



Assessing lidocaine-based analgesia for mouse ear notching: Insights into strain-specific reactions

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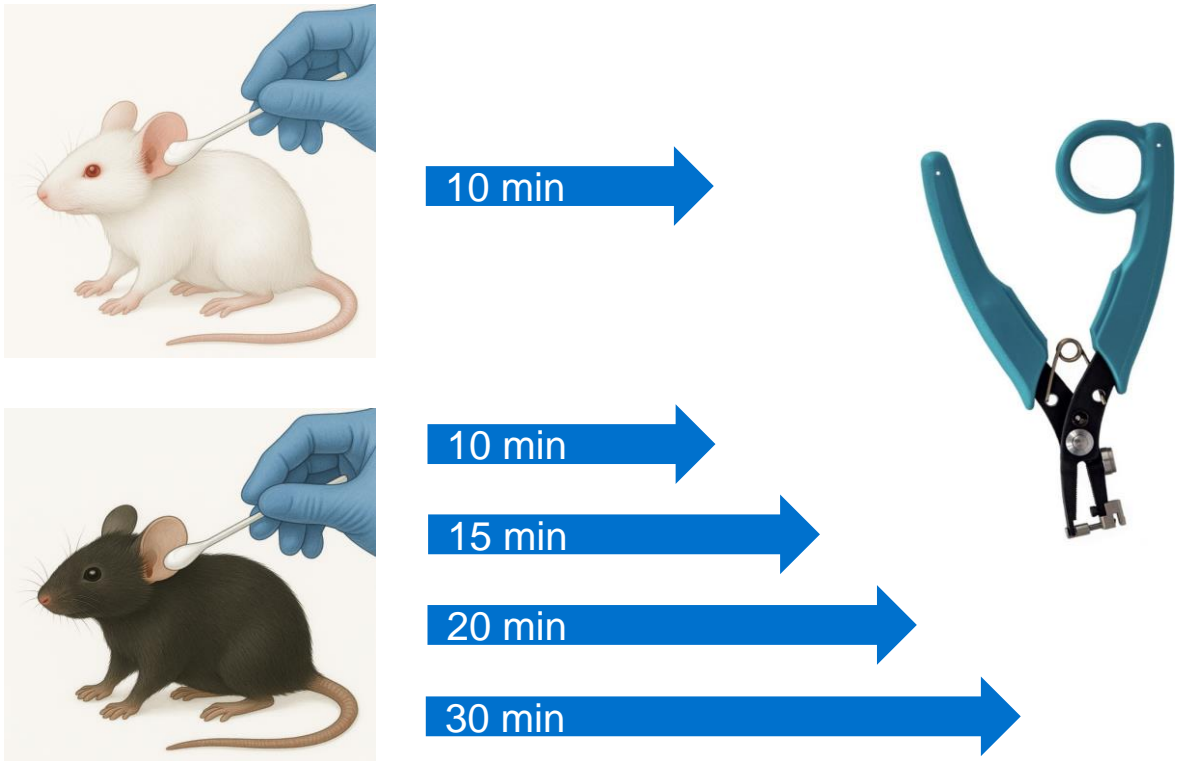
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Introduction

From the beginning of 2024, new national law and associated decree on animal protection in Finland (1165/2023 3 §)¹ require laboratory rodent ear notching to be performed with "appropriate pain relief" unless exceptional licence is applied for. However, the EU Directive 2010/63/EU on the protection of animals used for scientific purposes does not classify it as a procedure², and no guidelines on suitable analgesia for rodent ear notching exists on the EU nor the national level. This study aimed to evaluate the suitability of a lidocaine-based cream as analgesia (EMLA cream 5%, lidocaine + prilocaine 25+25 mg/g, Aspen Pharmacare Australia) for mice undergoing ear notching.

Methods

The experiment involved 15–33-week-old inbred male and female C57BL/6JRj mice and 17-week-old male BALB/cJRj mice (Janvier Labs, France). Reactions to notching after different sitting times were categorised as follows: no reaction (0), mild (flinch, 1) or marked reaction (head shake/vocalisation, 2).



Results

Most C57BL/6JRj mice displayed marked reactions at 10–20 minutes post-application (e.g., 20 min: 83% marked, 8% mild, 17% no reaction, n=13). In mice that were notched with 30 minutes post-application, reactions were significantly reduced (27% marked, 13% mild, and 60% no reaction, n=30). In contrast, BALB/cJRj mice showed minimal responses even at 10 minutes (30% mild, 70% no reaction, n=10).

10 minutes ##			Score			
			2	1	0	Total
BALB/cJRj ***	male	%	0.0	30.0	70.0	100.0
		n	0	3	7	10
C57BL/6JRj ***	male	%	100.0	0.0	0.0	100.0
		n	6	0	0	6

***C57BL vs. BALB, Fisher's exact test: P<0.0001

20 minutes			Score			
			2	1	0	Total
C57BL/6JRj	male	%	71.4	0.0	28.6	100.0
		n	5	0	2	7
	female	%	83.3	16.7	0.0	100.0
		n	5	1	0	6

15 minutes			Score			
			2	1	0	Total
C57BL/6JRj	male	%	50.0	33.3	16.7	100.0
		n	3	2	1	6

30 minutes ##			Score			
			2	1	0	Total
C57BL/6JRj	male	%	18.2	18.2	63.6	100.0
		n	4	4	14	22
	female	%	50.0	0.0	50.0	100.0
		n	4	0	4	8

##10 min vs. 30 min, male C57BL, Fisher's exact test: P=0.0013

Conclusions

- EMLA effectively reduced reactivity in C57BL/6JRj mice if applied 30 minutes before ear notching.
- Strain-specific behavioural differences exist: BALB/cJRj mice exhibited lower sensitivity.
- There is a sex-specific non-significant trend indicating females are more sensitive to the notching.
- Further research is required to evaluate the level of pain more comprehensively.

References

- Valtioneuvoston asetus eläimille tehtävistä toimenpiteistä ja keinollisen lisäämisen menetelmistä (1165/2023).
- Directive 2010/63/EU of the European Parliament and of the Council on the protection of animals used for scientific purposes.

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