GUIDELINES

Use of CO₂ as a Euthanasia Technique

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Carbon dioxide is commonly used to euthanize laboratory animals (particularly rats and mice). However, its use is controversial. Amongst the community of scientists who have examined the use of CO₂ as a euthanasia technique, there is disagreement between those who believe that CO₂ cannot be used humanely under any circumstances and those who suspect CO₂ may be an acceptable method of euthanasia in some circumstances.

An international consensus meeting on carbon dioxide euthanasia of laboratory animals was held February 27-28, 2006 at the University of Newcastle-upon-Tyne, UK. The aim of the meeting was to place emphasis on the facts about the use of CO₂ as a euthanasia technique, there is disagreement between those who believe that CO₂ cannot be used humanely under any circumstances and those who suspect CO₂ may be an acceptable method of euthanasia in some circumstances.

The experts at the meeting presented the results of experiments that had been carried out to try and understand the level of pain and/or distress experienced by the animals (principally rats) undergoing euthanasia by CO₂. From studies carried out on human volunteers, involving taking a single breath of CO₂ below those shown to cause distress experienced by rodents when subjected to slowly rising levels of CO₂, there appears to be little doubt that high concentrations of CO₂, such as those experienced by rats in pre-filled chambers, are extremely painful. More difficult to measure and understand is the degree of distress experienced by rodents when concentrations reached >16% CO₂, which would suggest that rats do experience distress prior to loss of consciousness.

There was considerable debate at the meeting concerning whether euthanasia is a good death if it involves a short period of intense pain prior to loss of consciousness, versus a longer period of distress (i.e. how the time x intensity quotient should be interpreted). However, at least according to European legislation, the degree of pain must be minimized.

A report of the meeting has now been published and is available on the website of Laboratory Animalswww.lal.org.uk. Whatever method of euthanasia is employed, it must be reliable. It was agreed that ideally animals should be anaesthetized by overdose of barbiturates (recognizing that this involves handling stress and possible pain due to the barbiturate itself, unless administered with lidocaine) or by volatile anesthetic gases. However, in the cases where there is difficulty in accessing these drugs, CO₂ might be preferable to physical methods because of the need for a high level of competency to carry out physical euthanasia, in addition to operator burn-out, especially where large numbers of animals need to be euthanized.

CCAC is currently preparing guidelines on: euthanasia which include recommendations made by other jurisdictions. Recommendations emerging from this international meeting of experts will also be incorporated into the CCAC guidelines document.●