Local Analgesia/Anesthesia for Adult Rodents SOP
Lidocaine/Bupivacaine/Ropivacaine

Purpose: To provide additional pain relief directly at the site of surgery. Local anesthesia can be used in addition to systemic analgesia such as NSAID's or opioids to control mild, moderate or severe pain in rats and mice.

Policy: Pain should be appropriately treated based on signs of pain in the rodent and the likelihood that the procedure will cause pain. When possible, pain should be treated pre-emptively (before the cause). The use of multi-modal analgesia (using multiple drugs) maximizes the benefits of analgesia for procedures anticipated to cause moderate to severe pain. These include but are not limited to the addition of opioids and/or NSAIDs. Investigators should be consulted prior to treating rodents involved in research. Contact the veterinarian to determine the best form of analgesia for a particular animal.
Local anesthetic/analgesic drugs are not to be used as the sole analgesia for moderate or severe pain.

Responsibility: Those persons listed on an approved Animal Care Committee protocol who are responsible for procedures, surgeries, and post-procedure monitoring.

Materials: Lidocaine HCl Neat (without epinephrine) 2% (20 mg/ml) or
Marcaine HCl (Bupivacaine) 0.5% (5 mg/ml) or
Naropin (Ropivacaine) 0.2% (2 mg/ml)
Hypodermic needles (25 or 27g, 1/2" or smaller)
1 cc syringes
Sterile, amber multi use vials for dilutions
**Vials can be purchased from Omega 1-877-271-6228 (Richmond, B.C.)
Sterile, pyrogen-free water for injection

Formulary: Rats and Mice			
Local Anesthetic	**Dose***	**Application**	**Notes**
Lidocaine (2%)	Dilute to 0.5%, do not exceed 7 mg/kg total dose; Incisional line block	Use locally before making surgical incision	Faster onset than bupivicaine but short (<1 hour) duration of action
Bupivacaine (0.5%) (Marcaine)	Dilute to 0.25%, do not exceed 8 mg/kg total dose; Incisional line block	Use locally before making surgical incision	Slower onset than lidocaine but longer (~ 4-8 hour) duration of action
Ropivacaine (0.2%) (Naropin)	No need to dilute, do not exceed 8 mg/kg total dose; Incisional line block	Use locally before making surgical incision	Slower onset than lidocaine but longer (~ 4-8 hour) duration of action; wider safety margin

*See Dilution directions below.

Dilutions:

→Lidocaine:

Dilute the 2% (20 mg/ml) Lidocaine 1:4 to get final concentration of 0.5% (5 mg/ml) (for example: take 1 cc of Lidocaine and add 3 cc of Sterile, pyrogen-free water to an amber, sterile, multi-use vial). Transfer solutions aseptically, carefully label vial with drug name, concentration and date of dilution. Discard diluted solutions in 30 days.

→Bupivacaine:

Dilute the 0.5% (5 mg/ml) Bupivacaine 1:2 to get final concentration of 0.25% (2.5 mg/ml) (for example: take 1 cc of Bupivacaine and add 1 cc of Sterile, pyrogen-free water to an amber, sterile, multi-use vial). Transfer solutions aseptically, carefully label vial with drug name, concentration and date of dilution. Discard diluted solutions in 30 days.

Choice of Local Anesthetic

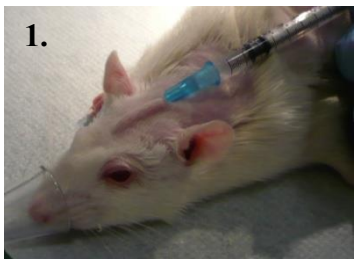
Choose the longer acting Bupivacaine or Ropivacaine if the duration of pain is expected to exceed one hour or if the length of surgery is longer than 1 hour (i.e. craniotomy, laparotomy, thoracotomy, etc.).

Procedure:

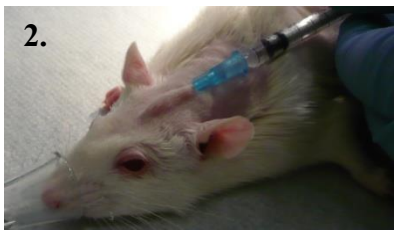
1. Weigh animal(s) to be treated.
2. Determine maximum dose that can be used depending on weight of animal (see next page). This is the <u>maximum</u> amount that can be used safely. If smaller incisions are planned, use only the volume needed to deposit the local anesthetic along the planned incision line

but do not exceed the maximum calculated dose. The dose can be divided if multiple incisions are planned.

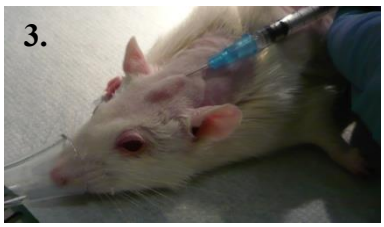
3. Inject local anesthetic into the subcutaneous space ("line block") below the planned incision line prior to surgery (once the animal is anesthetized, fur clipped and the skin prepped for surgery).



Insert needle fully into the subcutaneous space below the planned incision. Gently pull back syringe plunger to make sure there is no blood in the hub of the needle (avoid intravenous injections).



Begin injecting small volumes of the local anesthetic as the needle is withdrawn.



Complete injection of the local anesthetic under the planned incision site. If incision site is longer, re-insert needle further along the planned incision and repeat with remaining calculated volume of local anesthetic.

Maximum Volume

Weight of **Rat**	Maximum Volume Diluted **Lidocaine** (0.5%) Do Not Exceed	Maximum Volume Diluted **Bupivacaine** (0.25%) Do Not Exceed	Maximum Volume **Ropivacaine** (0.2%) Do Not Exceed
250 g	0.35 ml	0.8 ml	1.0 ml
350 g	0.49 ml	1.12 ml	1.4 ml
450 g	0.63 ml	1.44 ml	1.8 ml
550 g	0.77 ml	1.76 ml	2.2 ml

Weight of **Mouse**	Maximum Volume Diluted **Lidocaine** (0.5%) Do Not Exceed	Maximum Volume Diluted **Bupivacaine** (0.25%) Do Not Exceed	Maximum Volume **Ropivacaine** (0.2%) Do Not Exceed
25 g	0.03 ml*	0.08 ml	0.1 ml
35 g	0.05 ml	0.11 ml	0.14 ml
45 g	0.06 ml	0.14 ml	0.18 ml
55 g	0.07 ml	0.17 ml	0.22 ml

*Can dilute further to 0.25% to get a larger volume for longer incisions

Local Anesthetics should be used pre-operatively (before the first incision) and can be used in conjunction with opioid analgesics and/or NSAIDs for controlling moderate to severe pain. Intramuscular and intravenous injection must be avoided. Systemic toxicity (seizures, heart rhythm disturbances and death) results from overdosage or accidental intravenous injection.

There is no advantage to combining Lidocaine with Bupivacaine or Ropivacaine.

Ropivacaine is currently only available as a special order from a human pharmacy with a Veterinary Prescription. Please contact a UBC Veterinarian for information on using this drug.

Dripping the local anesthetic into the incision after the incision is already made is less effective than the line block described above, but is still better than not using a local anesthetic.