Reports and Comments

Canadian Council on animal care guidelines on mice used in research

Mice are the most commonly used animal in scientific research and there is a wealth of information, guidance and legislation worldwide on their care and management. The latest addition to this is a set of clear guidelines from the Canadian Council on Animal Care (CCAC)

The CCAC is the "national peer-review organization responsible for setting and maintaining standards for the ethics and care of animals in science throughout Canada". The CCAC has recently published its guidelines on mice, the document is intended to provide information and guidance for the care and use of mice in scientific research and testing in Canada or by Canadian researchers overseas. The guidelines are targeted at all those involved in research involving (or potentially involving) mice to allow them to implement the 3Rs (Replacement, Reduction and Refinement). The comprehensive guidelines will serve as a useful reference for Canadian researchers and may also be useful for researchers working elsewhere although some of the specific stipulations and recommendations will differ from those in other jurisdictions.

The document provides extensive guidelines on all aspects of the use and welfare of mice in research, including: facilities; personnel; procurement; breeding; husbandry; handling and restraint: welfare assessment; health; the use of experimental procedures; and euthanasia.

The document includes clear guidelines which state, in a single sentence. the intent of the guidelines – for instance under the heading of 'Handling and restraint' the guideline states that: "mice must be handled gently to avoid injury and distress". The document then goes on to discuss in detail the rationale behind the guideline and the specifics of how it should be implemented.

Several topics which have been the subject of recent scientific developments are covered by guidelines including the ongoing debate on group housing of mice, methods for handling mice, welfare assessment, and the selection of the most humane methods of euthanasia.

In the section covering housing, the document is very clear in its guidance that mice should be group housed wherever possible. There has been debate about whether male mice should be group housed since fighting is common amongst groups of males confined to cages. The document presents strategies to reduce aggression amongst group-housed males and goes on to make the case against single housing except where an exceptional case is made on scientific grounds or where insurmountable aggression cannot be avoided.

Another recent development in laboratory mouse welfare has been the demonstration that handling mice by picking them up in the cupped hand or a tunnel offers a significant reduction in stress compared to the traditional method of handling by their tails. The evidence for the benefits of this method is discussed and has also been incorporated into the guidelines, which suggest tail handling should be avoided where possible.

The guidelines also consider methods for the assessment of the welfare of mice in laboratories, with the guideline stating that "All mice maintained in an animal facility should be subject to routine welfare assessments." This is another area which has been the subject of numerous recent developments, such as the development of grimace scales, nest-building scores and ways to assess positive behaviours. Potential welfare assessments are concisely set out in an appendix, and the guidelines emphasise that such methods may be valuable but should be validated, ideally by the laboratory that uses them to ensure they are valid for the scenario in which they are used.

One of the final sections covers the choice of euthanasia methods for mice, which remains controversial, in particular there is ongoing debate about whether exposure to carbon dioxide is humane. The CCAC guidelines are clear in recommending that CO_2 has potential welfare consequences and consideration should be given to the use of inhaled anaesthetics to anaesthetise the animal prior to exposure to CO_2 if this method is to be used. The guideline states "Euthanasia of mice must be carried out by competent personnel only, using the method best suited to the particular animals, their housing situation, and the impact on the study data." The guidelines sensibly emphasise that the science concerning the impacts of various euthanasia methods, as is the case with many other areas of mouse welfare, continues to evolve and that readers should carefully monitor the literature for new evidence and evaluate this evidence once it becomes available.

Overall, these guidelines, whilst intended for a Canadian audience, provide a freely accessible, practical and comprehensive guide to the care and use of mice in a research setting which will be useful for many who use mice in research and who seek to apply the 3Rs.

CCAC Guidelines: Mice (2019). A4, 118 pages. Canadian Council on Animal Care. Available at: https://www.ccac.ca/Documents/Standards/Guidelines/CCAC-FAQs-on-mice.pdf.

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