

Guidelines for Lidocaine and Bupivacaine for Line Block Anesthesia in Mice and Rats

Reviewed and Approved by FAU IACUC

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1. **Lidocaine** (Xylocaine®) and **Bupivacaine** (Marcaine®; Sensorcaine®) are topical anesthetics that can be used alone or in combination with each other.
2. Administration for local anesthesia in form of a line block, i.e. injection along the imaginary surgical incision site before cutting, adds to pre-emptive analgesia.
3. Lidocaine has a fast onset (within 5 min) with shorter duration (up to 1-2 hours) while Bupivacaine has a longer onset (about 20 min) with longer duration (up to 4-6 hours) in most species.
4. The combination of both drugs provides the advantage of fast onset (i.e. Lidocaine within 5 min) and longer lasting numbing of the incision site (i.e. Bupivacaine about 4-6 hours).
5. It is important to be aware of the concentration of each of the drugs as these drugs could be deleterious at concentrations higher than recommended
 - a. Lidocaine commonly available in 1% (i.e. 10mg/ml) or 2% (i.e. 20mg/ml)
 - b. Bupivacaine commonly available in 0.25% (i.e. 2.5mg/ml) and 0.5% (i.e. 5mg/ml)
6. Due to small amounts necessary for rodents it might be necessary to dilute the drug mixture with sterile saline to achieve a large enough volume allowing to infiltrate the entire length of the intended incision to be made. The total volume depends on the weight of the animal and the length of the incision, i.e. if a longer incision needs to be done a larger volume might be necessary. This can be achieved by adding more saline. However, if the mixture is diluted with more than an equal volume of sterile saline the duration of the local anesthesia might be reduced.
7. If Lidocaine and Bupivacaine are combined a 1:1 mixture is created. Both drugs and the saline should be drawn into one syringe and mixed within the syringe just prior injection. The mixing can be done by moving the syringe plunger back and forth in a large enough syringe (e.g. 1ml total volume of mixture in a 3ml syringe). Discard any unused mixed drug by the end of the day.
8. The injection is done along the imaginary incision line starting on the most distal point of cutting and injecting slowly but steady while moving the needle proximally away yourself along the entire length of the future incision. Use of a small gauge needle (25 or 27 gauge is recommended for this procedure.
9. Allow the drug to become effective (see above onset times for each drug) before performing the incision.
10. The below tables contain the volumes per weight to be injected using Lidocaine at a concentration of 2% and Bupivacaine at a concentration of 0.5% for RATS and 1% Lidocaine and 0.25% Bupivacaine for MICE. If different concentrations of the drugs are used the volume must be adjusted accordingly. Due to the small volume needed, esp. in mice, it is advisable to use a 0.5ml insulin syringe.
11. If the weight of the animal is in between two of the listed weights use the dosage for the nearest lower weight.
12. If using only one of the two drugs use only the amount listed per drug.

13. Dosages for rodents are:

- a. **Lidocaine** up to 10mg/kg and b. **Bupivacaine** up to 5mg/kg.

RAT

Body Weight in g (rat)	2% Lidocaine in ml	0.5% Bupivacaine in ml
200	0.1	0.2
250	0.12	0.25
275	0.13	0.27
300	0.15	0.3
325	0.16	0.32
350	0.17	0.35
375	0.19	0.37
400	0.2	0.4
425	0.21	0.42
450	0.22	0.45
475	0.24	0.47
500	0.25	0.5

MOUSE

Body Weight in g (mouse)	1% Lidocaine in ml	0.25% Bupivacaine in ml
15	0.015	0.03
20	0.02	0.04
25	0.025	0.05
30	0.03	0.06
35	0.035	0.07
40	0.04	0.08
45	0.045	0.09