
1. PURPOSE

This Standard Operating Procedure (SOP) describes methods for anesthetizing birds, with a specific emphasis on laboratory finches.

2. RESPONSIBILITY

Principal investigators (PIs) and their research staff, veterinarian, veterinary care staff.

3. Introduction

- 3.1. The fasting period for birds depends on the size of birds. For small birds such as finches, a fasting period less than 2 hours is adequate.
- 3.2. Birds can be anesthetized with either inhalant gas or injectable drugs. The use of inhalant gases is the preferred method of anesthesia whenever possible. Inhalant anesthesia is recommended due to its wide safety margin, reliability, rapid control of anesthetic depth, and faster recovery.
- 3.3. Heat loss is rapid in anesthetized birds. Keep animals warm by providing a heat source such as a heated pad, jacket, or heat lamp. Provide heat until the animal has recovered from anesthesia. Care should be taken not to overheat or burn the animals; do not place animals directly in contact with the heat source, use a drape or other material as a barrier.
- 3.4. Monitor animals closely during induction, maintenance, and recovery from general anesthesia. Monitoring must be documented.
 - 3.4.1. Never leave an anesthetized animal unattended.
 - 3.4.2. Monitor animal every 5 minutes:
 - 3.4.2.1. Anesthetic depth: absence of reflexes, e.g., pedal, absence of movement, muscle relaxation.
 - 3.4.2.2. Respiratory function: respiratory rate, thoracic wall movements. When species-adapted equipment is available include oxygen saturation (SpO₂), end-tidal carbon dioxide (ETCO₂).
 - 3.4.2.3. Cardiovascular function (circulation): mucous membrane color, capillary refill time (CRT) when possible. When species-adapted equipment is available include electrocardiography (ECG).
 - 3.4.2.4. Body temperature: rectal temperature when possible. Warming pad probes can also be used.
- 3.5. Apply ophthalmic ointment to prevent corneal desiccation. Reapply as needed, every 30 minutes at a minimum
- 3.6. Maintain records of each anesthesia procedure and include:
 - 3.6.1. Date and time of procedure
 - 3.6.2. Principal investigator and Animal Use Protocol (AUP)
 - 3.6.3. Species and animal's identification
 - 3.6.4. Animals' weight
 - 3.6.5. Name, dose, route, and time of administration of each drug
 - 3.6.6. Description of the procedure
 - 3.6.7. Measurements of the animal's anesthetic depth and vital signs
 - 3.6.8. Time of recovery
 - 3.6.9. Name of the individual monitoring the animal and of the surgeon

4. MATERIALS

- 4.1. Material or equipment to provide or conserve body heat, e.g., gauze pads, towel, warming pad, jacket, or heat lamp. If using heat lamp, use 60W bulbs or less. Do not use electric heating pads unless specifically designed for use with laboratory animals.
- 4.2. Ophthalmic ointment (natural tears)
- 4.3. Animal weighing scale
- 4.4. Gas anesthesia machine, calibrated within the last 12 months, with adequate gas scavenging system or filter
- 4.5. Induction chamber constructed of a see-through material (glass, polycarbonate, etc.)
- 4.6. Tight-fitting mask attached to a non-rebreathing circuit with separate tubing for delivery for fresh gas and evacuation of waste gas (Bain circuit)
- 4.7. Isoflurane
- 4.8. Ketamine (100 mg/mL) *Controlled drug
- 4.9. Xylazine (20 mg/mL)
- 4.10. Midazolam (5 mg/mL)
- 4.11. Atropine (0.5 mg/mL)

