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## Analgesia in rats

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### **SCOPE**

#### **The need for analgesia:**

*Australian code of practice for the care and use of animals for scientific purposes (8<sup>th</sup> Edition 2013), states (3.3.8) that;*

*'the use of local and general anaesthetics, analgesics and sedatives must be considered as part of a plan to manage pain and distress, and such use should at least parallel their use in current veterinary or medical practice'*

Monitoring the animals regularly and acting promptly to alleviate pain and distress is also a Code requirement and details must be included in protocol applications, including any monitoring sheets which will be used to record the wellbeing of the animal.

### **AUTHORISATION TO UNDERTAKE PROCEDURE**

Animal technicians and investigators authorised by the AEC, or assessed as competent by BRC training assessor

### **SPECIAL REQUIREMENTS/SAFETY**

- Buprenorphine is an S8 drug and use must be authorised and recorded
- Carprofen is an S4 drug and use must be authorised and recorded
- The authorisation to use analgesia agents is in AEC protocol or given by veterinary surgeon

### **PROCEDURE**

A variety of agents are available and the following are commonly used in rats. Analgesics are used in combination with anaesthetic agents and this needs to be taken into consideration. Information regarding veterinary anaesthetics and analgesics is available from the veterinarian, Sue Peirce, (ext. 2657).

#### **1. Non-steroidal anti-inflammatory drugs (NSAIDS)**

NSAIDs are drugs which inhibit the production of chemicals which activate the peripheral pain receptors. These receptors are responsible for the pain resulting from tissue damage caused by surgery.

NSAIDs are generally not satisfactory for animals with bleeding disorders, renal or hepatic insufficiency.

The most suitable NSAID for laboratory animals is carprofen (*Rimadyl*). Carprofen exhibits analgesic, anti-inflammatory and anti-pyretic activity. In rodents one dose of carprofen provides effective post-operative analgesia up to 24 hours

Dose rate: 5mg/kg

Dilute 1 in 50 with sterile saline or water for injection. This can be labelled and stored in fridge for up to 4 weeks.

Administer 0.1ml per 20g of diluted carprofen sub/cut.

## 2. Opioids

This group of drugs works by binding to sites in the brain preventing pain sensations from being stimulated. Most opioid cause respiratory depression and reduce gastro-enteric activity by slowing peristalsis.

Opioid are classified as drugs of addiction that entail particular responsibilities regarding the acquisition, storage and use these agents.

The most suitable in laboratory rodents is buprenorphine (*Temgesic*). Duration of action is 6-8 hours. Dose can be repeated if rat is depressed, or anorexic, after 8 hours.

Dose rate: 0.01-0.05mg/kg (note this is a smaller dose rate than mouse)

Dilute Temgesic 1ml in 10 mls water for injection (0.03mg/ml)

Administer 0.1ml/100g body weight; this is equivalent to 0.03mg/kg sub/cut.

## 3. Acetaminophen (Paracetamol)

Paracetamol can be used to alleviate mild pain in rodents and can be administered to rodents if stronger analgesics are not appropriate. This can be administered in the drinking water. Paediatric preparations are suitable (Tylenol 1-2mg/ml in drinking water).

Administer 24 hours before surgery and 24 hours post-surgery.

Dose rate: 1-2mg/ml in drinking water

### Time of administration

The preferred time of administration is before noxious stimulation begins to prevent the adverse central nervous system changes that this stimulation induces.

This works particularly well with carprofen.

However the respiratory depression associated with buprenorphine makes it unsuitable for use with ketamine/xylazine anaesthesia before surgery. Administering buprenorphine 1-2 hours post operatively seems to be most effective.

### REFERENCES

Australian code for the care and use of animals for scientific purposes 8<sup>th</sup> Edition 2013

Laboratory Animal Anaesthesia 2<sup>nd</sup> Edition 1996 P. Flecknell

Veterinary Drug Handbook 4<sup>th</sup> Edition 2002 D.C. Plumb

Analgesic Effects of Tramadol, Tramadol-Gabapentin and Buprenorphine in an incisional model of pain in rats, GP McKeon, C Pacharinsak, CT Long, AM Howard et al JAALAS Vol. 50, No 2, March 2011

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