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Husbandry and experimental routines cause stress and anxiety. Care is taken to minimize such effect. APCF Laboratory Assistant Mr. Marco Fung is changing cages and inspecting animals following an SOP which balances stress on animals, biosecurity and efficiency.

Animal Stress from Routines

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Introduction

Whenever possible, laboratory animals are kept in a stable environment including during husbandry and handling with the minimal stressors. However, husbandry and care routines unavoidably cause stress. The following list some of the laboratory routines causing certain degree of stress. Researchers and caretakers may take at least some of the followings as references to justify, compare or refine animal handling procedures.

Husbandry

An animal may experience cage changing once to twice per two weeks depending on the cage type and other housing factors, e.g. number of animals per cage. Studies showed that cage change caused an increase of heart rate and blood pressure up 46% and 34% respectively, indicating a significant disturbance on the animals.

Cage change frequency should be programed to balance the stressor from the increasing waste in the enclosure and the disturbance brought about by the cage changing activity. Measurement of fecal corticosterone levels (a stress indicator) of mice indicated that the stress level did not differ significantly from day 7 to day 14 in a ventilated cage without changing or cleaning. On the other hand, cage changing weekly resulted in a pre-wean mortality of 3.3% while biweekly cage change resulted in a pre-wean mortality of 1.9% only, indicating the consequence of cage change procedure or the new environment which lack the familiar smell of the animals.

Cages being moved to the floor and to another room also increase stress markers significantly.

Experimentation

Handling rodents by tail-picking is used widely to move one mouse or rat from one place to another, e.g. to experimental equipment or to a new cage. However when comparing with the cupping and tunnel handling techniques (mentioned in Issue 8 previously), tail-picked mice exhibit more anxiety-like behavior when measure by open-field test.

Although mouse handling by cupping and tunnel-handling may not be practical in routine husbandry due to working efficiency and biocontainment issues, experimenter may handle mice with a less stress-inducing technique to lower the baseline of anxiety for behavioral experiments. It may probably increase the test sensitivity and reduce data variations due to the high baseline caused by tail picking before experiment.

"Glove materials" affect mouse behaviour. In a study, mice responded to bare hands with the most sign of aversion, i.e. rostral grooming and defensive burying, followed by nitrile gloved then latex gloved hands. Such aversion behavior increased after being handled with gloves sprayed with alcohol.

Olfactory exposure to male but not female experimenter caused an increase in corticosterone at a level similar to that after a 3-min forced swim and 15 min restraint. The effect can be replicated with a T-shirt worn by men. Gender of experimenter may therefore be considered during the pilot test of certain animal experiment.

The presence of mice injected with pain stimuli caused an increase of the pain sensitivity of the untreated mice in the same room up to 68%. Such communication was confirmed via smell. Mice receiving painful treatment may therefore be separated from animals to be treated. Alternatively, one should consider a barrier to smell, e.g. filter-top cages or IVC to minimize inter-cage odor transmission.

References

Contemp Top Lab Anim Sci. (2004) 43:42-51.
J Am Assoc Lab Anim Sci. (2009) 48:763–773.
Physiology & Behavior. (2015) 150:31–37.
UFAW Meeting. (2018) Poster title: Olfactory Effects of Husbandry on Laboratory Mouse Welfare.
Sci Adv. (2016) 2: e1600855.

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