5. PROCEDURES FOR ADULTS

- 5.1. As a pre-anesthetic, atropine 0.01 mg/kg can be administered to prevent secretions.
- 5.2. Isoflurane anesthesia:
 - 5.2.1. Induction:
 - 5.2.1.1. Place the mask, connected to the Bain circuit, over the beak of the animal
 - 5.2.1.2. Adjust the oxygen flowmeter to 0.5 to 2.5 L/min.
 - 5.2.1.3. Adjust the isoflurane vaporizer to 3%, increase as needed to effect until loss of consciousness
 - 5.2.2. Maintenance:
 - 5.2.2.1. Remove the animal from the induction chamber and use a nosecone or mask connected to the Bain circuit.
 - 5.2.2.2. Adjust the flowmeter to 0.5 to 2.5 L/min.
 - 5.2.2.3. Adjust the isoflurane vaporizer to 0.5 to 2 % (dose to effect).
 - 5.2.2.4. Apply ophthalmic ointment (natural tears) to both eyes.
 - 5.2.2.5. Continuously monitor the animal during anesthesia and adjust the level of isoflurane as needed according to monitored parameters.
 - 5.2.3. Recovery:
 - 5.2.3.1. Turn off the isoflurane vaporizer and keep the animal on oxygen.
 - 5.2.3.1. Transfer animal to their cage once it begins to move and allow to recover fully (sternal position).
 - 5.2.3.2. Provide supplemental heat during the recovery period.
- 5.3. Injectable anesthesia:
 - 5.3.1. Injectable anesthetic dose can vary with the sex, the age, the strain, and the general condition of the animal.
 - 5.3.2. Injectable anesthetics can be used alone for short, non-invasive procedures or prior to use of isoflurane anesthesia for smooth and rapid induction.
 - 5.3.3. Contact your veterinarian for advice on the appropriate dose prior to use.

Drug	Dose	Route	Duration of Effect	Notes
Ketamine	10- 40 mg/kg	IM	15 to 30 minutes	
Ketamine Midazolam	10-40 mg/kg 0.5-2 mg/kg	IM	30 minutes to 1 hour	Can be mixed in the same syringe.
Ketamine Xylazine	25- 40 mg/kg 5- 50 mg/kg	IM	1 to 2 hours	Can be mixed in the same syringe. After 30 minutes, a quarter to a half dose may be administered as needed.

- 5.3.4. After injection, place animal in a dark and quiet holding chamber with a heat source.
- 5.3.5. Monitor animals closely for any signs of movement in response to stimuli and re-dose early to avoid emerging from the surgical plane of anesthesia. A quarter or half dose of may be administered to prolong anesthesia as needed.
- 5.3.6. Provide supplemental heat and monitor until recovery (sternal position).

SOP REVISION HISTORY

DATE	NEW VERSION
2020.05.13	3.3. Heat loss is rapid in anesthetized birds. Keep animals warm by covering them with a gauze pad or towel and/or providing a heat source such as a heated pad, jacket or heat lamp. Provide heat until the animal has recovered from anesthesia. Care should be taken to not overheat or burn the animals.
2020.12.07	5.2.3.1. Turn off the isoflurane vaporizer flush the system but and keep the animal on oxygen.
2024.01.12	2. RESPONSIBILITY Principal Investigators (PIs) and their research staff, veterinarian , veterinary care staff.
2024.01.12	3.2. Birds can be anesthetized with either inhalant gas or injectable drugs. The use of inhalant gases is the preferred method of anesthesia whenever possible. Inhalant anesthesia is recommended due to its wide safety margin, reliability, rapid control of anesthetic depth, and faster recovery.
2024.01.12	3.3. Heat loss is rapid in anesthetized birds. Keep animals warm by covering them (e.g. gauze pad or towel) and/or providing a heat source such as a heated pad, jacket, or heat lamp. Provide heat until the animal has recovered from anesthesia. Care should be taken to not overheat or burn the animals; do not place animals directly in contact with the heat source, use a drape or other material as a barrier.
2024.01.12	4.1. Material or equipment to provide or conserve body heat, e.g., gauze pads, towel, heating warming pad, jacket, or heat lamp. If using heat lamp, use 60W bulbs or less. Do not use electric heating pads unless specifically designed for use with laboratory animals.
2024.01.12	4.3. Animal weighing scale
2024.01.12	4.6. Tight-fitting mask attached to a non-rebreathing circuit with separate delivery for fresh gas and evacuation of waste gas (Bain circuit)
2024.01.12	5.1.2.3. Adjust the isoflurane vaporizer to 3% to 5% increase as needed to effect until loss of consciousness
2024.01.12	5.2.2.1. Apply ophthalmic ointment (natural tears) to both eyes to prevent dryness and damage to the cornea. Reapply as needed.
2024.01.12	5.2.3.1. Turn off the isoflurane vaporizer, flush the system and keep the animal on oxygen.
2024.01.12	5.3.5. Apply ophthalmic ointment (natural tears) to both eyes to prevent dryness and damage to the cornea. Reapply as needed.
2024.01.12	5.3.5. Monitor animals closely for any signs of movement in response to stimuli and re-dose early to avoid emerging from the surgical plane of anesthesia. A quarter or half dose of may be administered to prolong anesthesia as needed.
2024.01.12	5.3.5. Provide supplemental heat and monitor until recovery (sternal position).