



Press Release – Carbon dioxide ‘causes laboratory rodents considerable distress’

Carbon dioxide (CO₂), a gas that is extensively used as a method of euthanasia and by some as a method of short-term anaesthesia for laboratory rodents is likely to cause considerable distress and should be replaced with more benign gases, UK researchers say.

Dr Matt Leach, currently of the Department of Clinical Veterinary Science at the University of Bristol, and his colleagues report their findings from research carried out at the University of Birmingham in the April 2004 issue of the journal *Animal Welfare*.

The research involved experiments with 60 laboratory rats and 60 mice, and eleven gaseous agents of anaesthesia and euthanasia in various concentrations and combinations, including: halothane, isoflurane, enflurane, sevoflurane, desflurane, argon and CO₂. The degree to which the animals found these gases aversive was evaluated using a range of measures, including the time taken for an animal to withdraw from a test chamber containing the gases after initially entering it, the time taken for the animal to re-enter the chamber and the total time spent in the chamber. They found that: “*Carbon dioxide, either alone or in combination with oxygen or argon, washighly aversive to both species. The least aversive agents were halothane in rats and enflurane in mice. Exposing these animals to CO₂ in any form, either for anaesthesia or for euthanasia, is likely to cause considerable pain and distress and is therefore unacceptable... “*

The researchers recommend “*that anaesthesia in rats should be induced with halothane at around 3-4%, and in mice with enflurane at about 5%, since these concentrations produce rapid and effective induction of anaesthesia with minimal distress*”.

They suggest that any conscious animal unable to escape from an environment containing CO₂ either alone or combined with other gases at levels high enough to cause a loss of consciousness “*is very likely to experience considerable pain and distress*” before it loses consciousness. For euthanasia they recommend a high concentration of argon alone for both rodent species, or, to achieve the most humane death, halothane or enflurane initially to induce unconsciousness, followed by CO₂ or argon.

They conclude that CO₂ alone “*should not be used for anaesthesia or euthanasia of laboratory rodents, and possibly not for other species... ”.*

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SCIENCE IN THE SERVICE OF ANIMAL WELFARE

Notes to Editors

Measurement of aversion to determine humane methods of anaesthesia and euthanasia, by MC Leach, VA Bowell, TF Allen and DB Morton. In: Kirkwood JK, Roberts EA and Vickery S (eds). *Proceedings of the UFAW International Symposium 'Science in the Service of Animal Welfare'*, Edinburgh, 2003. *Animal Welfare* 2004, Vol 13: S77-85 (Suppl)

Other reports in this special supplementary issue of *Animal Welfare*, which features the papers presented at the UFAW International Symposium 'Science in the Service of Animal Welfare' that took place in Edinburgh, 2-4 April 2003, include:

- the science of welfare assessment
- using science in ethical decisions
- public understanding, science and other factors influencing animal welfare policy
- the application and transfer of scientific advances to the care of animals.

The symposium was the largest ever gathering of animal welfare scientists in the UK, and featured 374 delegates from 24 countries.

For more details and for copies of the report, please contact UFAW's director, Dr James Kirkwood, at the address above.

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INFORMATION ABOUT THE UNIVERSITIES FEDERATION FOR ANIMAL WELFARE

UFAW, founded in 1926, is an internationally recognised, independent, scientific and educational animal welfare charity concerned with promoting high standards of welfare for farm, companion, laboratory and captive wild animals, and for those animals with which we interact in the wild. It works to improve animals' lives by:

- promoting and supporting developments in the science and technology that underpin advances in animal welfare
- promoting education in animal care and welfare
- providing information, organising meetings, and publishing books, videos, articles, technical reports and the journal *Animal Welfare*
- providing expert advice to government departments and other bodies and helping to draft and amend laws and guidelines
- enlisting the energies of animal keepers, scientists, veterinarians, lawyers and others who care about animals.

"Improvements in the care of animals are not now likely to come of their own accord, merely by wishing them: there must be research ... and it is in sponsoring research of this kind, and making its results widely known, that UFAW performs one of its most valuable services."

Sir Peter Medawar CBE FRS, 8th May 1957

| Nobel Laureate (1960), Chairman of the UFAW Scientific Advisory Committee (1951-1962)