

Rat Anesthesia/Analgesia

Recommended Best Practices

Note that all of these doses are approximations and must be titrated to the animal's strain, age, sex and individual responses. Significant departures from these doses should be discussed with a veterinarian. Doses will also vary depending on what other drugs are being administered concurrently.

All doses are listed as milligrams per kilogram (mg/kg) unless otherwise noted. Dilution of injected drugs allows more precise dosing, but may shorten the shelf-life of the compound (diluted drugs should be labeled, then discarded after 1 month) source UCSF

DRUG NAME	DOSE (mg/kg) & ROUTE	FREQUENCY	NOTES
Inhalation anesthetics			
Recommended: Isoflurane	1-3% inhalant to effect (up to 5% for induction)	Whenever general anesthesia is required	Survival surgery should have concurrent preemptive analgesia. Use precision vaporizer
Ketamine combinations			
Ketamine-Medetomidine	75-100 + ~0.5-1 IP (in same syringe)	As needed	May not produce surgical-plane anesthesia for major procedures. If redosing, use ketamine alone. May be partially reversed with Atipamezole
Ketamine-Xylazine	75-100 Ket + 5-10 IP (in same syringe)	As needed	May not produce surgical-plane anesthesia for major procedures, though more reliable than in mice. If redosing, use ketamine alone. May be partially reversed with Atipamezole or Yohimbine
Ketamine-Xylazine-Acepromazine	75-100 + 2 - 6 + 1 – 2IP (in same syringe)	As needed	May not produce surgical-plane anesthesia for major procedures. If redosing, use ketamine alone. May be partially reversed with Atipamezole or Yohimbine
Ketamine-Midazolam	75-100 + 4-5 IP (in same syringe)	As needed	May not produce surgical-plane anesthesia for major procedures, but may be useful for

			restraint.
Reversal agents			
Atipamezole	0.1 - 1.0 subcutaneous or IP	Any time medetomidine or xylazine has been used	More specific for medetomidine than for xylazine (as a general rule, Atipamezole is dosed at the same <i>volume</i> as Medetomidine, though they are manufactured at different concentrations)
Yohimbine	1.0 - 2.0 SC or IP	For reversal of xylazine effects	
Other injectable anesthetics			
Sodium pentobarbital (Nembutal)	40 - 50 IP	Recommended for terminal/acute procedures only, with booster doses as needed. May occasionally be appropriate for survival procedures	Consider supplemental analgesia (opioid or NSAID) for invasive procedures, especially when used on a survival basis
Opioid analgesia			
Recommended: Buprenorphine	0.01 - 0.05 SC or IP	Used pre-operatively for preemptive analgesia and post-operatively every 6-12 hours	For major procedures, require more frequent dosing than 12 hour intervals. Consider multi-modal analgesia with a NSAID. High doses of buprenorphine may lead to pica behavior in rats
Non-steroidal anti-inflammatory analgesia (NSAID) - Note that prolonged use may cause renal, gastrointestinal, or other problems			
Recommended: Carprofen	4 - 5 SC	Used pre-operatively for preemptive analgesia and post-operatively every 12-24 hours	Depending on the procedure, may be used as sole analgesic, or as multi-modal analgesia with buprenorphine
Recommended: Meloxicam	~ 0.2 PO, IM or SC	Used pre-operatively for preemptive analgesia and post-operatively every 12-24 hours	Depending on the procedure, may be used as sole analgesic, or as multi-modal analgesia with buprenorphine
Recommended: Ketoprofen	2 - 5 SC	Used pre-operatively for preemptive analgesia and post-operatively every 12-24 hours	Depending on the procedure, may be used as sole analgesic, or as multi-modal analgesia with buprenorphine
Flunixin meglumine	~ 2 SC	Used pre-operatively for preemptive analgesia and post-operatively every 12-	Depending on the procedure, may be used as sole analgesic, or as multi-modal analgesia

		24 hours	with buprenorphine
Local anesthetic/analgesics (lidocaine and bupivacaine may be combined in one syringe for rapid onset and long duration analgesia)			
Lidocaine hydrochloride	Dilute to 0.5%, do not exceed 7 mg/kg total dose, SC or intra-incisional	Use locally before making surgical incision	Faster onset than bupivacaine but short (<1 hour) duration of action
Bupivacaine	Dilute to 0.25%, do not exceed 8 mg/kg total dose, SC or intra-incisional	Use locally before making surgical incision	Slower onset than lidocaine but longer (~ 4-8 hour) duration of action