Report of the 2025 RSPCA/UFAW Rodent Welfare Group Meeting

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Introduction

The RSPCA/UFAW Rodent Welfare Group holds a one-day meeting every autumn. This has been for the last 32 years so members can discuss current welfare research, exchange views on welfare issues and share experiences of the implementation of the 3Rs for Replacement, Reduction and Refinement with respect to rodent use.

This meeting was held at the University of Edinburgh in October 2025 and focussed on the use of technology in improving rodent welfare. This report summarises the meeting and ends with a list of action points for readers to consider raising at their own establishments.

Rat tickling: happier rats for better science?

Vincent Bombail

Stress is a source of experimental variability across animal research and can negatively impact Animal Welfare. It is an adaptive response which can be induced by multiple factors (physical, social, physiological or emotional), ultimately compromising the validity of the data.[1]

Stress can be minimised through the proactive adoption of Positive Animal Welfare (PAW) principles. PAW recognises that animals experience positive affective states (or moods) which contrast with the historical focus on suppressing negative experiences. By fostering these positive affective states, we can enable animals

i) Social play

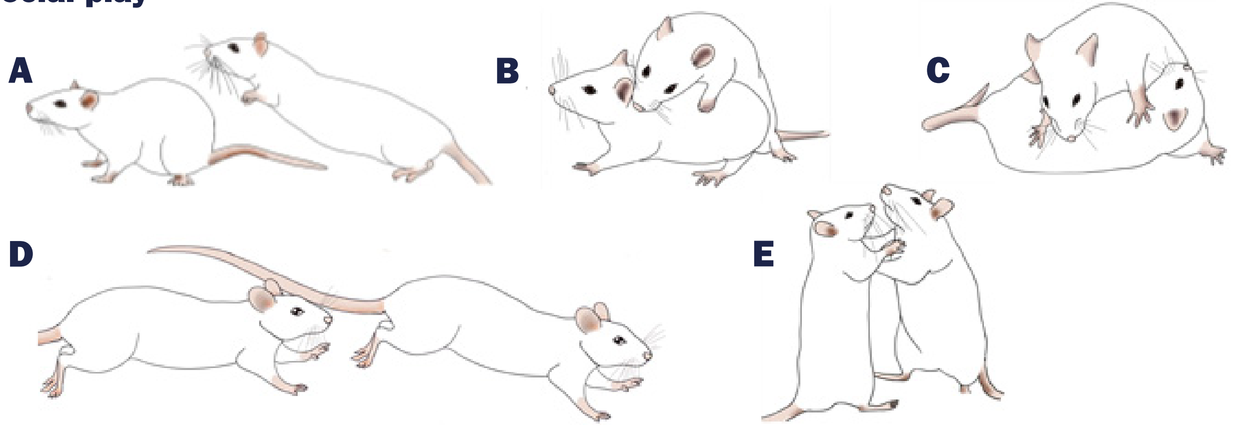

Figure 1. Rats engaging in social play.[3]

to build resilience (the ability to maintain or quickly regain healthy functioning following a challenge), taking into consideration that this is something that needs to be built up over time.[2]

It is important not to make assumptions about animals' experiences when aiming to achieve positive welfare states. Our research therefore centred on refinement of the rat tickling protocol, a playful handling technique stimulating juvenile rough-and-tumble play (Figure 1).

The team hypothesised that the original protocol, which had emphasis on repeated pinning (pinning the rat in a supine position whilst tickling its abdomen (Figure 2), might cause the rats to respond differently based on their individual preferences, which could detract from the positive experience.[4]

By using 50kHz ultrasonic vocalisations (USVs) as an indicator of positive effects,[5] the study revealed significant sexual dimorphism in response to pinning levels. The study found that female rats strongly preferred protocols with minimal pinning, as high-pinning protocols resulted in fewer USVs, indicating reduced enjoyment. In contrast, male rats showed no significant preference across the pinning levels.

This led to the recommendation for the development of the playful handling refined protocol.[4] This method minimises pinning and recommends that the handler's movements are flexible and adaptable to the individual rat's behavioural responses, incorporating more aspects of natural play behaviour (Figure 3). Furthermore, incorporating a short habituation period before initiating tickling is essential to prevent neophobia in juvenile rats.

