

IACUC Guideline - Volatile Gas Anesthesia

Statement

This guide is intended to provide information on appropriate procedures for the use of volatile gases for anesthesia and euthanasia and to establish procedures to be followed.

Details

- The use of precision vaporizers for accurate delivery of volatile anesthetics is strongly recommended by the IACUC.
 - Using a precision vaporizer allows the user to deliver predictable amounts of anesthesia, thus producing a quick induction and quick recovery.
 - Anesthetic gases can be delivered from the vaporizer to the animal via a properly placed endotracheal tube or laryngeal cuff, an appropriately sized nose-cone, or by placing the entire animal inside a clear induction box or chamber.
 - Waste gas must be scavenged. Acceptable scavenging of waste gases include:
 - The use of a down draft table designed for scavenging.
 - Use of chemical fume hood
 - Use of a class II Biosafety cabinet ducted to the outside
 - Use of Charcoal canister; (must be weighed regularly and replaced when increased by 50 gm in weight or by the weight indicated on the canister). All new, unused canisters should be weighed and clearly labeled with initial weight.
 - When using an induction chamber, the system should be flushed with fresh oxygen for 10 – 15 seconds prior to opening the container.
 - Always consult the Purdue EHS department when planning a new method of scavenging. (Environmental Health and Safety <https://www.purdue.edu/ehts/>)
- The Drop technique or “Bell Jar” method is a recognized method of delivering anesthetic gases for certain applications in rodents, and is only used when the following criteria are met:
 - The technique is performed in a closed container that is transparent allowing the observation of the animal.
 - The technician administering the gas NEVER leaves the container unattended; as few as 10 breaths can be enough for an anesthetic overdose!
 - A rigid physical barrier is between the animal and the liquid anesthetic or the liquid-soaked cotton ball.
 - The method is performed inside an approved fume hood, class II Biosafety cabinet or within an area that has previously been approved by the Purdue EHS department, (Environmental Health and Safety <https://www.purdue.edu/ehts/>).

Responsibilities

- All traditional anesthesia machines and their parts must be serviced and certified by a qualified service center or manufacturer on an annual basis. The newer SomnoSuite-type anesthesia machines do not need to be serviced/certified on an annual basis.
- It is the responsibility of the investigator to contact an authorized service vendor, pay for the certification and maintain records. Records are to include, a) date of last service, b) initials of service technician, c) date of calibration. Records will be reviewed by IACUC during semi-annual inspections.
 - LAP provides the option of joining group certification events, in which LAP covers the cost of the service visit. It is the responsibility of the investigator to sign up for these events if they wish to participate.
- All equipment must be routinely checked for leaks, function, appropriate hose connection, etc. Inspect and clean all anesthesia equipment including nose-cones, face-masks, endotracheal tubes and induction chambers before and after each use, to ensure proper working condition. Do not use hoses that are cracked or kinked.
- Check the integrity of your scavenging system.
- Hypothermia can significantly prolong anesthesia, and impair recovery leading to unintended death of the animal. Provide the animal with a heat source during pre-operative, intra-operative and post-operative periods. The animal must always be separated from a physical heat source by a towel or drape to prevent thermal injury to the animal. Hyperthermia can be as detrimental as hypothermia.
- Recovering rodents should not be placed onto loose bedding material until they are fully awake, as suffocation can result. A paper towel, drape, or gauze square can be placed between the bedding and the animal until it awakens and is ambulatory.
- Animals must be monitored continuously until they can maintain sternal recumbency, and every 10 minutes until they can ambulate on their own. Once the animal can ambulate with appropriate balance, it is ready to return to the home cage.

Use for Euthanasia – in rodents

- When using volatile anesthetic overdose as a method of euthanasia, a secondary follow up method must be used to confirm death, such as cervical dislocation, exsanguination, decapitation, bilateral thoracotomy, or full necropsy.
- Always perform a firm toe pinch to determine loss of feeling, along with visual confirmation of pulmonary arrest, prior to secondary method of euthanasia or animal disposal.
- **Do not crowd the animals.** Each animal must have enough floor space to make normal posture movements without touching another animal in the euthanasia chamber.

Training

- For more information about the use of gas anesthesia, trouble shooting, and how it may benefit your research goals, contact the Purdue training coordinator at 494-2521 (dowellc@purdue.edu) or LAP veterinarian at 494-9163.