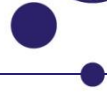




Faculty of Health and Medical Sciences



Refinement of animal models of pain:

Establishment of strategies to alleviate avoidable pain in rat models for pain and inflammation

Klas Abelson
Associate Professor, PhD



Effect of analgesic treatment on experiments

Analgesic drugs may affect several systems in the organism, and consequently the experimental data

- However, this is not necessarily always the case
- and we don't really know until we have investigated it



What about pain models?

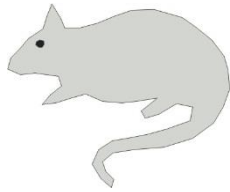
- ❖ Can we treat against pain where pain is a part of the model?
- ❖ We should at least, if possible, treat against avoidable and unnecessary pain
 - Post-operative pain
 - When relevant pain is not tested

Says who?

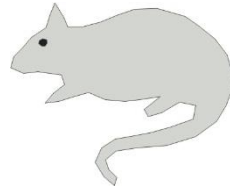
- ✓ Our morality says we should
- ✓ Our legislation says we should (*EU Directive 2010/63/EU, Article 15 §2*)
- ✓ Our scientific data may say we should
 - Dougherty et al, *Differential influence of local anesthetic upon two models of experimentally induced peripheral mononeuropathy in the rat*, Brain Res. 570, 1992
 - Hestehave et al, *Is there a reasonable excuse for not providing post-operative analgesia when using animal models of peripheral neuropathic pain for research purposes?* Manuscript, 2016



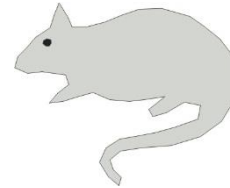
The hypothesis



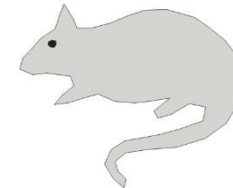
Control



Negative control:
Arthritis without
pain relief



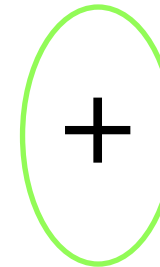
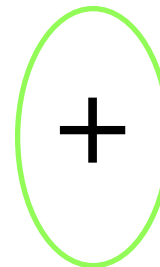
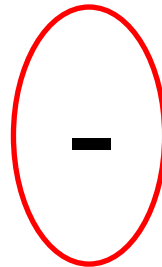
Positive control:
Arthritis with anti-
inflammatory pain
relief



Arthritis with pain relief
expected not to interfere
with model parameters

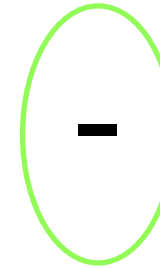
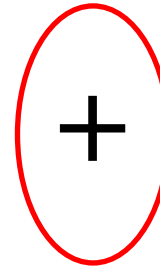
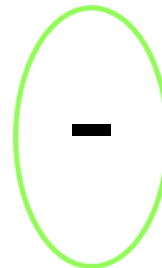
Parameters for animal welfare:

- Welfare score
- Pain relief
- Stress reduction



Parameters relevant for the model:

- Arthritis score
- Cytokines
- Histopathologi



Results – parameters relevant for model

- ❑ Analgesic treatments had only minor impact on the clinical and pathological development on the arthritis parameters
- ❑ The anti-inflammatory compound carprofen (positive control) appeared to have a more pronounced effect on the joint swelling than the opioid buprenorphine, as expected
- ❑ Histopathological changes seemed not to be altered by analgesic treatment
- ❑ Cytokine analysis inconclusive



Results

- ❑ The differences between groups on pain, stress and wellbeing parameters were only subtle
- ❑ the most notable finding was a decreased hyperalgesia in one of the buprenorphine groups



Conclusions

- ❑ Data indicate that there is no immediate justification to withhold buprenorphine analgesia to rats subjected to the applied monoarthritis model, in the present setup
- ❑ More studies are needed, to further improve the wellbeing of the animals
- ❑ More studies needed to improve the actual model, in order to focus the inflammation to the joint and avoid infiltration into surrounding tissue



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