Rat Analgesia

Preparation:
- All solutions for parenteral use should be prepared aseptically using pharmaceutical grade sterile saline in a sterile vial/or red top tube
- The solution must be labeled with the active drug, diluent, final concentration (mg/mL), expiration date, and initials
  - Dilutions should be examined prior to use and disposed of if a precipitate forms regardless of the expiration date

Procedure:
- Analgesia should be provided pre-emptively whenever possible
  - Water bottle dosing should be initiated 24 prior to procedure or
  - Direct oral dosing/injectable analgesia given at time of anesthesia induction or during recovery
- NSAID (COX2 selective provides for analgesia, antipyretic, and anti-inflammatory effects)
  - Carprofen (stock needs to be refrigerated, diluted drug can remain at room temperature for 28 days)
    - Injectable – 5mg/kg SC or IP, BID to SID
      - 0.2mL Carprofen (50 mg/mL) + 3.8 mL sterile saline = 2.5 mg/mL solution.
    - Clear H2O gel formulation (NOT CURRENTLY COMMERCIALLY AVAILABLE)
      - 1 -2 oz cup/2 rats provided 24-48 hours in advance of surgery
      - Provides 5mg/kg/day
      - Flip or replace as needed (every 2-3 days)
  - Meloxicam (1.5 mg/mL oral suspension or 5 mg/mL injectable solution)
    - Oral Dosing – 2 mg/kg, PO, SID
    - Injectable – 2 mg/kg, SC, SID
    - Bacon Flavored Tablet 0.25mg/tablet (from bio-serve)
      - Give 1 tablet/rat/day
      - Provides 0.8 mg/kg for a 300g rat
- NSAID (non-selective, propionate acid derivatives provide for analgesia, antipyretic, and anti-inflammatory effects)
  - Ibuprofen (Children’s Motrin Suspension – 100 mg/5mL)
    - Water Bottle:
      - 5 mL Children’s Motrin + 500 mL water = 0.2 mg/mL solution, changed twice weekly
      - Dose of 20 mg/kg assuming a 300g rat drinking 30 ml/day

Supplies:
1. Sterile Vial/Red Top Tube
2. Miscellaneous supplies as needed (22-25ga. Needles, 1-10mL syringes)
3. Alcohol swabs
4. 0.9% Sterile Saline
5. Rat water bottle filled with 500mL RO water
6. Children’s Motrin (Ibuprofen 100mg/5mL)
7. Rimadyl (Carprofen 50mg/mL)
8. Metacam Oral Formulation (meloxicam 1.5mg/mL)
9. Metacam Injectable (meloxicam 5mg/mL)
10. Meloxicam Tablets 0.25mg/tablet from Bio-Serve
11. Carprofen Clear H2O gel from Cincinnati labs
12. Buprenorphine SR-LAB (1mg/ml)
Opioid

- Buprenorphine
  - Injectable – 0.05 mg/kg SC or IP, BID
  - Dilution: add 0.1 mL of Buprenex + 0.9 mL of sterile saline = 0.03 mg/mL solution.
- Buprenorphine SR-LAB (Sustained release)
  - Draw up in a 3cc syringe with a 22g needle.
  - It is recommended to warm the bottle and/or syringe in your hands or a water bath to thin out the Bup SR product and improve ease of handling.
  - Wipe the needle carefully with an alcohol swab to remove drug residue prior to administration.
  - **Administer slowly subcutaneously between the shoulder blades** and pinch injection site for 10 seconds after removing the needle (ideally inject while anesthetized).
  - Dose at 1.0 – 1.2 mg/kg SQ, every 48-72 hours (do not dilute further).

<table>
<thead>
<tr>
<th>Drug</th>
<th>100g</th>
<th>250g</th>
<th>500g</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meloxicam – INJ (5 mg/mL)</td>
<td>Dilute out</td>
<td>0.1 mL</td>
<td>0.2 mL</td>
</tr>
<tr>
<td>Meloxicam – Oral (1.5 mg/mL)</td>
<td>0.1 mL</td>
<td>0.3 mL</td>
<td>0.7 mL</td>
</tr>
<tr>
<td>Ibuprofen – Oral (100 mg/ 5mL)</td>
<td>0.1 mL</td>
<td>0.2 mL</td>
<td>0.4 mL</td>
</tr>
<tr>
<td>Carprofen – INJ (Diluted 2.5 mg/mL)</td>
<td>0.2 mL</td>
<td>0.5 mL</td>
<td>1.0 mL</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Drug</th>
<th>60-145g</th>
<th>150-200g</th>
<th>210-260g</th>
<th>270-320g</th>
<th>330-380g</th>
<th>390-440g</th>
<th>450-500g</th>
</tr>
</thead>
<tbody>
<tr>
<td>Buprenorphine HCL– INJ (Diluted 0.03 mg/mL), dosed at 0.05mg/kg</td>
<td>0.2 mL</td>
<td>0.3 mL</td>
<td>0.4 mL</td>
<td>0.5 mL</td>
<td>0.6 mL</td>
<td>0.7 mL</td>
<td>0.8 mL</td>
</tr>
</tbody>
</table>

Volumes rounded to nearest 1/10th of mL

<table>
<thead>
<tr>
<th>Drug</th>
<th>&lt;115g</th>
<th>116-200g</th>
<th>201-280g</th>
<th>281-365g</th>
<th>366-450g</th>
<th>451-530g</th>
</tr>
</thead>
<tbody>
<tr>
<td>Buprenorphine SR (1 mg/mL), dosed at 1.2 mg/kg</td>
<td>0.1 mL</td>
<td>0.2 mL</td>
<td>0.3 mL</td>
<td>0.4 mL</td>
<td>0.5 mL</td>
<td>0.6 mL</td>
</tr>
</tbody>
</table>

Volumes rounded to nearest 1/10th of mL

REFERENCES:

- IACUC Policy on the Use of Pharmaceutical and Non-Pharmaceutical Compounds
- Formulary for Laboratory Animals- third edition, Hawk et al, 2005
- Guidelines for the Assessment and Management of Pain in Rodents and Rabbits. ACLAM position statement.
- Vet Guideline 13-004 Controlled Substances
- Ferrets, Rabbits, and Rodents Clinical Medicine and Surgery, 2nd edition, Quesenberry and Carpenter, 2004
- Exotic Animal Formulary – Fifth Edition, Carpenter, 2018