperative analgesia following non-surgical procedures will be ascertained on a case-by-case basis by the IACUC.
 - a. For major survival surgery (see “Performing Rodent Survival Surgery” for definition), multimodal analgesia is standard practice. Multimodal analgesia is defined as the use of a combination of analgesic drugs from different classes, typically one NSAID and one opioid, and/or local anesthesia in lieu of an NSAID or opioid if one of those classes of drugs would interfere with the study. Multimodal analgesia may allow for reduced dosages of these drugs, as well as minimize potential adverse effects of the analgesics (4).
 - b. Analgesia for minor survival surgery is usually adequate with only one class of analgesic, such as an NSAID or an opioid.
3. Preemptive analgesia (administration prior to the procedure that has the potential to cause pain) enhances intraoperative patient stability and optimizes postoperative care and well-being by reducing postoperative pain, and is strongly encouraged during all survival surgical procedures unless there is justification otherwise (2, 4). In addition, preemptive use of analgesia can reduce the amount of anesthesia necessary.
4. Depending on the procedure, postoperative analgesia may be necessary beyond 48 hours and should be carefully gauged by frequent observation for clinical signs of pain and distress. Animals must be monitored by personnel able to assess species-specific signs of pain and distress. If signs of pain and/or distress are observed, analgesia should be administered as described in the *Proposal* or an CMRU veterinarian should be consulted for recommendations. Examples of signs of pain in the mouse are reflex withdrawal, biting response to handling, piloerection, hunched back, sunken eyes and abdomen, dehydration and weight loss. Key signs of pain in the rat are vocalization, struggling, licking/guarding, weight loss, piloerection, hunched position, and hypothermia. Key signs of pain in the guinea pig are struggling, withdrawal, vocalization, easy restraint or capture, and unresponsiveness. Note, however, that masking signs of pain, distress, and clinical illness is one of the most conserved instincts in these “prey species”; therefore, it is paramount to pro-actively treat for potential post-operative pain (see: Recommended Rodent Anesthetics and Analgesics).

References:

1. ACLAM Position Statement on Pain and Distress in Research Animals. 2016. Journal of the American Association for Laboratory Animal Science. Vol. 55, No 6.
2. Interagency Research Animal Committee (IRAC). 1985. *U.S. Government Principles for the Utilization and Care of Vertebrate Animals Used in Testing, Research, and Training*.
3. National Research Council. 2011. Guide for the Care and Use of Laboratory Animals (8th Edition).
4. American College of Veterinary Anesthesia and Analgesia’s position paper on the treatment of pain in animals. 2006. <https://acvaa.org/wp-content/uploads/2019/05/Treatment-of-Pain-in-Animals.pdf>.

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