The research demonstrated a significant impact of positive handling on stress physiology, finding that while baseline stress markers (hypothalamic-pituitary-adrenal (HPA) activity) and anxiety behaviours remained unchanged, refined tickling treatments led to a reduced HPA response when rats were exposed to subsequent mild stressors. This outcome provides evidence that positive interventions can foster stress resilience and improve the physiological stability and therefore reproducibility of the animal model.

Ultimately, the conclusion is that happier rats mean better science, underscoring positive handling as a critical application of the Refinement principle of the 3Rs.

ii) Tickling

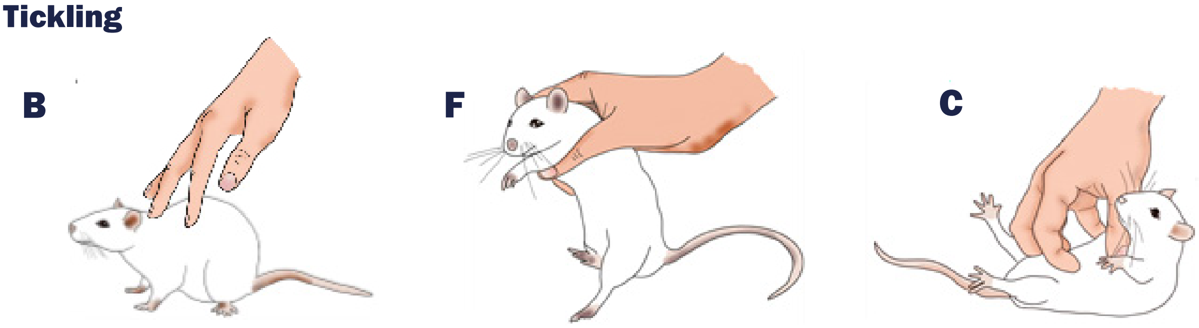

Figure 2. The original rat tickling protocol.[3]

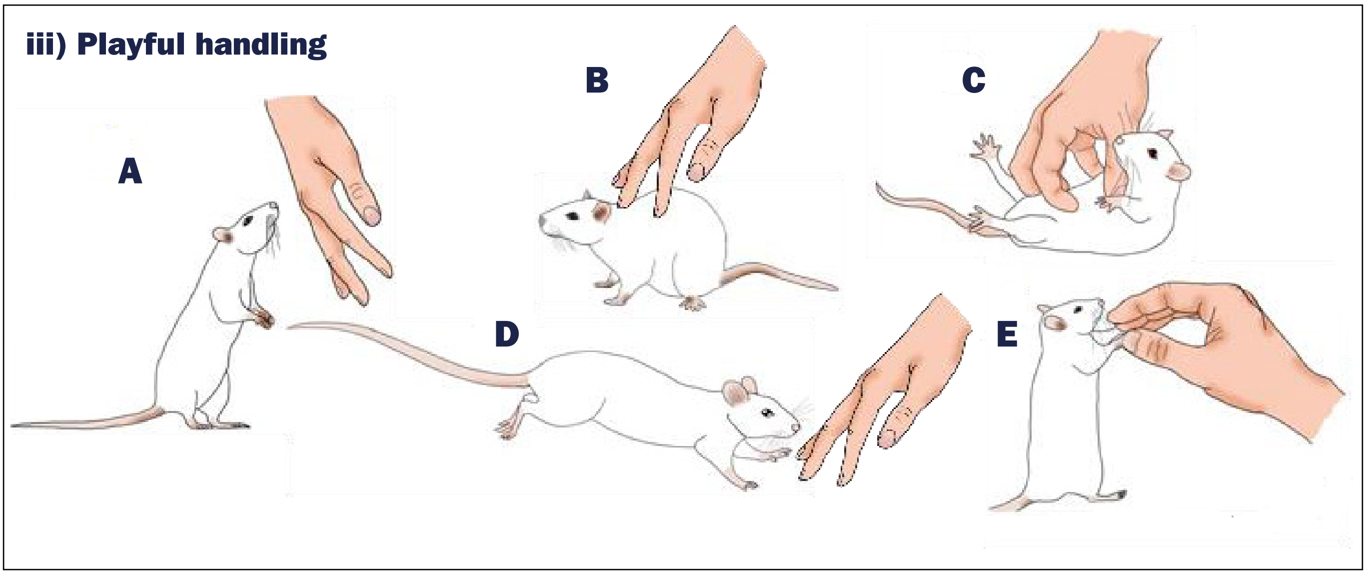

Figure 3. The reimagined playful handling protocol.[4]

