



Section

Fields (of activity)

Style sheet (Bitte die Vorlage direkt mit Ihrem Text überschreiben)

Main Title

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Key words

Euthanasia, CO₂, Refinement, Mice, Nitrogen

Aim of the study

Carbon dioxide is one of the most common gas euthanasia agents used in mice, despite it causing aversion and nociception. Inert gases may be a viable alternative to carbon dioxide. Here we aimed to compare aversion responses by locomotion activity, number of aversive jumps and freezing episodes in C57Bl6 mice undergoing euthanasia with either carbon dioxide or nitrogen both gradual fill and rapid fill to euthanasia.

Material and methods

Groups of littermate mice were randomised to be euthanased with either carbon dioxide or nitrogen at either gradual (30% chamber volume/minute) or rapid flow (80% chamber volume/minute). We further evaluated the effect of mixing of non-familiar animals and the influence of moving animals to a novel environment. Video recordings of experiments were analysed for locomotor activity, aversive jumps and freezing behaviour.

Results and significance

We found that mice euthanased with carbon dioxide increased locomotor activity compared to baseline, however mice exposed to nitrogen decreased locomotion. Moreover, mice in carbon dioxide showed significantly more aversive jumps than in nitrogen. In addition carbon dioxide caused more freezing episodes in mice than nitrogen. Interestingly, we found that mice euthanased in home cage did not change locomotion activity during nitrogen exposure, however mice mixed before experiments decreased the motility during nitrogen exposure. Moreover, mice exposed to nitrogen, jumped more times in the home cage than in the built chamber, however they did not show freezing at any time in home cage.

Taken together these results demonstrate that, nitrogen is less aversive than carbon dioxide and further studies are required to evaluate it as euthanasia agent in mice. Furthermore, mixing cage does not increase aversive behaviour in nitrogen euthanasia.

Publications, posters and presentations

Carlotta Dettoto, Regula Bettschart-Wolfensberger, Thomas C. Gent. Is nitrogen a viable alternative to carbon dioxide for gas euthanasia of mice? PLOS ONE (*in submission*).

Project 2.16.01

Project duration September 2014 to February 2017