

UBC Animal Care Committee Guidelines - Rodent Procedures Classifications and Analgesia Requirements

This guideline recommends “Best Practice” for control of pain in rodents undergoing painful procedures¹. If a protocol requires a different analgesic regimen than those described herein, the ACC may require justification.

According to UBC ACC POLICY 016 “Policy on Survival Surgery of Rodents”, animals undergoing survival surgery will be administered suitable analgesic agents as per the approved Animal Care Protocol.

Procedure Classifications for Mice and Rats				
Class	1	2	3	4
Pain Level	<i>Mild pain</i>	<i>Moderate pain</i>	<i>Moderate/ severe pain</i>	<i>Severe pain</i>
Examples	Subcutaneous implant with trocar	Craniotomy with or without implant	Laparotomy with major organ manipulation or removal	Peritonitis/ pancreatitis
	Ocular procedures	Simple laparotomy	Organ transplant	Hind limb ischemia
	Tracheal injections	Embryo transfer	Spinal surgery	Spinal or nerve injury
	Skin biopsy/wound	Ovariectomy	Thoracotomy (costal approach)	Thoracotomy (sternal approach)
	Vessel cut down or cannulation	Castration	MCAO	Cecal ligation and puncture
	Intramuscular injection	Intra-peritoneal osmotic pump		Orthopedics/ Fractures
	Subcutaneous osmotic pump			Bone cancer
	Dental extractions			
Minimum Pre-operative (before Surgery) Analgesia Administration				
Pre-operative Analgesics	A local anesthetic ² at the site of surgery (before tissue is cut or closed) AND non-steroidal drug ³ OR buprenorphine		A local anesthetic at the site of surgery (before tissue is cut or closed) AND non-steroidal drug AND buprenorphine	
Minimum Post-Operative Analgesia Administration - Times per day is based on the known duration of action of the drug. Administration of analgesia may need to be extended if signs of pain persist.				
Post-operative Analgesics	Day 0 ⁴ : non-steroidal SID OR buprenorphine BID	Day 0 and Day 1: non-steroidal SID OR buprenorphine BID-TID	Day 0, Day 1 and Day 2: non-steroidal SID AND buprenorphine BID - TID	Day 0, Day 1 and Day 2: non-steroidal SID AND buprenorphine TID
Number of Days and Times Per Day required for Monitoring for Signs of Pain⁵				
# of Days (including Day 0)	2	3	4	5
# of Times per Day	1 - 2	2	2	3

Abbreviations: SID is administered once daily, BID is administered twice daily (every 12 hours) and TID is three times daily (every 8 hours).

Rodent Analgesia Formulary		
Drug	Rat	Mouse
Buprenorphine ⁶	0.01-0.03 mg/kg SC BID-TID	0.05-0.1 mg/kg SC BID-TID
Ketoprofen injectable	5 mg/kg SC SID	5 mg/kg SC SID
Meloxicam injectable	1 mg/kg SC SID	5 mg/kg SC SID ⁷
Bupivacaine ²	8 mg/kg max dose SC	8 mg/kg max dose SC

Abbreviations: SC is subcutaneous. Note that there are other potentially acceptable analgesics not listed here. For more information talk to a UBC Clinical Veterinarian.

Notes:

1. Any procedure may warrant reclassification into a higher category by the ACC based on the severity of the anticipated pain level. Pain levels can vary according to skill of surgeon.
2. Local anesthetic, such as Bupivacaine (MarcaineTM), provides perioperative analgesia when injected subcutaneously (SC) as a line block at the surgical incision site. DO NOT EXCEED 8mg/kg to avoid toxicity that may result in central nervous system signs (seizures) and/or cardiac dysrhythmias. Please see TECH 16 – Local Anesthetic SOP for details.
3. Non-steroidal drugs for rodents include meloxicam (MetacamTM) or ketoprofen (AnafenTM).
4. The day of surgery is considered day 0.
5. Beyond the minimum post-op monitoring period for pain, animals should be checked regularly until all wounds are completely healed and sutures/skin closures have been removed (See UBC ACC POLICY 016 “Policy on Survival Surgery of Rodents”).
6. If administered pre-operatively with pentobarbital anesthesia, reduce the dose to 0.01 mg/kg for rats and 0.05 mg/kg for mice.
7. The new increased recommended dose of Meloxicam in mice to provide adequate analgesia is 5 mg/kg. Long term safety has not been fully established.

References:

1. ACLAM (2006) Guidelines for the Assessment and Management of Pain in Rodents and Rabbits. http://www.aclam.org/Content/files/files/Public/Active/position_pain-rodent-rabbit.pdf
2. Flecknell, P. (2009) Laboratory Animal Anaesthesia, 3rd Edition. Elsevier; London, UK.
3. Guide for the Care and Use of Laboratory Animals, 8th edition, National Research Council, 2011.
4. Public Health Service Policy on Humane Care and Use of Laboratory Animals, Office of Laboratory Animal Welfare, NIH, 2002.
5. UBC ACC Policy #16: Survival Surgery of Rodents
http://www.ors.ubc.ca/sites/research.ubc.ca/files/uploads/documents/ORS/animalcare/016_Survival_Surgery_of_Rodents.pdf
6. See Animal Care and Use Program for SOPs on various types of analgesic drugs.
<https://animalcare.ubc.ca/planning-your-research/sops-guidelines>