Refinements in practice

Linda Horan

At Strathclyde, the technicians and members of the Culture of Care group look to implement refinements wherever possible. Investing time into refinements around handling and habituation is mutually beneficial to the animals and the staff. Examples of initiatives include simple interventions, such as placing postcard prompts in the Personal Protective Equipment (PPE) area to remind researchers that a few minutes of gentle habituation daily builds animal trust.

There is also a focus on implementing simple and cost-effective environmental and social refinements. A key example is the rat playpen, a large, enriched space stocked with completely novel items (often simple, free materials like cardboard) and used twice weekly. This playpen serves the dual purpose of reducing handling-associated stress and acting as a crucial socialisation and habituation tool. The NC3Rs has further information on rat playpens.[6] Furthermore, the facility utilises a mouse socialisation tank, which is an enriched environment designed specifically to address welfare challenges such as reducing fighting among male BALB/c mice through early socialisation.

Crucially, the commitment to refinement extends beyond research. Re-homing is considered an ethical imperative and a core function of the AWERB (Animal Welfare and Ethical Review Body) as it significantly boosts staff morale and improves public perception of *in vivo* research.[7]

To facilitate this, Strathclyde maintains a formal re-homing policy, an authorisation programme and a gallery of successfully adopted animals.

Additionally, to fulfil the reduction and replacement goals of the 3Rs, the facility implemented a centralised tissue sharing initiative (via a Microsoft Teams site). This ensures tissues from surplus animals are not wasted, maximising the scientific data derived from every animal and demonstrating that animals' lives are valued.

Welfare refinements for working with small mammals in the wild

Davina Hill

It is important to consider ethical and practical considerations when working with small mammals in the wild. My research investigates how African striped mice (*Rhabdomys pumilio*), hazel dormice (*Muscardinus avellanarius*) and hedgehogs (*Erinaceus europaeus*) cope with challenging environments, characterised by social stress, climate/weather and urbanisation, respectively. African striped mice are described as resilient to extreme and fluctuating environments, while dormice and hedgehogs hibernate to avoid resource scarcity.

Key welfare and ethical considerations involve responsible sampling, tracking and minimising disturbances. African striped mice are an ideal species to observe because they are diurnal, abundant, occupy open habitats, habituate easily and are classified as least concern by the International Union for Conservation of Nature (IUCN).

By contrast, hazel dormice are classed as vulnerable in the United Kingdom (UK) so to avoid capturing and tagging new individuals, this study draws on the largest existing national monitoring networks.

Both dormice and hedgehogs are surface hibernators, making them relatively accessible. In addition hedgehogs are widespread across the UK and large enough to carry thermistors on their back. These can be glued to their spines, avoiding the need for surgically implanted devices.

To achieve Reduction, power analyses and pilot studies are used to ensure appropriate sample sizes.

Trapping, identification and handling methods were all adapted to each species to minimise stress.[8] Striped mice are captured using Sherman live-traps checked within 30-45 minutes and identified using ear tags and hair dye. When handling them researchers balance bare-handed tactile sensitivity to prevent physical injury against the risk of disease transmission. Because they do not hibernate, monitoring focusses entirely on these active periods.

Hazel dormice require no manual handling or stressful radio-collars. Instead researchers leverage an existing passive integrated transponder (PIT) tagged population (via the UK National Dormouse Monitoring Programme). A novel scanning array is used (PIT-tag reader and antenna) during hibernation to locate individuals alongside camera traps outside nests to record low-resolution arousal data.

Hedgehogs are hand-captured during nocturnal spotlight surveys and identified via numbered heat-shrink tubes on their spines.[9] They are handled with gloved hands solely to attach equipment. To avoid the stress of frequent checks required by traditional neck collars, a high frequency temperature-sensitive transmitter is glued directly to their spines, providing high-resolution tracking and hibernation data via automated receiver stations.

