



The University of Georgia

Office of the Vice President for Research

UGA IACUC Policy on Rodent Euthanasia Using CO₂ *Effective May 18, 2006*

In order to be compliant with a directive from the NIH Office of Laboratory Animal Welfare (OLAW) (1) the Institutional Animal Care and Use Committee (IACUC) has adopted the following policy regarding the use of carbon dioxide as a euthanasia method. Rodents must be euthanized by trained personnel using appropriate technique, equipment and agents. This is necessary to ensure a painless death that satisfies research requirements. Death should be induced as painlessly and quickly as possible. Euthanasia should not be performed in the animal room. The euthanasia method must be appropriate to the species, approved in the animal use proposal and conform to the most recent Report of the AVMA Panel on Euthanasia (2). CO₂ inhalation is the most common method of euthanasia used for mice, rats, guinea pigs, and hamsters. Key considerations in complying with this policy follow:

- ❖ Carbon dioxide (CO₂) euthanasia is recognized as a humane form of euthanasia for adult rats and mice. Therefore, we recommend its continued use in accordance with the *Guide for the Care and Use of Laboratory Animals* and the 2000 Report of the AVMA Panel on Euthanasia.
- ❖ **Compressed gas cylinders are the only acceptable AVMA panel-recommended source of carbon dioxide for euthanasia.**
- ❖ Precharging euthanasia chambers is not recommended. Animals should be placed in uncharged chambers and flow rates should be used which displace 20% of the chamber volume per minute. (For a 10-liter volume chamber, use a flow rate of approximately two liter(s) per minute.) After the animals become unconscious, the flow rate can be increased to minimize the time to death. Sudden exposure of conscious animals to carbon dioxide concentrations of 70% or greater has been shown to be distressful (3).
- ❖ Overcrowding of the euthanasia chamber has been noted to lead to inadequate asphyxiation. The number of animals should be limited to allow free flow of CO₂ to each animal and allow animals to turn around.
- ❖ Only one species should be allowed in the chamber at a time. Use of the home cage as the euthanasia chamber reduces stress and is the preferred method to employ. Furthermore, mixing of unfamiliar or incompatible animals is discouraged.
- ❖ Neonatal animals (up to 10 days of age) are resistant to the effects of CO₂ (4). Carbon dioxide may be used for narcosis of neonatal animals provided it is followed by another method of euthanasia (e.g. decapitation using sharp blades).
- ❖ Unintended recovery of animals after apparent death from CO₂ is a documented occurrence. Such incidents constitute serious noncompliance with the PHS policy and

serious deviation from the provisions of the *Guide for the Care and Use of Laboratory Animals*.

- ❖ Death of the animal must be ensured prior to disposal of the carcass. Therefore, the IACUC is requiring that a secondary method that ensures irreversibility of the procedure is used. Acceptable secondary methods include:
 1. exsanguination
 2. decapitation
 3. cervical dislocation
 4. bilateral thoracotomy
- ❖ Investigators with approved protocols using carbon dioxide as the method of euthanasia should update their protocols to include a secondary method and make sure their personnel are advised to the update in this policy.

References:

1. PHS Policy on Humane Care and Use of Laboratory Animals Clarification Regarding Use of Carbon Dioxide for Euthanasia of Small Laboratory Animals (<http://grants.nih.gov/grants/guide/notice-files/NOT-OD-02-062.html>)
2. 2000 Report of the AVMA Panel on Euthanasia (http://www.avma.org/issues/animal_welfare/euthanasia.pdf)
3. Danneman PJ, Stein S, Walshaw SO. Humane and practical implications of using carbon dioxide mixed with oxygen for anesthesia or euthanasia of rats. *Lab Anim Sci* 1997, 47:376-385.
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.