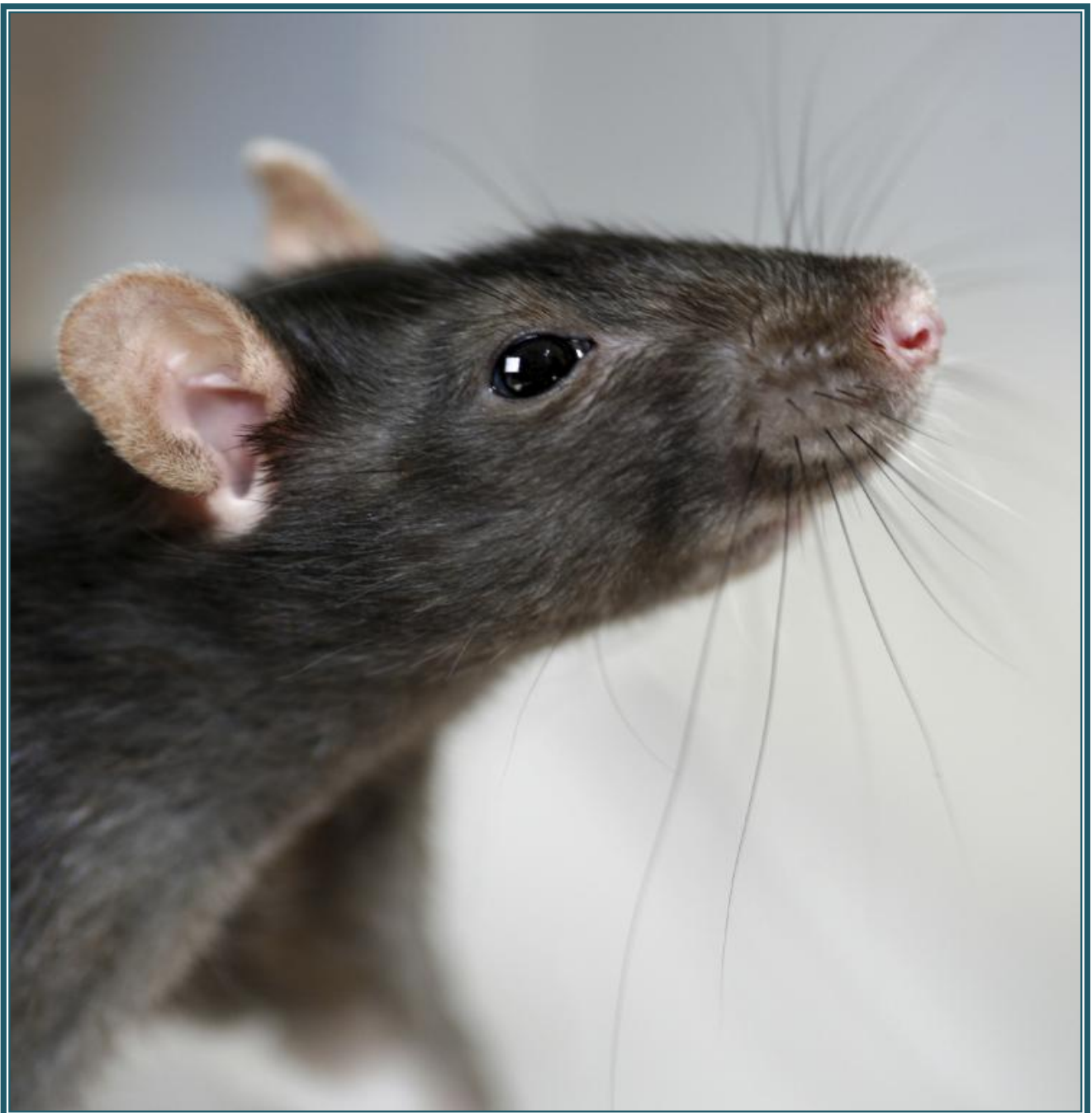




**RSPCA/UFAW
24th Rodent and Rabbit Welfare Meeting**

14 November, 2017

Animal and Plant Health Agency, Weybridge



A report of this meeting will be submitted to *Animal Technology and Welfare*. Last year's meeting report is in AT&W 16 (2):77-86 (August 2017).

Past meeting reports are all available to read here:

science.rspca.org.uk/sciencegroup/researchanimals/implementing3rs/rodentwelfaregroup

The RSPCA and UFAW have jointly organised meetings on developments in the Three Rs in relation to the care and use of rodents and rabbits in scientific procedures for 24 years. The primary aim of these meetings is to provide a forum for discussion on new developments in this field, so as to help encourage and promote advances in rodent and rabbit welfare.