The research aims to maximise data validity for welfare purposes by using validated equipment (environmental monitors, scanning arrays, thermistors), considering analysis before collecting data and plotting data as they come in.

Overall, the research advocates that a careful choice of study species, population and sample size enhances validity and potential for good welfare and that evaluating guidelines and recognising ethical and welfare issues promotes responsible research and informs best practices.

The authors in the subsequent sections of this report use the acronyms Home Cage Analysis (HCA), Home Cage Monitoring (HCM), Long-Term Continuous Monitoring (LTCM) and Digital Ventilated Cage (DVC) to describe unique systems for continuously monitoring health and welfare parameters.

Non-invasive detection of mouse health and welfare via home cage activity monitoring

Jessica Law

Home cage activity monitoring is being increasingly used as a non-invasive method for detecting mouse health and welfare, such as how wearable tech (i.e. smart watches and rings) is used for monitoring human health.

Non-invasive home cage monitoring involves several technologies to track mouse activity without disturbing the animals. The methods available for measuring home cage activity are numerous and can vary in what they measure and their sensitivity.

Examples of a home cage monitoring setup include a combination of Passive Infrared (PIR) sensors to detect heat-based motion, video monitoring for visual observation and radio frequency identification (RFID) to identify specific individuals. These are often paired with beam breaks that log activity when a subject interrupts a light path e.g. on a running wheel and base plate readers that use capacitive sensing to track movement through physical contact with the floor.

Other recent advances include a stress-free tracking method that utilises electromagnetic detection. Electrode sensors placed throughout the bottom of the cage detect mouse movement. The hardware converts the electrical signals into digital data which is then processed to reveal when and where a mouse moved (Tecniplast digital ventilated cages (DVC®)). Computer analysis of this data allows scientists to reveal subtle changes in mouse behaviour. Examples of data visualisations from the DVC® system show activity levels over periods of days, revealing patterns in movement (represented by colour intensity) across a 24-hour cycle. Home cage monitoring is particularly relevant for studying sickness behaviour, which is a coordinated set of responses animals display following an injury or infection. To accurately measure these changes, animals need to be studied within their normal environment, making home cage monitoring essential.

The use of long-term continuous (LTC) monitoring, such as with home cage monitoring, offers several potential advantages by allowing animals to remain in their familiar environment. This reduces stress and provides substantial welfare benefits compared to traditional testing. This non-invasive approach leads to improved data quality as it captures a more natural range of behaviours, whilst allowing researchers to align husbandry duties with the animals' natural circadian rhythms by ensuring minimal disruption during sensitive dark-cycle periods.

However the acquisition and use of data from activity monitoring systems must be handled carefully.

While LTC monitoring offers clear advantages like reduced stress and improved data quality, it presents practical and regulatory challenges. A significant operational hurdle is the alignment of husbandry duties with the mouse's typical reverse day/night cycles. The DVC® system and similar technologies also generate large datasets that are complex and not easy to understand. It is important for researchers to define what they are looking for in the data.

From an ethical and regulatory standpoint, the Named Animal Care and Welfare Officer (NACWO) highlights that while the DVC® algorithm is robust, a complete reliance on the technology is not yet feasible and human checks are still preferred. The application of such advanced monitoring is also complex under regulations like the ASPA (Animals (Scientific Procedures) Act 1986), requiring clear justification.

Despite these complexities, the overall potential to save time and money while offering effective welfare monitoring means that home cage monitoring (HCM) systems in conjunction with competent and empathetic human observers will play an important role in the future of animal care in research.

Scalable, low-cost, real-time monitoring of mouse home cage activity

Michal Milczarek

Conventional out-of-cage testing methods require specialised equipment and technical expertise, often rely on arbitrary measures, are challenging to replicate and can negatively affect the animals' development resulting in poor welfare and science. Our homecage monitoring solution leverages advances in computer vision and automated deep learning analysis to enable scalable and continuous monitoring throughout an animal's lifespan. This approach is non-invasive, unbiased and yields more robust and replicable results.

