

Guidelines for the Use of CO₂ for Euthanasia of Rodents

Euthanasia is the act of killing animals by methods that induce rapid unconsciousness and death without causing pain or distress. Euthanasia of laboratory rodents is often achieved by exposure to carbon dioxide in an enclosed container. Recent reviews of data concerning the use of CO₂ for euthanasia indicate that the results are conflicted as to whether CO₂ provides for death without pain or distress. The Office of Laboratory Animal Welfare has issued the following concerning the use of CO₂ for euthanasia of small laboratory animals.

The Office of Laboratory Animal Welfare has issued PHS Policy on Humane Care and Use of Laboratory Animals guidance to Assured institutions clarifying current requirements regarding the use of carbon dioxide (CO₂) as a euthanasia agent for small laboratory animals.

The guidelines for the use of CO₂ at Purdue University for the purpose of euthanizing rodents follow the guidance provided by the Office of Laboratory Animal Welfare.

- All individuals administering CO₂ euthanasia must be appropriately trained and adhere to PACUC approved protocols and institutional policies.
- Chambers used to administer CO₂ for euthanasia should allow for visualization of the animal(s).
- Chambers should not be crowded and allow for normal postural movements of the animals. Incompatible animals or unfamiliar animals should not be mixed in the chamber.
- Pre-filling of the chamber is not recommended as it has been shown that high concentrations of CO₂ are distressful to some animals.
- CO₂ should be introduced into the chamber at a rate of 10-20% of the chamber volume per minute to reduce distress to the animal(s).
- Death of the animal(s) must be verified prior to disposal. Unintended recovery must be avoided by the use of appropriate CO₂ concentrations and exposure times or by other means. OLAW notes that thoracotomy after apparent death from CO₂ is one way to ensure the irreversibility of the procedure.
- Compressed CO₂ in cylinders is the only AVMA Panel recommended source of CO₂ for euthanasia purposes.
- Unintended recovery of animals after apparent euthanasia with CO₂ is a documented occurrence. Such an incident constitutes serious noncompliance from the PHS policy and deviation from the Guide for the Care and Use of Laboratory Animals. Guidance regarding prompt reporting of related serious noncompliance is included in a July 17, 2002 notice published in the NIH Guide for Grants and Contracts (OD-02-062) and posted at <http://grants.nih.gov/grants/guide/notice-files/NOT-OD-02-062.html>
- Neonatal animals (up to 10 days) are resistant to the effects of CO₂ and alternative methods of euthanasia are recommended. CO₂ may be used for narcosis of neonatal animals provided it is followed by another method of euthanasia (e.g. decapitation).

References:

1. NIH Guide for Grants and Contracts. 7/17/2002, notice: OD-02-062.
<http://grants.nih.gov/grants/guide/notice-files/NOT-OD-02-062.html>

2. AVMA Panel on Euthanasia. 2000 Report of the AVMA Panel on Euthanasia. J Am Vet Med Assoc 2001, 218:669-696.
3. Conlee KM, Stephens ML, Rowan AN, King LA. Carbon dioxide for euthanasia: concerns regarding pain and distress, with special reference to mice and rats. Laboratory Animals 2005, 39: 137-161.
4. Guidelines for the Euthanasia of Rodent Feti and Neonates. NIH Animal Research Advisory Committee, 2004 <http://oacu.od.nih.gov/ARAC/.euthmous.pdf>
5. Klaunberg BA, O'Malley J, Clark T, Davis JA. Euthanasia of Mouse Fetuses and Neonates. Contemp Top Lab Anim Sc 2004, 43: (5) 29-34.