The RSPCA and UFAW produce a number of resources to help provide better care for rodents. These include; *The UFAW Handbook on the Care and Management of Laboratory and Other Research Animals*, 8th edition which provides information on practical husbandry, breeding, laboratory procedures and disease control for rodents and a wide variety of other vertebrates from marine fish to non-human primates, available from Wiley-Blackwell; and resources on the RSPCA website (see pp 14-15).

Opinions expressed by speakers do not necessarily reflect the views of RSPCA or UFAW Council, staff, members or associates.



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RSPCA/UFAW 24th Rodent and Rabbit Welfare Meeting 14 November, 2017

9.30 Registration and coffee		
10.25	Introduction	Penny Hawkins RSPCA
Session 1: Meeting animals' needs and aiming for a 'good life' – breeding rabbit does as a case study		
10.30	Behaviour and welfare needs of breeding rabbit does	Anne McBride University of Southampton
10.50	Rabbit housing and enrichment 'appropriate to the species' – a view from the Home Office	Giles Paiba ASRU
11.10	Refining housing, husbandry and care for breeding rabbits	Rita Rose Envigo
11.30 Tea/coffee & biscuits		
Session 2: Rodent welfare		
11.50	The NC3Rs Year of Lab Rodent Welfare update	Mark Prescott NC3Rs
12.10	Reducing stereotypic digging in gerbils	John Mulley Bangor University
12.30	Enabling group housing in rats with vascular access buttons	Sam Izzard GSK
12.50 Lunch & posters		
1.50	Expression of positive emotions in rats	Luca Melotti University of Münster
2.10	To group or not to group? Good practice for housing male mice	Sarah Kappel University of Bristol
2.30	General discussion session – speaking up for rodents	Penny Hawkins, RSPCA and Robert Hubrecht, UFAW
3.00 Close		

Behaviour and welfare needs of breeding rabbit does

Anne McBride, University of Southampton

Animal welfare is clearly both a moral and legal issue, but it can also be argued to include the quality of 'product outcomes' that the animal is expected to fulfil. These may be the quality of a human-animal interaction in the case of a companion animal; looks or physical performance in the show or sporting industry; quality and quantity of milk, meat or eggs in the farming industry; and validity, robustness, reliability and reproducibility of data in research and testing. Whilst there will always be financial, space and/or time constraints, animal users are legally obligated to provide for each individual animal's quality of life to the best of their ability. Additionally, this makes good moral, ethical, business and scientific sense.

However, providing for a good quality of life requires a good and up-to-date understanding of the physiological and behavioural requirements of the species, breed or strain and how these alter during the individual's life cycle. This requires knowledge of, amongst other things, ethology and normal behaviour of the species. This talk will consider the breeding rabbit doe as a case in point.

Understanding the behavioural needs of the pre and post parturient doe in the laboratory, or other breeding institution, means considering normal doe behaviour and that of the offspring, and how these interact and change during early development; up to and possibly beyond weaning, if appropriate.

A brief description of normal reproductive behaviour will be provided. Consideration of how this can be translated into the captive breeding environment will be followed by some concluding thoughts regarding the wider context of research into 'innovative – enrichment' practice through posing some questions about the whats, whys and hows of such postulated research.

Further reading:

- UFAW/RSPCA (2008) *Refining Rabbit Care: A Resource for those Working with Rabbits in Research*. **Download at:** tinyurl.com/UFAW-RSPCA-rabbit
- Dorning J & Harris S (2017) *The Welfare of Farmed Rabbits in Commercial Production Systems: A Scientific Review*. **Download at:** tinyurl.com/yckswdu8

Rabbit housing and enrichment 'appropriate to the species' – a view from the Home Office

Giles Paiba, Home Office Animals in Science Regulation Unit

The publication of the *Code of Practice for the Housing and Care of Animals Bred, Supplied or Used for Scientific Purposes*, in 2014, set out the minimum requirements for housing and breeding rabbits used within the confines of the Animals (Scientific Procedures) Act (ASPA) 1986 (as amended). This presentation will discuss how to ensure that rabbits are kept within the requirements of the Code and how these reflect the physiological and ethological needs of the animals.

Consideration will be given to how the Home Office may assess and evaluate the suitability of accommodation and provision of care in the light of what is known about rabbit biology and behaviour. For example, how an Inspector may interpret whether space is 'of sufficient complexity to allow expression of a wide range of normal behaviour'. The effect of practical constraints on this provision will also be discussed.