The MURIDAE (Modalities for Understanding, Recording and Integrating Data Across Early Life) project aims to improve the translatability of mouse models for neuro-psychiatric and neurodevelopmental diseases by continuously tracking multiple developmental measures in individual mice from early life. By doing so, the project seeks to pinpoint the optimal timing for therapeutic interventions.

Ultimately the core goal of MURIDAE is the widespread dissemination of this affordable and easily replicable early-life monitoring methodology to the broader scientific community.

The behavioural research is focussed on mice carrying genetic mutations linked to schizophrenia in both humans and animal models. It has significant impact during early development where the composition of a brain receptor changes an individuals' behaviour, however why this occurs remains largely unknown.

To facilitate this research, a homemade, low-cost video monitoring setup has been created that can be readily deployed at most mouse facilities. This custom system avoids commercial options that are expensive and may not comply with unit standards (e.g. ventilation). Initial analysis reveals fundamental behavioural patterns such as activity that exhibits clear 24-hour periodicity with a peak in power between 24-26 hours, within a 36-hour window.

Analytic methods were employed to obtain meaningful metrics, for instance velocity, distance travelled, spatiotemporal density patterns, relative time spent at a specific zone like the hopper and crucial inter-animal distances throughout the pre-weaning developmental period. There were some practical issues, like difficulty in matching animals across multiple cameras and identifying animals in particular areas of the cage.

These were resolved by applying teaching software to improve classification and testing the entire pipeline in a validated neurodevelopmental mouse model. The potential of these methods extends beyond neuro-developmental study to include wider applications, for instance, welfare monitoring.

Redefining animal research: a path towards refinement and sustainability

Catriene Thuring

The central animal facility (CDP), which is part of the University of Groningen and UMCG, is a large animal research facility. The facility manages a variety of species including over 5,000 mice, as well as rats, fish (Zebrafish and killifish), guinea pigs, hamsters and rabbits. The facility is supported by 28 full-time equivalent (FTE) staff and serves 34 research groups.

To support its operations and commitment to refinement, the CDP has invested in Tecniplast digital ventilated cages (DVC®).

The motivation for adopting home cage monitoring systems is multifaceted, combining operational efficiency with significant welfare advancements. The goals are considered equally important and encompass several key areas. The facility aims for better resource management by achieving more adequate cage changes and a reduction of allergens. Operational efficiency is improved by ensuring a more balanced workload for staff and uniformity in housing conditions.

In terms of welfare and data, the system provides insight into mouse activity 24 hours per day 7 days per week and facilitates data-driven welfare monitoring.

The implementation of DVC® successfully moved the facility away from fixed cage change intervals to a data-driven model based on actual need. This has led to Animal Welfare benefits, as cage changing (although essential for health and hygiene) is disruptive for animals and can be stressful. There were also financial savings. Under the previous fixed schedule, cage change intervals ranged from 7 days (3 - 5 animals per cage) to 14 days (1 or 2 animals). Under the automated schedule, these intervals were significantly extended. For example, a single-animal cage went from 14 days to 48 days and a cage with five animals went from 7 days to 13 days.

This has also significantly reduced resource consumption, energy usage and carbon emissions.

Activity is identified as a significant determinant of Animal Welfare, serving as a characterisation factor for animal models (e.g. heart failure development) and a read-out parameter for various processes. The DVC® signals are used for continuous welfare monitoring, specifically through night welfare checks, by alerting staff to abnormal activity patterns, including hypoactivity, hyperactivity, unusual spatial activity, fighting-like activity and stereotypies.

The findings from 2024 welfare checks revealed critical insights. At first a post-cleaning activity spike was observed. Activity levels and the incidence of fighting behaviours remained elevated for up to two days after cage cleaning that suggested measurements during this 48-hour period should be interpreted cautiously. Second, pup delivery prediction showed a distinct drop in activity 24 hours before birth which was followed by increased activity from day two onward.

Thirdly, mortality and morbidity signals demonstrated the system's strong capacity to predict critical health issues. Out of 67 found-dead cases in 2024, 76% (51 cases) had received a night welfare check (NWC) task in the week prior, suggesting potential to predict mortality. This enabled early detection of subtle health issues (e.g. swelling, limping) not easily visible during routine checks.

