

**GUIDELINES- Rodent Surgical
Classifications and Analgesic
Guidelines**

Version 1.2

Surgical Classifications¹ for Mice and Rats:

Class 1 Mild pain	Class 2 Moderate pain	Class 3 Moderate/severe pain	Class 4 Severe pain
Craniotomy with implant Dental extractions Ocular procedures Subcutaneous implant Skin biopsy/wound Tracheal injections Vessel cut down or cannulation	Embryo transfer Simple laparotomy	Laparotomy with major organ manipulation or removal Organ transplant Orthopedics	Hindlimb ischemia Thoracotomy

Pre-operative Analgesic Requirements for Mice and Rats:

- Class 1-3: Investigator must administer meloxicam or buprenorphine pre-operatively unless using ketamine/xylazine anesthesia for the procedure.
- Class 4: Investigator must use an opioid analgesic and when performing a thoracotomy must administer either buprenorphine, buprenorphine SR LAB (BSR) or a bupivacaine line block pre-operatively.

Minimum Immediate Postoperative Monitoring and Analgesia Period for Mice and Rats:

Surgical Classification	Minimum Post-op Monitoring Period²		Minimum Post-op Analgesia	
	Frequency (Times/day)	Duration (# of days after day 0³)	Minimum Post-op Analgesia Period	Post-operative Analgesics⁴
1	1	2	12 hours	Day 0: single injection of meloxicam or buprenorphine pre- or postoperatively
2	1	2	36 hours	Day 0-1: meloxicam SID or buprenorphine BID or BSR once
3	1	3	60 hours	Day 0-2: meloxicam SID or buprenorphine BID or BSR once
4	1	3	60 hours	Day 0-2: buprenorphine BID or BSR once +/- meloxicam SID

Rodent Analgesia Formulary:

Drug	Rat	Mouse
Buprenorphine⁵	0.1 mg/kg SC BID	0.1 mg/kg SC BID
Buprenorphine SR⁶ LAB (sustained release- BSR)	1.2 mg/kg SC once perioperatively	1.0 mg/kg SC once perioperatively
Meloxicam	1 mg/kg SC SID	2 mg/kg SC SID
Bupivacaine	2 mg/kg max dose SC ⁷	2 mg/kg max dose SC ⁷

Notes:

1. Any procedure may warrant reclassification into a higher category by the ACC based on the severity of the anticipated pain level.
2. Animals must be monitored for a minimum of two weeks following surgery. The required monitoring during the immediate post-operative period satisfies the requirement of monitoring for the first week as long as the animals are doing well. Two additional days of monitoring separated by 3-4 days are required during the second week. .
3. The day of surgery is considered day 0.
4. If a surgical protocol requires a different analgesic regimen than those described herein, the ACC may require justification.
5. The dose is decreased to 0.05 mg/kg if administered pre-operatively with pentobarbital anesthesia.
6. Buprenorphine SRTM LAB- is the specific formulation developed and recommended for use in laboratory mice and rats. It is critical that investigator follow the procedures for administration in the document Buprenorphine SR LAB Administration Instructions found on the BRL website at <http://www.brl.uic.edu> under the Forms tab.
7. Bupivacaine (MarcaineTM or SensorcaineTM) is a local anesthetic which provides perioperative analgesia when injected subcutaneously (SC) at the surgical incision site. DO NOT EXCEED 2mg/kg to avoid toxicity which may result in central nervous system signs (seizures) and/or cardiac dysrhythmias. For use in rodents, prepare a 0.125% (1.25 mg/ml) solution by purchasing 0.25% (2.5 mg/ml) bupivacaine and dilute it 50:50 with sterile water or 0.9% saline. Inject a volume not to exceed 2 mg/kg SC at the site of the incision. Following this preparation, the maximum volume for 300 g rat is 0.5ml and for a 30 g mouse is 0.05ml. Wait a minimum of 5 minutes before making the incision.

Abbreviations: SC is subcutaneous, BID is administered twice daily and SID is administered once daily.

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.