Reducing stress to rodents by use of a screen

EMMA MUSTAFA

Axovia Therapeutics Inc., London Bioscience Innovation Centre, 2 Royal College Street, London NW1 0NH UK

Correspondence: e.mustafa@gmail.com

Introduction

It is widely acknowledged that most procedures should not be carried out in the presence of other animals, due to stress caused by sight, sound and smell. As Animal Technologists, we are constantly asking ourselves the question, *what more can we do to refine the way we work?* We began investigating ways we could improve the Culture of Care in the facility, reviewing possibilities of refining performance of procedures and promoting the 3Rs.

Development of the screen

Research shows that rodents are known to recognise and have emotional reactions (to show empathy) when exposed to cage-mates in pain (Langford, 2006) and which, in turn, could potentially contaminate data.[1] By recycling an old CO_2 chamber we were able to produce the Procedural Screen prototype.

Figure 1. The procedural screen.

As mice and rats are less sensitive to red light[2,3] the unused CO_2 box was a perfect opportunity to build the prototype, as the red tinted plastic hinders those in the home cage from observing the procedure when in situ. Further research showed that scientists in Canada were already utilising similar screens between animal cages undergoing experiments to mitigate this risk.[4]

The prototype gave an opportunity for feedback from a small pool of Animal Technologists in the first instance, the main points being;

- Could it be made foldable?
- Could it also be made from an opaque material?
- Can it be easily cleaned, washed, sterilised?

With these notes to work on, I began a collaboration with North Kent Plastics-Isotec (NKP-Isotec) to improve the screen and to make this widely available to all. Together we were able to add durable hinges to allow use where space was limited i.e., Containment Level 2 cabinets, cage change station and laminar flow workstations. This addition also streamlined storage capabilities. We were also able to make the screen available in a range of materials to include red tinted and opaque in a variety of colours as well as in two different sizes.

The real challenge came with ensuring the product was sterilisable to be compatible with the various health status barriers, areas and rooms in each institute. While autoclaving is not possible with this product due to the shape and size of the plastic, we have been able to confirm that cage washing and use of a cold sterilant such as F10, VHP and formaldehyde can be utilised.

With these modifications, the Procedural Screen can now be used in a variety of ways during procedures and bench separation in unlimited locations such as IVC downflow hoods, bench tops and isolators. For example, as shown below between the home cage and a procedural area:

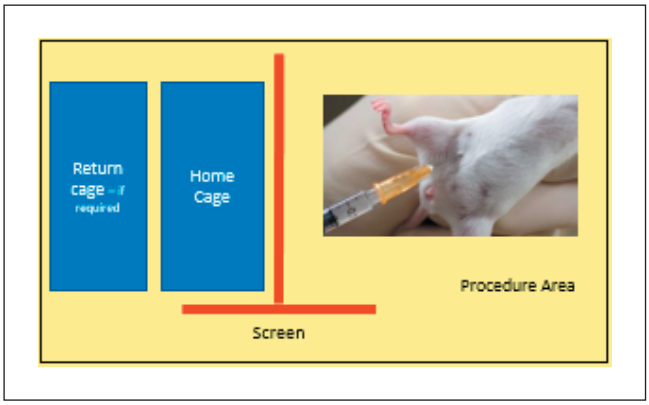

Figure 2. Diagram showing positioning of screen when in use.

Benefits of use include;

- Blockade of visual stimuli to home cage animals.
- Ease of disinfecting/sterilising.
- Ease of use for operators.
- Ease of storage due to hinges implemented into design.
- Translucent plastic allows the technologist to have uninterrupted viewing of animals at any given time, though opaque is available should this be a preference.

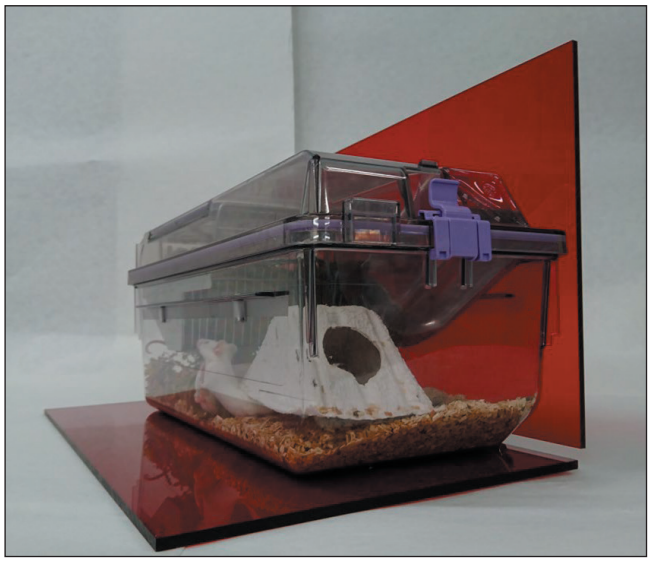

Figure 3. Screen positioned for use.

Future Goals

This screen is fully protective of visual stimulation; however, it is important to consider how sound and smell can cause stress and this will be a consideration in future work.

Additional improvements will include combating autoclaving difficulties to make the screen compatible to the all-barrier restrictions. Finally, we aim to undertake a study to quantify the effects of the screens further.

References

1 **Langford, D.J.** (2006). Social Modulation of Pain as Evidence for Empathy in Mice. Science, [online] 312 (5782), pp.1967–1970 Available at: https://science.sciencemag.org/content/312/5782/1967.full [Accessed 24 Oct. 2019].2.

2 **Key, D. and Hewett, A.** (2002). The Development of a Novel Form of Mouse Cage Enrichment. In: *Animal Technology and Welfare. Volume 1*.

3 **Peirson, S.N., Brown, L.A., Pothecary, C.A., Benson, L.A. and Fisk, A.S.** (2018). Light and the laboratory mouse. *Journal of Neuroscience Methods, [online] 300, pp.26–36. Available at:* https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5909038/

4 **The Scientist Magazine®. (n.d.).** Mice show evidence of empathy. [online] Available at: https://www.the[1]scientist.com/daily-news/mice-show-evidence-of-[1]empathy-47440 [Accessed online February 2017]

Bibliography

Ratbehavior.org. What Do Rats See? [online] Available at: http://www.ratbehavior.org/RatVision.htm. [Accessed February 2017]

www.f10products.co.uk. (n.d.). Table of Contents – F10 Cold Sterilant. [online] Available at: http://www.f10products.co.uk/ebooks/F10coldsterilant/files/assets/basic-html/index.html#page1 [Accessed 7 Sep. 2021].