The implementation confirms that the NWC enabled the facility to continuously and consistently monitor the welfare of their mice. The current focus is on refining the system to identify the crucial signals in an early phase to better determine humane intervention points and humane endpoints.

Home cage technology in safety pharmacology – better welfare and better science

Douglas Armstrong

The fundamental challenge, as highlighted by the rise of automated home cage analysis (HCA), lies in answering the critical question: what do animals truly do when no one is looking? Given that many common research species, particularly rodents are predominantly nocturnal, traditional daytime studies fundamentally misrepresent their natural behavioural profile. This discrepancy not only compromises Animal Welfare through necessary handling and isolation but severely limits the scientific utility and translational value of the resulting data.

The inherent conflict in conventional research methodologies is rooted in time and context. Laboratory environments often fail to replicate a subject's natural rhythm, especially by testing nocturnal animals during the light phase. Furthermore, traditional tests frequently require moving the animals out of their familiar home cage and into novel apparatus (such as an elevated plus maze), an event that is stressful and compounds social isolation which is particularly detrimental to social species. This acute stress response, often augmented by the presence of human technicians, inevitably confounds the very behavioural metrics being measured. As the collected data only captures short, isolated moments in time, the full spectrum of an animal's health, circadian rhythm and individual response to experimental compounds remains hidden.

The central hypothesis guiding the development of HCA technology was that automated, continuous analysis of individuals within small, stable social groups could deliver substantial improvements in both Animal Welfare (refinement) and scientific accuracy. The resulting technology, such as ActualHCA,[10] transforms a regular plastic home cage into a sophisticated 24 per day 7 days per week monitoring station. This is achieved by installing an array of radio frequency identification (RFID) readers beneath the cage floor to track individual animals tagged with subcutaneous transponders. An infrared (IR) camera and lighting system provide continuous side-view video allowing for automated feature extraction and the recognition of complex behaviours.

This system generates multiple continuous data streams providing an unprecedented longitudinal view of individual animal health and behaviour. Initial cage-level analysis already reveals subtle, yet crucial, biological phenomena such as the anticipation of the dark phase and overall increased nocturnal activity. Crucially HCA reveals that individuals really matter. Within a seemingly uniform group, the system can distinguish between hypoactive, hyperactive and mostly normal individuals, allowing researchers to build a robust temporal profile of a normal strain before introducing an intervention. This deep, continuous data is sensitive enough to detect early phenotypes in disease models, for instance, showing age-dependent changes in daytime behaviour in Huntington's disease mouse models much earlier than traditional methods.

The translational impact of HCA has been most clearly demonstrated in safety pharmacology. Traditional preclinical safety tests often result in a high rate of failure later in clinical trials. In validation studies HCA systems proved 10 times more sensitive than paired isolation challenge tests. For example, when re-testing drug candidates that had passed traditional preclinical safety screens but subsequently failed in human trials, HCA revealed novel, dose-dependent side effects that were only apparent during the animals' dark (active) phase. This capacity to capture data 24 hours a day, including during the critical nocturnal period where many pharmacological effects are most pronounced significantly improves the predictive power of preclinical studies.

Ultimately, HCA sets new, higher standards in the principles of the 3Rs. By providing a greater wealth of data per animal, the technology facilitates reduction in the total number of animals required for a study. It offers refinement by minimising handling and invasive procedures, allowing animals to remain socially housed in their familiar environment. Finally, the rich datasets enable replacement of subsequent studies by allowing existing data to be re-analysed in novel ways long after the experiment is complete. Automated home cage analysis represents a paradigm shift, moving scientific inquiry from stressful, misleading snapshots to continuous, ethologically relevant and individually sensitive data collection.

In-cage monitoring systems are vehicles for improving research, compliance and welfare – but who is driving?

Julie Keeble

The session opened with a discussion on the possible drivers behind the implementation of new developments within the facility, focussing on research impact, welfare, compliance and facility management. Under research impact, it was noted that certain pieces of equipment cannot be purchased through grant funding, which places importance on the research infrastructure fund (RIF). Annual bids are submitted through this to secure funding for specific items, including digital ventilated cages (DVC®). It was emphasised that any new equipment acquired should clearly demonstrate how it directly and indirectly supports new research initiatives. The principle of good welfare equals good science was highlighted as a central consideration.

