



INDIANA UNIVERSITY

Office of Research Compliance (ORC)

Institutional Animal Care and Use Committee (IACUC)

Euthanasia

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Responsible University Office:
Office of Research Compliance IACUC Office(s)

Responsible University Administrator:
Vice President for Research

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Definition

For the purpose of this policy, euthanasia is the act of inducing humane death in an animal. Euthanasia techniques should result in rapid unconsciousness followed by cardiac or respiratory arrest and ultimate loss of brain function. In addition, the technique should minimize any stress and anxiety experienced by the animal prior to unconsciousness. Stress may be minimized by technical proficiency and humane handling of the animals to be euthanized.

Background

The Institutional Animal Care and Use Committee (IACUC) uses the 2013 AVMA Guidelines on Euthanasia as its guide in reviewing methods of euthanasia in IACUC Animal Protocols.

Policy

- The method of euthanasia must be fully described in the IACUC Animal Protocol.
- Personnel performing euthanasia procedures must be adequately trained in the specific method to be used for euthanasia and confirming death.
- Deviations from the recommendations of this policy should be fully justified in the IACUC Animal Protocol.
- Animals euthanized by decapitation or cervical dislocation must be anesthetized prior to euthanasia. The PI must provide scientific justification for the use of physical methods without prior anesthesia.
- Animals may be euthanized by perfusion or exsanguination as a primary method of euthanasia if fully anesthetized under deep surgical plane anesthesia. This can include incisions into the chest and heart for the purpose of euthanasia by these means. The IUSM IACUC classifies this as euthanasia, rather than non-survival surgery, so long as no other surgical or non-surgical procedures will occur during the anesthetic event.

Procedures/Acceptable Methods

Adapted from appendix I from the AVMA Guidelines on Euthanasia 2013

| Species | Acceptable‡ | Conditionally acceptable† |
|---------|--|---|
| Dogs | IV barbiturates or barbiturate combinations, injected anesthetic overdose | Barbiturates (alternate routes of administration), inhaled anesthetic overdose, IV or Intracardiac injection of potassium chloride in an unconscious or anesthetized animal |
| Rabbits | IV barbiturates or barbiturate combinations | Inhaled anesthetic overdose |
| Rodents | Injected Barbiturates or barbiturate combinations, dissociative agent combinations | Inhalant anesthetics, CO ₂ , tribromoethanol, cervical dislocation, decapitation |
| Swine | Injected barbiturates | IV or Intracardiac injection of potassium chloride in an unconscious or anesthetized animal |

‡Acceptable methods are those that consistently produce a humane death when used as the sole means of euthanasia. Refer to Appendix 2 and text of the 2013 AVMA Guidelines on Euthanasia for details.

†Conditionally acceptable methods are those that by the nature of the technique or because of greater potential for operator error or safety hazards might not consistently produce humane death or are methods not well documented in the scientific literature. Refer to Appendix 3 and text of the 2013 AVMA Guidelines on Euthanasia for details.

Confirming Death in Rodent Species:

Rodents, especially neonates, are particularly resistant to euthanasia by overdose of inhaled agents such as CO₂ or even injectable agents; for this reason, the IACUC requires a secondary physical method of euthanasia for all rodents prior to carcass disposal.

Acceptable secondary physical methods for adult and neonatal rodents include:

- Decapitation
- Removal of vital organs (e.g. heart, lungs)
- Opening of the chest cavity to induce pneumothorax
- Cervical dislocation in adult rodents less than 200g in body weight

These physical methods of euthanasia may not be performed in conscious animals without specific IACUC approval.

Confirmation of Death in Non-Rodent Mammalian Species:

The IACUC requires confirmation of death for non-rodent mammalian species. This can be accomplished through assessments for heartbeat, respiration, and reflex checks. A secondary physical method of euthanasia is also recommended, but not required.

- Heart beat: The best assessment is through direct palpation of either the pulse in the carotid or femoral artery, direct cardiac palpation or auscultation of the heart. Lack of electrical activity of the heart as determined by ECG (provided that the leads are correctly connected) may also be utilized to confirm death.
- Pupillary response to light: Shine a bright light into the eyes of the animal. A constriction (narrowing) of the pupil indicates a neurological response. Upon death, the pupils will become dilated and unresponsive to light. Some drugs and experimental agents (e.g., anticholinergics such as atropine) can prevent pupillary reactivity or otherwise affect this neurological response.
- Respiratory pattern: Profoundly anesthetized animals may exhibit shallow and irregular breathing patterns that may be confused for lack of spontaneous breathing. Thus, lack of spontaneous breathing should not be used as sole criteria for confirming euthanasia.

- Removal of vital organs (e.g. heart, lungs)
- Opening of the chest cavity to induce pneumothorax

Confirmation of Death in Non-Mammalian Species

The IACUC may require a secondary physical method of euthanasia be performed, depending on the species and other considerations, in accordance with the AVMA Guidelines on Euthanasia.

References:

Silverman et al (Eds), The IACUC Handbook, 3rd Edition. Danneman, Peggy J. Ch 17: Euthanasia. CRC Press, Boca Raton FL, 2014.

Guide for the Care and Use of Animals

Animal Welfare Act & Regulations

AVMA Guidelines for Euthanasia, 2013