Some of the mechanisms that can be used to ensure that relevant information is available to those responsible for the care, accommodation and use of animals in the facility, and how this may be evaluated and implemented, will be considered. How the Named People (e.g. Named Information Officer) are designed and expected to support the regular review and update users will also be discussed.

Refining housing, husbandry and care for breeding rabbits

Rita Rose, Envigo

Breeding rabbits – it should be simple.....right? In the wild absolutely, but in a laboratory, as with many things it is not so straightforward. Before embarking on a breeding program fundamental questions are needed to explore what the study objective or production colony needs are, and how you can safely meet these and the needs of the animals under your care.

Envigo is dedicated to an excellent Culture of Care for our animals. Our company has establishments for animal supply as well as for Contract Research. Rabbits under our care maybe part of a breeding colony to supply other establishments outside our company, or be part of a scientific study that required breeding as part of its objective e.g. reproductive toxicology.

This talk will focus on refinement of the various aspects of working with breeding rabbits, and where the 3Rs can be implemented across all areas:

Housing – facility design, health status, exclusion criteria, workflow, cage/pen design, environmental parameters, transportation

Husbandry & Care – animal selection, colony management, husbandry routines, food, water, consumables, enrichment, staff training and expertise

Comparisons from what rabbits need to what the constraints are in a laboratory setting will be considered alongside best practice advice from other areas. Working across teams with researchers or customers to a mutually beneficial outcome also relies upon the ability to say “no” to requests that do not benefit the animals, and work on alternative solutions. Examples of recent work looking to refine equipment and practices across our four UK sites housing rabbits will be discussed, as well as the role of the AWERB in guiding rabbit care during breeding.

The NC3Rs Year of Laboratory Rodent Welfare

Mark Prescott, NC3Rs

Mice and rats account for the majority of animals used in scientific procedures in the UK and globally. Throughout 2017 the NC3Rs has been highlighting opportunities to improve the welfare of laboratory rodents. By spotlighting recent advances in animal welfare science and technology, hosting workshops, events and data collection projects aimed at animal technicians, and focusing on the adoption of best practice, we aim to have a positive impact on the large number of rodents used in research. This presentation will provide an overview of our Year of Laboratory Rodent Welfare, including: outputs and impacts from NC3Rs-funded research and innovation, such as systems for automated recording of the behaviour of individual mice and rats socially housed in the home cage, and a novel lightweight device for electroencephalogram (EEG) recording in unrestrained and untethered mice; new research awards, for example to refine the capture and tracking of wild rodents for ecological studies; guidelines from our data sharing working groups on refining bile duct cannulation studies in rats and rodent models of ischaemic stroke and epilepsy/seizures; workshops on improved methods of handling mice and providing rats with more complex environments; plus other office-led work, such as our data crowdsourcing study on aggression in group-housed male mice.

See also: nc3rs.org.uk/rodent-welfare-hub

Reducing stereotypic digging in gerbils

John Mulley, Bangor University

The lack of access to a tunnel system, and the inability to construct one, leads to stereotypical digging behaviour in many species of desert rodent, including the Mongolian gerbil (*Meriones unguiculatus*). The situation is further exacerbated by the excessive chewing behaviour exhibited by gerbils, which renders many traditional forms of environmental enrichment unsuitable. Here we demonstrate a low-cost and low-tech intervention tailored to the specific needs and behaviour of gerbils and their relatives which reduces or entirely eliminates stereotypical digging.

Enabling group housing in rats with vascular access buttons

Sam Izzard, GSK

Dual cannulated rats have previously been singly housed, due to concerns that animals would interfere with one another's cannulae, potentially causing distress and infection. However, singly housing rats is undesirable on welfare grounds, as they are social animals. We therefore set up a vascular access button system, which has enabled GSK to group house surgically prepared rats. My presentation will tell the story of how we set up trialling this system and how it was validated for pharmacokinetic steady state infusion studies. I will also discuss the issues we encountered and how we solved them. This model is now our first choice for surgically cannulated rats. Hopefully you will agree.

Expression of positive emotions in rats

Luca Melotti¹, Jessica Frances Lampe², Kathryn Finlayson², Sara Hintze³, Oliver Burman⁴, Hanno Würbel²

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² Division of Animal Welfare, University of Bern, Bern, Switzerland

³ Division of Livestock Sciences, Dept. of Sustainable Agricultural Systems, University of Natural Resources and Life Sciences Vienna (BOKU), Vienna, Austria

⁴ School of Life Sciences, Joseph Banks Laboratories, University of Lincoln, Lincoln, LN6 7DJ, United Kingdom

While animal welfare research has traditionally focussed on preventing or reducing negative experiences, more recently attention has also been given to the promotion of situations which could induce positive emotions. Therefore it is crucial to develop objective methods to detect and quantify positive emotions in animals. To this end, two studies were conducted with rats which aimed (i) to identify facial indicators of positive emotions and (ii) to measure positive emotional contagion between rats (where one individual's emotions and related behaviours directly trigger similar emotions and behaviours in others).