In terms of welfare, DVC® were acknowledged as being more expensive than standard individually ventilated cages (IVC) but offering a clear, demonstrable advantage. Their use supports a strong Culture of Care, empowering staff and contributing positively to their wellbeing. The issue of compassion fatigue was raised, with concern that high dependency and the emotional weight of welfare monitoring can contribute significantly to this. DVC® were seen as a tool that may help alleviate such pressures by providing more reliable and autonomous monitoring to supplement human observers.

Compliance challenges were also discussed, particularly the difficulty facility staff face when tracking animal movements, including when completing annual returns to the Home Office. The use of DVC® presents an opportunity to improve oversight and facilitate easier monitoring of these movements, strengthening compliance and record-keeping practices.

From a facility management perspective, DVC® offer a way to ensure that Animal Welfare monitoring is more consistent and that welfare can be prioritised alongside biosecurity. This was considered especially valuable in high-containment areas where agents with known welfare impacts are being used. Lighting control was also discussed, with the leddy cage system providing an example of advanced environmental control that allows for different light cycles within the same room, creating tailored microenvironments for animals.

The group then reflected on the concept of who is the driver in this context. It was suggested that while drivers and driving lessons are both important that the analogy could be extended to identify instructors as unit management, examiners as budget holders or regulators and the regulators themselves as drivers. Above all, it was agreed that the animals are the most important consideration in all decisions. The discussion concluded with the sentiment that while a driver may exist, what is now needed is a pilot to guide the process forward.

High-tech habitats: what do they mean for rodent welfare?

Vikki Neville

There are a number of claims suggesting that HCM has scope to improve rodent welfare. However there is not enough evidence to support this and measuring welfare is rarely straightforward. Even if we try to understand what it is like to be a rodent, this is a question that is merely subjective and an educated guess based on a typical rodent's lifetime experience. However considering how rodents experience the world can provide valuable insights into possible refinements and the potential welfare impacts of new approaches like home-cage monitoring.

A rat's life is characterised by the constant need for predator avoidance. They live in complex burrow systems, averaging seven exits, five chambers and sixteen tunnel segments mostly in low-light conditions.[11] Rats have a distinct sensory world that dictates their interaction with the environment. For example, rats have eyes on the side/top of their head to help them maintain an overhead binocular field.[12] This is highly important for predator avoidance, especially for detecting aerial predators. Their field of view is significantly wider than many other animals and their colour vision is also different from human colour vision.[13] In relation to their hearing, rats utilise ultrasonic noises and their peak frequency for hearing differs from that of humans. This acute hearing is vital for communication with conspecifics (members of the same species) and for predator avoidance.[14] Rats possess a highly developed sense of olfaction used for predator detection (smelling predator odour), foraging and communication with other rats. Their sense of touch relies on highly sensitive whiskers for active sensing, essential for navigation and capturing prey.

When applying a rodent-centered perspective, monitoring systems must be scrutinised for being potentially aversive. Several questions arise concerning potential disturbances from the equipment itself: could overhead components cause an overhead visual disturbance, which, given their focus on predator avoidance, might be stressful? Does the equipment emit any detectable odour that could interfere with their highly developed olfaction? Does the system generate any noise, including sound in ranges not perceptible to humans (ultrasonic)? Are there any vibrations or changes to the airflow caused by the monitoring hardware?

HCM is often considered to benefit welfare by reducing human disturbance and allowing welfare issues to be detected earlier. However human rodent interactions are not strictly aversive. Researchers must investigate whether HCM changes the extent to which human-rodent interactions are positive. It is also important to assess whether welfare issues can be identified earlier, what can be reliably inferred from the HCM measures and the impact of HCM failures on welfare. Finally, it is important to understand the impact of HCM on sample sizes. Examining these questions will be vital to assess whether net welfare benefits could be achieved with HCM.

To ensure the ethical implementation of high-tech habitats and maximise welfare, the following recommendations are proposed:

– Consider how welfare for individual rodents can be maximised within the HCM system.
– Determine if there is a net welfare benefit to using the system, even if some individual welfare aspects may be compromised.
– It is crucial to ensure robust safeguards are put in place in the event of system failures to prevent unforeseen compromises in care.

