

Rodent Procedures and Pain Classifications and Analgesia Recommendations

This guideline recommends “Best Practice” for control of pain in rodents undergoing painful procedures. If a protocol requires a different analgesic regimen than those described herein, the AEC will require justification. Not using appropriate levels of analgesia for procedures recognised to cause pain is unacceptable. Animals undergoing survival procedures/surgery must be administered suitable analgesic agents as per the approved Animal Ethics Protocol.

Procedure Pain Classifications for Mice and Rats

Class	1	2	3	4
Pain Level	Mild Pain	Moderate Pain	Severe Pain	Extreme Pain
	SC Implant	Craniotomy	Laparotomy with major organ removal	Spinal surgery
	Ocular procedure	Simple laparotomy	Organ transplant	Thoracotomy
	Tracheal injection	Embryo Transfer	Mid Cerebral Artery Occlusion	Caecal ligation/ ischemia development
	Skin biopsy / wound	Ovariectomy	Ovariohysterectomy	Pancreatic Surgery/ peritonitis
	Catheter placement	Castration		Bone cancer
	Intramuscular injection	IP osmotic pump		Fractures
	SC osmotic pump	Dental procedures		Orthopaedic Procedures
	Ear punch Tail clip			

Minimum Pre-operative (before procedure) analgesia requirement		
Pre-operative analgesia*	Local anaesthetic at the site of procedure/surgery (before tissue is cut or closed) AND an NSAID OR Buprenorphine	Local anaesthetic at site (before tissue is cut or closed) AND an NSAID 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.		
*For very short procedures, EMLA cream containing local anaesthetic may be used (e.g.catheter placement) but must be given adequate time after topical application to be effective, 30 minutes).		

Pain Level	Mild Pain	Moderate Pain	Severe Pain	Extreme Pain
Post-operative Analgesics	Day 0: non-steroidal 1x/D OR buprenorphine 2x/D	Day 0 and Day 1: non-steroidal 1x/D OR buprenorphine 2x/D	Day 0, 1, and 2 non-steroidal 1x/D AND buprenorphine 2-3x/D	Day 0, 1 and 2 non-steroidal 1x/D AND buprenorphine 3x/D
Number of Days and Times Per Day required for Monitoring for Signs of Pain				
# of Days (including Day 0)	2 days	3 days	4 days	5 days
# of Times per Day	1-2x/D	2x/D	2x/D	3x/D

Abbreviations:

1x/D =once daily,

2x/D = administered twice daily (every 12 hours) and

3x/D = three times daily (every 8 hours).

Rodent Analgesia Formulary

Drug	Rat	Mouse
Buprenorphine	0.01-0.03 mg/kg SC 2-3x/D	0.05-0.1 mg/kg SC 2-3x/D
Meloxicam injectable	1 mg/kg SC 1x/D	5 mg/kg SC 1x/D
Bupivacaine	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 University Veterinarian (AWO).

Notes:

1. Any procedure may warrant reclassification into a higher category by the AEC based on the severity of the anticipated pain level. Pain levels can vary according to skill of surgeon.
2. Local anaesthetic, such as Bupivacaine (Marcaine™), 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.
3. Non-steroidal drugs for rodents include meloxicam (Metacam™) oral and injectable.
4. The day of surgery is considered day 0.
5. Beyond the minimum post-op monitoring period for pain, animals should be checked a minimum of once daily to ensure that all wounds are completely healed and sutures/skin closures are removed in a timely fashion.

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. www.nhmrc.gov.au/guidelines-publications/ea20
- Best practice methodology in the use of animals for scientific purposes, 2017/8
3. Plumb's Veterinary Drug Handbook, 2018. <https://www.wiley.com/en-au/Plumb's+Veterinary+Drug+Handbook:+Desk,+9th+Edition-p-9781119344452>