3R Blackboard: A platform for animal and organ sharing.

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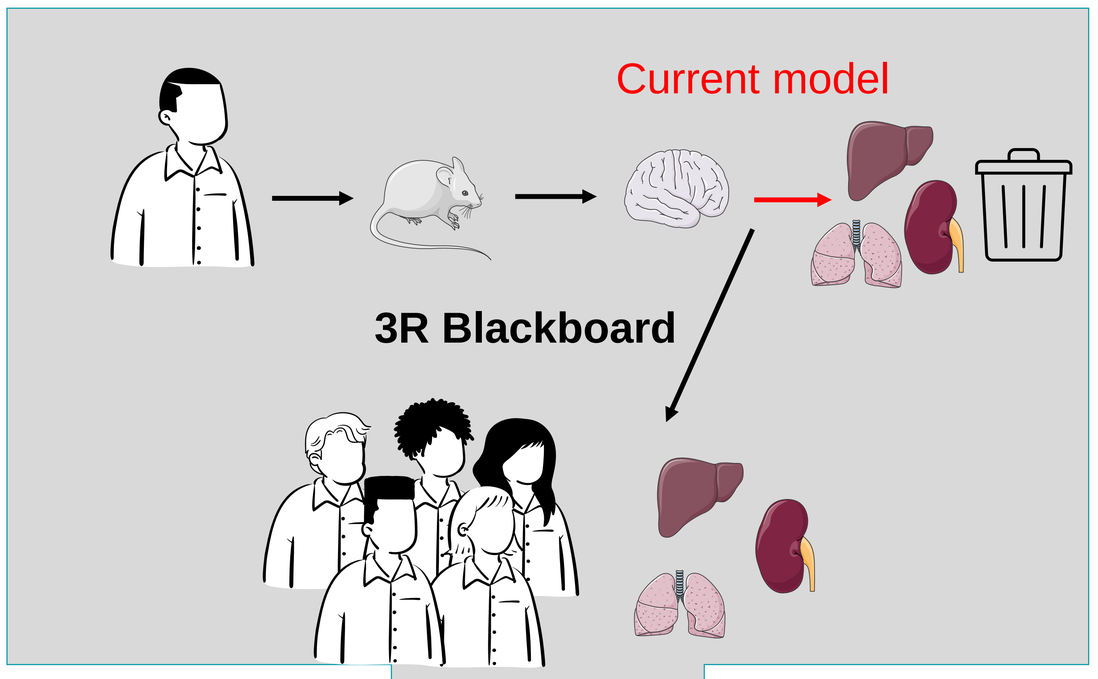
Background

A recent report revealed that about 10 million animals were used per year for experimental and other scientific purposes in the 28 EU Member States during 2015 2017[1]. Mice are the most common species used in regulated procedures (61%) and are mainly sacrificed for organ harvesting only. Often, animals are destined for tissue collection without procedure, or culled for harvest of a single organ at the end of an experiment, while the rest of the sacrificed animal is disposed of. Additionally, the generation and maintenance of new genetically modified strains creates an excess of animals with undesired genetic background. When shared, these sacrificed animals can offer a rich source of biological materials (e.g. organs, tissues, cells) for other researchers and contribute to reduction of animals used in research.

Here, we present a digital platform, called '3R Backboard', linked to a laboratory animal management system, a-tune. 3R Blackboard aims to enable personal license holders (PILs) to announce excess animals and tissues which consequently can be collected by other multiple researchers based on their preferences for animal strain, age, treatment etc. Use of 3R Blackboard allow scientists to get organs and tissues from animal being scarified, which effectively reduce the need to scarify additional animals for this purpose.



