

# **GUIDELINES – Euthanasia of Rodents Using Carbon Dioxide**

Version 2.2

## **I. Introduction**

The Public Health Service Policy on the Humane Care and Use of Laboratory Animals and the Animal Welfare Act require Institutional Animal Care and Use Committees (IACUCs) to determine that methods of euthanasia utilized in research proposals are consistent with the most recent American Veterinary Medical Association Guidelines on Euthanasia, unless a deviation is justified for scientific reasons by the investigator. The UIC Animal Care Committee Policy on Euthanasia summarizes the AVMA Guidelines based on method and suitability of the euthanasia technique. The AVMA Guidelines and the UIC ACC Policy on Euthanasia recognizes CO<sub>2</sub> euthanasia as an acceptable method for some species provided that certain conditions are met. Of primary importance is that when performed correctly, the CO<sub>2</sub> euthanasia method is a two step process that consists of 1) exposure of CO<sub>2</sub> until the animal succumbs to respiratory arrest and 2) the use of an adjunctive technique that ensures death. The purpose of this guideline is to augment the UIC Animal Care Committee Policy on Euthanasia to ensure consistent and appropriate application of CO<sub>2</sub> as a euthanasia method.

## **II. Institutional Guidelines**

CO<sub>2</sub> euthanasia is considered a conditionally acceptable method of euthanasia for small laboratory animals. Its acceptability is predicated on the following:

1. Individuals that euthanize animals with CO<sub>2</sub> must be adequately trained. One common adjunctive technique is cervical dislocation. When properly performed, cervical dislocation is an effective and humane technique to ensure death. All individuals that euthanize rodents including those that perform cervical dislocation must be adequately trained and demonstrate proficiency. Cervical dislocation training for mouse users can be conducted by either investigative or veterinary staff. However, because the technique may be challenging in larger rodents, individuals that perform cervical dislocation in rats must be trained by or demonstrate proficiency of the technique to a BRL veterinarian. The requirements for adequate training for euthanizing other species with CO<sub>2</sub> will be determined by the ACC on a case by case basis.
2. CO<sub>2</sub> (100%) should be used to fill the chamber at a rate that displaces 10 – 30% of the chamber air volume per minute. High concentrations of CO<sub>2</sub> are painful to rodents. Accordingly, pre-filling the chamber or filling the chamber rapidly is not recommended.
3. Compressed CO<sub>2</sub> in cylinders is the only acceptable source of CO<sub>2</sub>. Dry ice, antacids and other sources of CO<sub>2</sub> are unacceptable.
4. CO<sub>2</sub> chambers must not be overcrowded nor should different species or incompatible animals be placed together in the chamber.
5. Gas flow should be maintained for 1 minute after respiratory arrest. It should be noted that neonates and some burrowing animals are relatively resistant to CO<sub>2</sub> and will require longer exposure times compared to adult non-burrowing animals.
6. It is imperative that unintended recovery of animals be prevented by using appropriate CO<sub>2</sub> concentrations, exposure times and ensuring death. Death of animals must be verified after exposure to CO<sub>2</sub> and prior to disposal. The ACC recognizes several methods to ensure the irreversibility of the procedure such as cervical dislocation, decapitation, and thoracotomy.

Mechanical dislocators are available at all central UIC Animal Care Program CO<sub>2</sub> stations for use on rats euthanatized with CO<sub>2</sub>.

7. Individuals euthanatizing animals at UIC common use CO<sub>2</sub> chambers should follow specific CO<sub>2</sub> chamber procedures posted by the BRL veterinary staff.

**References:**

- *AVMA Guidelines on Euthanasia, June 2011.*
- *Public Health Service Policy on the Humane Care and Use of Laboratory Animals Directive Regarding the Use of Carbon Dioxide for Euthanasia of Small Laboratory Animals, July 17, 2002.*