Arizona State University
Institutional Animal Care and Use Committee
STANDARD INSTITUTIONAL GUIDELINE

RECOMMENDED ANESTHESIA AGENTS

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:

Carpenter, J. W. 2022. *Exotic Animal Formulary, 6th ed.*, Elsevier, St. Louis, MO.

Plumb, D. C. 2018 *Veterinary Drug Handbook, 9th ed*. Wiley-Blackwell Publishing, Ames, IA.

Hubbell, J. A. E., and Muir, W. W. 1996. Evaluation of a survey of the diplomats of the American College of Laboratory Animal Medicine on use of analgesic agents in animals used in biomedical research, *Journal of the American Veterinary Medical Association* 209: 918-921.

Fish, R. E., Brown, M. J., Danneman, P. J., and Karas, A. Z. 2008. *Anesthesia and Analgesia in Laboratory Animals, 2nd ed.*, Elsevier, St. Louis, Mo.

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=ketamine (100 mg/ml), X=xylazine (20 mg/ml), A=acepromazine (10 mg/ml)

Purpose	*K (mg/kg)*	*X (mg/kg)*	*A (mg/kg)*	*Vol (ml/100gBW)*	*Rte*
sedation and simple procedures	50	5	1	0.10	IP
more invasive or longer procedures	75	10	none	0.20	IP
more invasive or longer procedures (alt)	95	5	1	0.20	IP

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

i. Atipamezole (1 mg/kg; 5 mg/ml) can be used after the anesthetic event to reverse the xylazine and aid in recovery. It will not reverse the ketamine so the animal will still need to be monitored during recovery.

b. 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=ketamine (100 mg/ml), X=xylazine (20 mg/ml), A=acepromazine (10 mg/ml)

Purpose	*K (mg/kg)*	*X (mg/kg)*	*A (mg/kg)*	*Vol (ml/25gBW)*	*Rte*
sedation and simple procedures	42	4.8	0.6	0.05	IP
more invasive or longer procedures	100	2.5	2.5	0.10	IP
more invasive or longer procedures (alt)	120	6.0	none	0.10	IP

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

i. Atipamezole (1 mg/kg; 5 mg/ml) can be used after the anesthetic event to reverse the xylazine and aid in recovery. It will not reverse the ketamine so the animal will still need to be monitored during recovery.

b. 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. 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

d. 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. **MACAQUES** – see IACUC SIG "*Macaque 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