It is the policy of the IACUC that appropriate anesthetic agents will be administered, when necessary, to animals utilized in approved research and teaching protocols. The anesthetics listed in this SIG are guidelines from the DACT veterinary staff. However, prior to submitting an IACUC protocol, we strongly recommend you discuss anesthetic choices with the DACT veterinary staff to determine the most effective anesthetic regimen for your project.

A. General Information

1. Appropriate anesthetic agents, dosages, and routes of administration are identified in a number of different sources, including:
   

2. When necessary, other current references should be consulted.

3. The following anesthetic agents, dosages, and routes of administration may be used for the listed species.

B. Formulary of Anesthetic Agents used in Research and Teaching

1. **RATS**
   
   a. Rat KXA Cocktail: (Contact DACT veterinary team for the recipe for making the cocktail or to make the cocktail for you.)

   \[ k=\text{ketamine} (100 \text{ mg/ml}), \ X=\text{xylazine} (20 \text{ mg/ml}), \ A=\text{acepromazine} (10 \text{ mg/ml}) \]

<table>
<thead>
<tr>
<th>Purpose</th>
<th>K (mg/kg)</th>
<th>X (mg/kg)</th>
<th>A (mg/kg)</th>
<th>Vol (ml/100gBW)</th>
<th>Rte</th>
</tr>
</thead>
<tbody>
<tr>
<td>sedation and simple procedures</td>
<td>50</td>
<td>5</td>
<td>1</td>
<td>0.10</td>
<td>IP</td>
</tr>
<tr>
<td>more invasive or longer procedures</td>
<td>90</td>
<td>5</td>
<td>none</td>
<td>0.20</td>
<td>IP</td>
</tr>
<tr>
<td>more invasive or longer procedures (alt)</td>
<td>95</td>
<td>5</td>
<td>1</td>
<td>0.20</td>
<td>IP</td>
</tr>
</tbody>
</table>

   Booster dose to extend anesthesia: ketamine alone (25 mg/kg)  

   b. Pentobarbital sodium* (not recommended for survival procedures; not reasonably available in a pharmaceutical grade; non-pharmaceutical grade use requires IACUC approval):

   30-60 mg/kg  

   * best if given with atropine (0.4 mg/kg, SC)
c. Isoflurane

*Induction:* 3-5% inhalant

*Maintenance:* 1-3% inhalant

2. **MICE**

a. Mouse KXA Cocktail: (Contact DACT veterinary team for the recipe for making the cocktail or to make the cocktail for you.)

\[ k=\text{ketamine (100 mg/ml), } X=\text{xylazine (20 mg/ml), } A=\text{acepromazine (10 mg/ml)} \]

<table>
<thead>
<tr>
<th>Purpose</th>
<th>K (mg/kg)</th>
<th>X (mg/kg)</th>
<th>A (mg/kg)</th>
<th>Vol (ml/25gBW)</th>
<th>Rte</th>
</tr>
</thead>
<tbody>
<tr>
<td>sedation and simple procedures</td>
<td>42</td>
<td>4.8</td>
<td>0.6</td>
<td>0.05</td>
<td>IP</td>
</tr>
<tr>
<td>more invasive or longer procedures</td>
<td>100</td>
<td>2.5</td>
<td>2.5</td>
<td>0.10</td>
<td>IP</td>
</tr>
<tr>
<td>more invasive or longer procedures (alt)</td>
<td>120</td>
<td>6.0</td>
<td>none</td>
<td>0.10</td>
<td>IP</td>
</tr>
</tbody>
</table>

*Booster dose to extend anesthesia:* ketamine alone (25 mg/kg) IP

b. Pentobarbital sodium* (not recommended for survival procedures; not reasonably available in a pharmaceutical grade; non-pharmaceutical grade use requires IACUC approval):

50-90 mg/kg (dilute in saline to give a volume of 0.1 ml/10g) IP

* best if given with atropine (0.4 mg/kg, SC)

c. Isoflurane

*Induction:* 3-5% inhalant

*Maintenance:* 1-3% inhalant

3. **HAMSTERS**

a. Hamster KX Cocktail: ketamine (80 mg/kg), xylazine (5 mg/kg) IM or IP

Booster dose to extend anesthesia: Ketamine (40 mg/kg) IM or IP

b. Pentobarbital sodium* (not recommended for survival procedures; not reasonably available in a pharmaceutical grade; non-pharmaceutical grade use requires IACUC approval):

70-90 mg/kg IP

* best if given with atropine (0.4 mg/kg, SC)

c. Isoflurane

*Induction:* 3-5% inhalant

*Maintenance:* 1-3% inhalant

4. **GUINEA PIGS**

a. Ketamine/dexmedetomidine combination (recommended):

Ketamine (40 mg/kg) IM or IP

Dexmedetomidine (0.25 mg/kg) IM or IP

b. Guinea Pig KX cocktail: ketamine (40 mg/kg), xylazine (0.5-2.0 mg/kg) IP

c. Telazol (10-30 mg/kg) IM

Telazol (25-50 mg/kg) IP

Updated 7/23/2020
Updated 7/27/2017
Updated 7/28/2016
d. Pentobarbital sodium* (not recommended for survival procedures; not reasonably available in a pharmaceutical grade; non-pharmaceutical grade use requires IACUC approval):
   30-45 mg/kg IP
   * best if given with atropine (0.4 mg/kg, SC)

e. Isoflurane
   Induction: 3-5% inhalant
   Maintenance: 1-3% inhalant

5. RABBITS
a. Rabbit KX Cocktail: ketamine (35 mg/kg), xylazine (5 mg/kg) IM
b. Rabbit KXA Cocktail:
   Ketamine (35 mg/kg), xylazine (5 mg/kg), acepromazine (0.75 mg/kg) IM
c. Isoflurane
   Induction: best if use KX cocktail, but can use 3-5% isoflurane inhalant
   Maintenance: 1-2.5% inhalant

6. NON-HUMAN PRIMATES – see IACUC SIG “NHP Anesthesia, Analgesia, and Antibiotic Regimens”

7. PERCHING BIRDS (e.g., finches, sparrows)
a. Isoflurane (1.5-3%) inhalant

8. REPTILES
a. Isoflurane (3-5%) inhalant

9. AMPHIBIANS - *Dosage varies greatly among species. Consult DACT veterinary staff*
a. Tricaine methanesulfonate (MS-222) (typically 1 g/L water; may be higher) immersion
   Buffer with equal amounts of sodium bicarbonate to achieve a neutral pH
   Aerate water
b. Benzocaine (100-300 mg/L water; some species may be higher) immersion
   Poor solubility in water, must first dissolve crystalline benzocaine in ethanol (1 g/4 mL)

10. FISH - *efficacy and safety vary by species, size of fish, & water temperature, consult DACT veterinary staff*
a. Tricaine methanesulfonate (MS-222) (typically 25-75 mg/L water) immersion
   Buffer with equal amount of sodium bicarbonate to achieve a neutral pH
   Aerate water
b. Benzocaine (25-35 mg/L water; some species may be higher) immersion
   Poor solubility in water; first dissolve crystalline benzocaine in ethanol (1 g/4 mL)
   Aerate water