

Institutional Animal Care & Use Program - UTEP	
Title: Guidelines on Reptile Anesthesia and Analgesia	
Policy#: 043	Date in Effect: 25 August 2025
Version #: A	Rev Date:
In Effect <input checked="" type="checkbox"/> Rescinded <input type="checkbox"/>	Date Rescinded:

1. RESPONSIBILITIES

It is the responsibility of all personnel conducting research involving the use of animals at the University of Texas at El Paso (UTEP) to abide by this policy in order to ensure appropriate animal welfare. It is the responsibility of the Institutional Animal Care and Use Committee (IACUC) to review for approval, properly justified requests for an exception to this policy.

2. BACKGROUND

Anesthesia:

This encompasses both of the following definitions:

1. Local Anesthesia: Temporarily induces loss of sensation to a specific part of the body. May provide pain relief.
2. Systemic Anesthesia: Temporarily induces loss of sensation with loss of consciousness. Only provides pain relief due to or during loss of consciousness.

Analgesia:

1. Provides pain relief without loss of consciousness.

Sedation:

2. Central depression causing stupor where the animal is unaware of its surroundings but still responsive to painful procedures.

3. POLICY

All surgical procedures, anesthetics, analgesics, or other medications used on animals must be approved by the IACUC, described in the animal use protocol and performed by personnel listed on the protocol and appropriately trained for the procedure. Any techniques or drug protocols deviating from this document must be justified and approved in the IACUC animal care and use protocol prior to implementation.

4. ANESTHESIA

Injectable Anesthetics, General Considerations

While injectable anesthetics may be used and are relatively easy to administer, the effects can be prolonged and may be unpredictable once given. In addition, recovery may take several days. Therefore it is recommended that inhalant anesthetics be chosen whenever possible.

1. Alfaxalone: IV or intraosseous alfaxalone provides rapid, controlled induction
2. Propofol: IV or intraosseous propofol provides rapid, controlled induction
3. Ketamine and Dexmedetomidine Combinations
 - IM injection of ketamine/dexmedetomidine/hydromorphone can be effective for chelonians and reversible with atipamezole, naloxone, or naltrexone.
 - IM alfaxalone is effective if a higher dose is used. Forelimb muscles are preferred for IM injection in lizards and chelonians. Epaxial muscles are preferred for IM injection in snakes.

Inhalant Anesthetics, General Considerations

Induction chamber, bag, or mask can be used for induction.

Depth of anesthesia can be controlled if the reptile is intubated (use an uncuffed, or uninflated, endotracheal tube). This is preferred for maintenance. Use a precision vaporizer with supplemental oxygen to administer the gas.

1. Recovery from inhalant anesthesia is usually rapid.
2. Important things to remember when using inhalant anesthetics:
 - Reptiles breathe due to LOW partial pressure of oxygen. Use of room air or air with less than 100% oxygen is advised when recovering an intubated reptile, to prevent prolonged recoveries.
 - Reptiles can bypass standard metabolism requiring oxygen. Inadequate or excessive ventilation can disrupt anesthetic uptake in reptiles. This results in an inappropriate plane of anesthesia and response to noxious stimuli such as cutting during surgery.
 - Anesthesia induction, maintenance, and recovery should be performed at the average or at the high end of the reptile's preferred body temperature range. The range of 79° to 90°F is acceptable if species specific range is unknown.

- For commonly used anesthesia protocols in reptiles (see Procedures Section 6).

5. Isoflurane

- Preferred due to its wide margin of safety. Provides consistent and predictable anesthesia allowing for intubation in snakes
- May also be used with the open drop technique for short, non-surgical procedures only. Open drop technique must be performed within a fume hood.
- Monitoring Anesthesia
- The following points may be helpful in monitoring anesthesia in reptiles:
 - Muscle relaxation progresses from cranial (head) to caudal (tail) in the reptile; during recovery from anesthesia, motor function returns in reverse order.
 - Loss of the righting reflex (e.g., loss of ability to right rattle in rattlesnakes) occurs as the depth of anesthesia increases.
 - Mucous membrane color may be used to assess oxygen perfusion and cardiac output, but this may be misleading in species which do not normally have pink mucous membranes.
 - Visualizing or palpating cardiac or respiratory movements may be difficult but should be attempted. 2-4 breaths per minute is adequate in most species.
 - Corneal reflex remains present at a surgical depth of anesthesia in all reptiles except snakes.
 - Tongue withdrawal reflex in snakes remains present at a surgical depth of anesthesia.
 - The head and legs of turtles will not retract into the shell at a surgical plane of anesthesia.