Facial indicators of positive emotions

Previous studies have identified rodent facial expressions which specifically occur in situations likely to induce negative emotional states (e.g. pain, aggression and fear). This study aimed to investigate whether rats exhibit specific facial expressions of positive emotions during heterospecific play (with humans).

Fifteen adolescent male Lister Hooded rats were individually subjected to a 2 minute Positive Treatment (PT) and a 2 minute mildly aversive Contrast Treatment (CT) over two consecutive days. PT consisted of playful manual tickling administered by the experimenter, while CT consisted of exposure to a novel test room with intermittent bursts of white noise. The number of positive (50-kHz) ultrasonic vocalisations (USVs) were recorded to check whether rats had different emotional states in PT and CT. High-speed photos of the rats' faces in a profile or three-quarters view were taken during both treatments, between tickling bouts or white noise bursts, respectively. Novel qualitative and quantitative measures, and also the established Rat Grimace Scale, were used to detect fine changes in facial expression. Photos were scored by an experimenter who was blinded to which treatment the animals had received.

The number of positive vocalisations was significantly greater in PT than CT, indicating that the experience of being tickled was positive in comparison with the exposure to white noise. We found that Ear Colour (0-2 scale) was significantly pinker in PT than in CT, and Ear Angle was wider (ears more relaxed) in PT compared to CT. All other quantitative and qualitative facial measures, which included Eyeball height/width Ratio, Eyebrow height/width Ratio, Eyebrow Angle, visibility of the Nictitating Membrane, and the Rat Grimace Scale, did not show significant differences between treatments.

This study contributes to the exploration of positive emotions, and thus better welfare, in rats as it identified potential indicators of positive facial expression resulting from a positive heterospecific play treatment. Pinker Ear Colour and wider Ear Angle, both accompanied by the emission of positive vocalisations, may reflect internal physiological changes associated with positively valenced emotional arousal and muscle relaxation, respectively.

Positive emotional contagion

This study investigated positive emotional contagion by exploring the effects of positive treatments received by one rat on the behaviour and vocalisations of the rest of their social group.

Forty-eight adolescent male Lister Hooded rats were housed in groups of three non-littermates, and one rat per group received either positive or control treatments to assess whether this affected play and positive USVs in the home cage. After habituation to the experimental procedure, three tests were performed on separate days. The 'treated' rat was taken to a separate room for 2 minutes, where they were either manually tickled by the experimenter, given chocolate rewards, or placed in the treatment arena without further action (control condition). Testing was randomised and counterbalanced across days to avoid confounds due to 'order effects'. USVs and play events in the home cage - attacks to the nape, initiating play, and solitary scampering - were counted during the 10 minutes before and after the treatment by an experimenter who was blinded to the treatments the rats had received.

Compared to the control treatment, positive USVs, play initiations and scampering events within the home cage group were greater after the positive treatments, especially after tickling. We then investigated the direction of play initiations by comparing treated rats initiating play with untreated ones (TU), untreated rats initiating play with treated ones (UT) and untreated rats initiating play with untreated ones (UU).

Compared to control, both positive treatments induced more TU and UT play interactions; furthermore, the tickling treatment induced even more UT play interactions compared to the chocolate treatment, and more UU play interactions than control and chocolate treatments. With regard to solitary scampering, both T and U rats scampered more after the positive treatments, compared to the control treatment.

These results provide some evidence of short-term positive emotional contagion from one individual receiving a positive treatment to its social group. Positively treated rats appeared to promote emotional contagion by becoming the target of more play initiations by untreated rats, and by also inducing (after tickling) more play between untreated rats.