Validation study[2]

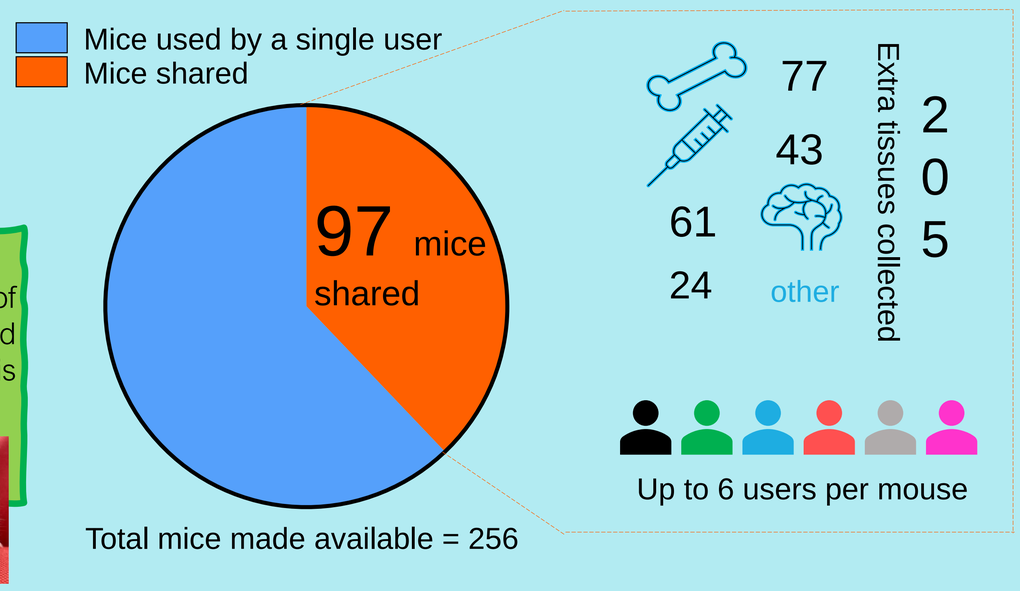
Is 3R Blackboard approach effective in reducing the animal number used in research? YES!

Methodology

- Cardiff University, UK.
- 19 months
- 10 PILs from 2 research groups
- Limit resources for simplicity: sharing mice tissues without prior treatment only.

Outcomes

In total, 256 mice were made available for sharing on the platform. Out of that, 37.9% (97) mice were shared by two to six PILs for extraction of tissues. In total, 205 extra tissues were collected from 97 mice. Most importantly, utilization of this sharing approach saved 140 mice (97 mice used by multiple users x 1.45 average number of extra users per mouse).



3R Blackboard benefits

- ✓ Animal REDUCTION
- ✓ Access to strains and tissues
- ✓ Reduced animals breeding and purchase
- ✓ Reduced workload for animal facilities
- ✓ Increased collaborations
- ✓ Increased productivity
- ✓ Protocols establishment
- ✓ Knowledge exchange
- ✓ Significant cost saving (£3,500* buy in; £1,430 – £3,800** housing)

The future is bright!

In the pilot study we demonstrated a saving of ~30% of animals used. If extrapolated to, and representative of, UK-wide mouse usage, this would equate to a reduction in the number of animals used in UK research of **~70,000 mice/year!*****

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97 mice multi-used x **1.45** average extra users/mouse = **140** mice reduction

Next steps

A full-scale evaluation of 3R's Blackboard approach so it can be easily and efficiently implemented across animal research establishments and adopted within other animal management platforms:

- Evaluate effectiveness of the platform within animal research establishment (e.g., Universities)
- Define and address limitations and legal requirements of the 3Rs Blackboard (e.g., MTA)
- Establish and publish comprehensive guidelines of best practice for implementing the approach internationally

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References: 1. Report from the Commission to the European Parliament and the Council. 2019 report on the statistics on the use of animals for scientific purposes in the Member States of the European Union in 2015-2019. Brussels, 5.2.2020. https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52020DC0016 (accessed 21 November 2021)
2.Czubala MA, *et al*., 2022. 3R Blackboard: a platform for animal and organ sharing. Laboratory Animals. doi: 10.1177/00236772211067456.

*Based on average buy-in cost of £25 per mouse for 140 saves mice.

**Based on 5 week housing cost of £0.30/mouse/day for charity funded projects in open top cages; and £0.80/mouse/day for non-charity funded project in scantainer.

***According to Annual Statistic of Scientific Procedures on Living Animals, there were about 435,000 basic research experimental procedures performed on mice in Great Britain in 2020, which could have potentially been shared for tissues between PILs in the presence of a 3R Blackboard. Based on this number and assuming the frequency of mice sharing (42%) and multiuse (37.9%) recorded in our pilot study could be maintained on the University scale, this would account to **69,243 mice** used by multiple researchers nationally (435,000*42%*37.9%).