Artificial intelligence: who needs an Animal Technician anyway?

Carmen Abela

Artificial intelligence (AI) influence is rapidly spanning both the scientific and logistical aspects of the laboratory animal industry. In research, AI tools are proving invaluable by drastically accelerating the timelines and costs associated with drug discovery, potentially reducing development cycles by several years. For Animal Welfare, AI provides crucial early-stage refinement by predicting the toxicity of novel chemicals, allowing for a first-order severity assessment before studies even begin.

Logistically, the industry is seeing the introduction of systems like robotics in the cagewash area, which minimises staff exposure to allergens and reduces human error in sanitation. Further automation includes the potential for self-driving vehicles to handle reliable, non-stop delivery of laboratory animals, complete with real-time tracking and significant cost savings. Even facility security is seeing upgrades, with AI-powered tools enhancing cybersecurity measures, such as facial recognition for access control.

A key innovation highlighted is the use of real-time home monitoring cages. These sophisticated systems employ integrated AI and video tracking to non-invasively observe and analyse animal behaviour, environmental conditions and intake of food and water. This continuous, objective data collection is performed without disturbing the animals or requiring single housing, yielding richer, more accurate data for researchers. This capability also enables prompt and proactive welfare interventions as AI can flag subtle changes that might otherwise be missed.

Despite this wave of intelligent automation, AI will not replace the Animal Technician. The verdict is that AI systems, no matter how sophisticated, require a trained human professional to effectively interpret the data, troubleshoot equipment and act upon the alerts they generate. AI is proficient at data collection and pattern recognition but it inherently lacks the necessary critical thinking, adaptability and ethical judgment that define a professional caretaker.

The technician's role encompasses numerous high-level, hands-on tasks that are resistant to full automation. These include administering medicine, performing precise dosing, conducting daily detailed health checks and safely handling and transporting animals. Most importantly, the core mission of Animal Welfare refinement –

- designing effective environmental enrichment
- innovating care practices
- providing compassionate, individualised attention

– relies entirely on the empathy, observation skills and accumulated experience of the human team.

The future of the industry is a collaborative model, where the technician skilfully leverages AI's analytical power to elevate the quality of both scientific outcomes and animal care.

Action points

1. Embed positive Animal Welfare (PAW) approaches into routine practice. Actively incorporate positive experiences (e.g. refined handling, habituation, play-based interactions) alongside harm minimisation, recognising their role in building stress resilience and improving data reproducibility.

2. Review and refine handling protocols using evidence-based methods. Assess current rodent handling techniques (e.g. rat tickling, habituation) and update protocols to be flexible, individual-responsive and sex-sensitive, minimising aversive elements such as excessive pinning.

3. Increase use of non-invasive home cage monitoring where justified. Evaluate the suitability of home cage activity monitoring (HCM/DVC®/HCA) for welfare surveillance, sickness behaviour detection and refinement of humane endpoints, while ensuring appropriate human oversight remains in place.

4. Use activity data to inform husbandry decisions, not fixed schedules. Where monitoring data are available, move towards data-driven cage change intervals and husbandry practices to reduce unnecessary disturbance, resource use and environmental impact.

5. Strengthen reduction strategies through sharing and smarter design. Promote tissue-sharing initiatives, pilot studies and power analyses to reduce animal numbers and maximise the scientific value derived from each animal, both in laboratory and field research.

6. Ensure technology adoption is welfare-led and ethically scrutinised. Before implementing high-tech monitoring or AI-driven systems, assess potential aversive impacts from a rodent-centred perspective (e.g. sensory disturbance, airflow, noise) and put safeguards in place for system failure.

7. Support staff wellbeing and Culture of Care alongside welfare monitoring. Recognise that increased welfare surveillance can contribute to compassion fatigue; ensure staff are supported through training, workload balance and clear guidance on how monitoring data should be interpreted and acted upon.

8. Maintain the central role of skilled animal care staff. Treat AI and automated monitoring as decision-support tools, not replacements for Animal Technicians, ensuring that professional judgement, observation, empathy and hands-on care remain fundamental to welfare and compliance.

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