5. ANALGESIA

1. Signs of pain in reptiles can be difficult to monitor. Signs may include, but are not limited to, the following:
 - Flinching and/or muscle contractions
 - Biting at affected area

- Anorexia/delayed feeding time
- Lethargy
 - Color changes or dull color
 - Ataxia/lameness
- Decreases coiling at site of pain
- Elevated respiratory rate
- Orbital tightening/closing eyes/third eyelid elevation

2. Prevention and Management of Pain:

- Although pain and pain relief in reptiles is not well understood, is advisable to use analgesia in reptiles that have undergone a painful procedure.
- Buprenorphine, flunixin meglumine, and metacam have been used in reptiles for postoperative analgesia.
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Analgesics Used In Reptiles

Drug	Dosage (mg/kg)	Route	Comments
<i>Opioids</i>			
Buprenorphine	0.005-0.02	IM	Dose Q24-48 h*
<i>Non-Steroidal Anti-Inflammatory Drugs (NSAIDS)</i>			
Flunixin Meglumine	0.1-0.5	IM	Dose Q24-48 h (maximum 3 days)
Meloxicam (Metacam)	0.1-0.5	PO, IM, SC	Dose Q24-48 h (maximum 3 days)**
<i>Local Anesthetics</i>			
Lidocaine	2-5	Local infusion	Maximum <5 mg/kg
Bupivacaine	1-2	Local infusion	Maximum <4 mg/kg

*Duration may vary per species as evidence suggests some reptiles metabolize it more rapidly

**Chronic use is not well documented and monitoring is advised

Sedatives Used in Reptiles

Drug	Dosage (mg/kg)	Route	Comments
<i>Lizards</i>			
Dexmedetomidine (D) + Midazolam (M)	0.05 – 0.1 (D) + 1.0 (M)	IM, SC	<ul style="list-style-type: none"> • Moderate sedation. • Completely reversible.
Dexmedetomidine (D) + Midazolam (M) + Ketamine (K)	0.05 – 0.1 (D) + 1.0 (M) + 2.5 – 5.0 (K)	IM, SC	<ul style="list-style-type: none"> • Deep sedation, can be used for minor surgery if used with local anesthesia. • Partially reversible.
Propofol	3.0 – 5.0	IV, IO	<ul style="list-style-type: none"> • Deep sedation to light anesthesia.
Alfaxalone	15.0	IC, SC, IM, IV	<ul style="list-style-type: none"> • Deep sedation achieved most consistently with IV.
<i>Snakes</i>			
Midazolam	1.5 – 2.0	IM, SC	<ul style="list-style-type: none"> • Minimal sedation, inconsistent effects. • Completely reversible. • Decreases MAC of isoflurane.
Telazol	2.0 – 5.0	IM, SC	<ul style="list-style-type: none"> • Mild to moderate sedation, intubation. • For use on large snakes
Ketamine	5.0 – 10.0	IM, SC	<ul style="list-style-type: none"> • Mild to moderate sedation, intubation. • Decreases incidence of breath-holding during chamber induction.
Propofol	3.0 – 5.0	IV	<ul style="list-style-type: none"> • Moderate sedation to light anesthesia. • First choice for induction agent.
Alfaxalone	10.0 – 20.0	SC, IM	<ul style="list-style-type: none"> • Brief procedures and intubation or induction. • Cranial or caudal third of body (cranial third SC injection may be more effective than caudal third, due to hepatic first pass effect). • IM injection- cranial to heart. • Slow IV injection via ventral tail vein after initial SC injection.

Anesthesia for Reptiles

Drug	Dosage (mg/kg)	Route	Comments
<i>Lizards</i>			
Propofol	5.0 – 10.0	IV, IO	<ul style="list-style-type: none"> • Induction agent, lower end of dose can last 20 – 30 minutes. • Can maintain with 0.25 mg/kg/min.
Isoflurane	2 – 5%		<ul style="list-style-type: none"> • Induction at 5%, maintenance at 2 – 3%.
Sevoflurane	2.5 – 8%		<ul style="list-style-type: none"> • Induction at 7 – 8%, maintenance at 2.5 – 4.5%.
Ketamine	5 – 10	IM	<ul style="list-style-type: none"> • Decreases the incidence of breath holding during induction with an inhalant agent.
Dexmedetomidine (D) + Ketamine (K)	0.05 – 0.07 (D) + 5.0 – 15.0 (K)	SCIM, SC, IV	<ul style="list-style-type: none"> • Partially reversible.
Alfaxalone (A) + Dexmedetomidine (D)	30.0 (A) + 0.1 (D)	SC	<ul style="list-style-type: none"> • General anesthesia lasting 30-35 minutes. • Full recovery after 10-12 minutes.
Ketamine (K) + Medetomidine (M)	100.0 (K) + 0.2 (M)		<ul style="list-style-type: none"> • Surgical plane anesthesia • Re-inject with half of previous dose every 4 hours to maintain • Partially reversible
<i>Snakes</i>			
Propofol	5-10 (IV), 1-2 (IO)	IV, IO	<ul style="list-style-type: none"> • Induction agent, lower end of dose can last 20 – 30 minutes.
Isoflurane	2 – 5%		<ul style="list-style-type: none"> • Induction at 5%, maintenance at 2-3%
Sevoflurane	2.5 – 5%		<ul style="list-style-type: none"> • Induction at 5%, maintenance at 2.5-4.5%
Ketamine	5 – 10	IM	<ul style="list-style-type: none"> • Decreases the incidence of breath holding during induction with inhalant agent
Telazol	2.0 – 6.0	IM	<ul style="list-style-type: none"> • Induction agent, helps with intubation. • Maintain with an inhalant agent. • Prolonged recoveries likely.
Tiletamine (T) + Zolazepam (Z)	2.0 (T) + 3.0 (Z)	IM	<ul style="list-style-type: none"> • Short term immobilization anesthesia

Review History	
Revision Version:	Revision Date:
A	25 August 2025