Reference:

- Finlayson K, Lampe JF, Hintze S, Würbel H, Melotti L (2016) Facial indicators of positive emotions in rats. *PloS one*, 11(11): e0166446, **download at:** journals.plos.org/plosone/article?id=10.1371/journal.pone.0166446
- Lampe J F, Burman O, Würbel H & Melotti L (2017) Context-dependent individual differences in playfulness in male rats. *Developmental Psychobiology* 59(4): 460-472
- Boissy A, Manteuffel G, Jensen M et al. (2007) Assessment of positive emotions in animals to improve their welfare. *Physiol Behav.* 92(3):375±97. doi: 10.1016/j.physbeh. 2007.02.003 PMID: 17428510
- Sotocinal SG, Sorge RE, Zaloum A et al. (2011) The Rat Grimace Scale: A partially automated method for quantifying pain in the laboratory rat via facial expressions. *Molecular Pain.* 7:55. doi:10.1186/1744-8069-7-55, **download at** ncbi.nlm.nih.gov/pmc/articles/PMC3163602/

To group or not to group? Good practice for housing male mice

*Sarah Kappel, University of Bristol; Penny Hawkins, RSPCA;
Michael T Mendl, University of Bristol*

It is widely recommended to group house male laboratory mice because they are 'social animals', but male mice do not naturally share territories and aggression can be a serious welfare problem. Even without aggression, not all animals within a group will be in a state of positive welfare. Rather, many male mice may be negatively affected by the stress of repeated social defeat and subordination, raising concerns about welfare and also research validity. However, individual housing may not be an appropriate solution, given the welfare implications associated with no social contact. An essential question is whether it is in the best welfare interests of male mice to be group- or singly-housed.

This presentation sets out the likely impacts, positive and negative, of both housing conditions, presents results of a survey of current practice and awareness of mouse behaviour, and includes recommendations for good practice and future research. Whether group- or single-housing is better (or less worse) in any situation is highly context-dependent according to several factors including strain, age, social position, life experiences, and housing and husbandry protocols. It is important to recognise this and evaluate what is preferable from animal welfare and ethical perspectives in each case.

Reference:

- Kappel S, Hawkins P, Mendl MT (in press) To group or not to group? Good practice for housing male laboratory mice. *Preprints* 2017, 2017100150 (doi: 10.20944/preprints201710.0150.v1), **download at:** preprints.org/manuscript/201710.0150/v1

List of Posters:

A cage-base and environmental preference test for laboratory rabbits
Joanna Cruden, GSK

Resocialization of single-housed male C57BL/6JRj mice after castration
Katharina Hohlbaum, Freie Universität, Berlin

Environmental enrichment for a range of experimental animals
Ute Weyer, APHA

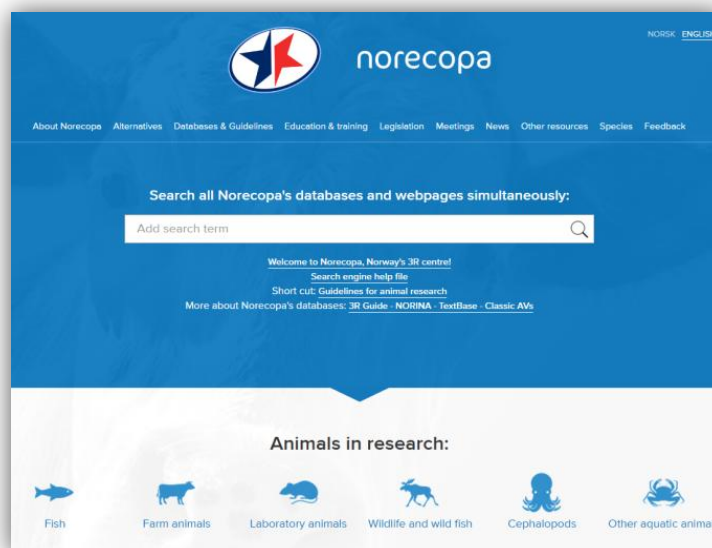
Resources:

RSPCA online resources:

www.rspca.org.uk/researchanimals

www.rspca.org.uk/severesuffering

A great new Three Rs database is also available at: norecopa.no





'Guiding principles on good practice for AWERBs' was jointly produced by the RSPCA Research Animals Department and the LASA Education, Training and Ethics Section.

This third edition covers all of the AWERB's tasks including practical activities such as project review, retrospective review and assessment, accommodation and care of animals, support and training for staff, and developing the right 'culture of care'.

Free download at:
tinyurl.com/RSPCA-LASA-AWERB

The second AWERB-UK, a meeting for all AWERB members including scientists, animal technologists, lab animal vets, AWERB chairs and lay members, was jointly convened by the RSPCA, IAT, LASA and LAVA and held in June 2017.



The meeting summary is at:
tinyurl.com/AWERB-UK2017



This report, produced by the UFAW/RSPCA Rabbit Behaviour and Welfare Group, provides practical guidance on refining laboratory rabbit husbandry for animal technologists, facility managers, veterinarians and scientists.

It sets out the welfare needs of the rabbit, based on the laboratory animal science and welfare literature, and explains how these needs can be fulfilled.

Free download at:
tinyurl.com/UFAW-RSPCA-rabbit

