

Behavioral Management Guidance Statement

Behavioral Management is a comprehensive approach aimed at enhancing the welfare and health of animals used in science and education and consequently, research reproducibility. By focusing on species-specific behavior as a key indicator, a Behavioral Management program improves various aspects of animals' lives, including but not limited to housing, husbandry, and handling techniques.

A comprehensive approach to Behavioral Management should be an essential element of the animal care and use program. Considerations for cage, pen or enclosure space and how it is furnished, choice of substrate/bedding, social housing, animal handling and restraint, opportunities for choice and control of aspects of their home enclosure, appropriate preparation of animals for science and education through habituation and training, opportunities for exercise, and provision of food and other resources to provide stimulation and alleviate boredom should be included.

Environmental enrichment and social housing are critical components of the Behavioral Management Program.

Environmental Enrichment

Environmental enrichment refers to the process of enhancing the living conditions of research animals to promote their natural behaviors and improve their overall welfare. It is crucial because it helps reduce distress, prevent abnormal behaviors, and improve the reproducibility of research by ensuring animals are in a healthy environment. Abundant literature has been produced on the benefits and means of implementation of enrichment strategies. Environmental enrichment has been adopted globally as standard practice in animal care and use programs and is already required in the legislation of some countries.

In general, provision of environmental enrichment will include appropriate housing and enclosure space including any elements that facilitate natural behavior depending on the different species needs (e.g., exploring, digging, hiding, chewing, exercising, nest building, manipulating, foraging, climbing).

Environmental enrichment should be provided in a consistent manner across the animal program, with due attention to animal welfare, and personnel and animal safety.

Implementation of environmental enrichment should also take into account the scientific goals of the study for which the animals are used; enrichment should be considered an independent variable and, thus, suitably controlled. Therefore, "consistency" in the implementation of the enrichment program does not necessarily mean that all animals must be provided with the same enrichment, but that the enrichment decided to be appropriate for each species, study or housing conditions, is applied consistently.

To ensure implementation of effective enrichment strategies, training on the enrichment program should be one aspect of the overall training program for all personnel taking care of animals at all levels and designing and

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performing animal experiments. AAALAC International expects that the IACUC/OB, with the collaboration of the veterinarians, animal care staff and researchers will coordinate and review periodically the implementation of the enrichment program and continuously monitor and adapt it to meet evolving standards and scientific understanding.

Social housing

Social housing will be considered by AAALAC International as the default method of housing unless otherwise justified based on social incompatibility resulting from inappropriate behavior, veterinary concerns regarding animal well-being, or scientific necessity approved by the IACUC or equivalent oversight body (IACUC/OB).

AAALAC recognizes that sometimes research objectives, the health condition of the individual animal, and/or the challenges associated with the social behavior of some species, strains and/or sex of the animals may preclude social housing. Not all members of a social species are necessarily socially compatible. Social housing of incompatible animals can induce chronic stress, injury, and even death. In some species, social incompatibility may be sex biased. The research and welfare benefits and consequences of both affiliative and aggressive species-typical natural social behavior should be considered.

When necessary, single housing of social animals should be limited to the minimum period necessary and, where possible, visual, auditory, olfactory and, depending on the species, protected tactile contact with compatible conspecifics should be provided. If such contact with compatible conspecifics is not possible, additional enrichment should be offered, such as safe and positive interaction with the animal care staff, as appropriate to the species of concern; periodic release into larger enclosures; supplemental enrichment items; and/or the addition of a companion animal in the room or housing area

The institution's policy and exceptions for single housing should be reviewed on a regular basis and approved by the IACUC/OB, with the collaboration of the veterinarians, researchers and animal care staff.

There may be a spectrum of social experience that can be made available to an animal based on the species, health, and use of the animal. These experiences are important because, when properly managed, they can significantly enhance the welfare of the animal. Full time social housing is the optimum manner to provide social experience. However, when full time housing with conspecifics is not possible, whether due to social incompatibility, veterinary concerns or scientific necessity, other social experiences should be considered such as part time access (e.g., overnight, when the animals are between studies, defined periods of time during the day, etc.) to full contact with conspecifics or protected contact that allows interaction. In this manner, the social experience of the animal occurs as a normal aspect of the animal's housing environment or as a separate activity that occurs outside of the primary enclosure, such as in a play yard, exercise cage, animal holding room aisle or facility corridor, etc. The staff responsible for the day-to-day management and oversight of the social experience of the research animals should be well versed in recognizing aggressive and affiliative behaviors of the various species in their care to provide for rapid identification and any necessary intervention.

Performance-based approach

The IACUC/OB, with the collaboration of the veterinarians, researchers and animal care staff should identify appropriate performance criteria, as well as a process for assessment, and ensure that the adequacy, safety, comfort and configuration of the animal environment is regularly reviewed to meet animal welfare and research

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quality needs. Animals should be adequately acclimated to their environment, as well as habituated to handling before experimentation begins to reduce stress as well as experimental variability. Non-aversive animal handling and positive reinforcement training methods should be used whenever possible to minimize stress and it should be performed by adequately trained personnel. When developing a performance-based approach to Behavioral Management, careful consideration should be given to addressing the specific needs of each species, taking into account factors such as, age, sex, animal size, group sizes and social structure, duration of study and behavioral needs according to current scientific understanding.

Behavioral Management should be applied to all animals including commonly used species such as mice, other rodents, and fish. The following species exhibit unique Behavioral Management and housing needs in addition to what is already described in other AAALAC standards.

Dogs

Dogs are generally social, athletic animals with a strong affinity for people. In managing the behavior of laboratory dogs, it is essential to address their social and physical needs to enhance welfare:

- Most dogs thrive on social interaction, both with humans and other familiar dogs. Regular, positive engagement with staff and opportunities for social experience with other known, compatible dogs can significantly enhance a dog's quality of life.
- Provision of comfortable living conditions, such as beds and chew toys help to promote dog comfort, health, and the expression of normal behaviors.
- Abnormal repetitive behaviors, such as circling, jumping, bouncing, and pacing, may be seen with suboptimal housing conditions or may be induced by fear, stress or aggressive interactions with other dogs. Additional assessment may be helpful to address specific behavioral problems.
- The expression of natural behaviors, such as sniffing, licking, physical activity, and play (for younger dogs), are natural stress relievers for dogs and contribute to positive welfare. Facilities that house dogs should incorporate daily opportunities for dogs to exercise and engage with their environment as well as with other dogs.

Nonhuman Primates

Nonhuman primates are non-domesticated species with significant cognitive capacity and require thoughtful housing and Behavioral Management programs to reduce the likelihood of injuries, boredom and frustration from developing in captive research settings. Key Behavioral Management needs for primates in research include appropriate housing environments, opportunities for social housing with familiar animals, habituation and desensitization to facility personnel, as well as research equipment and procedures, stimulating resources that are rotated on regular intervals to reduce boredom, and training to increase predictability and reduce stress during various procedures.

- Primary enclosures should allow animals to express their normal behavior and social hierarchy (e.g. perform a full range of normal movements and postural adjustments, provide safe and comfortable resting spaces that allow animals to avoid agonistic interactions, provide food foraging opportunities that encourage cognitive stimulation and give animals something to do, use of furnishings, such as swings and climbing devices, which encourage play and free movement, etc.).
- Abnormal behaviors may be seen with suboptimal management or in primates with fearful or anxious

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personalities, who may not adjust well to captive research settings. Additional assessment may be helpful to address specific behavioral problems.

- Primates are social species; thus, must be socially housed and enclosures must permit pair or group housing of animals (see Position Statement [\(link\)](#)). Opportunities for animals to move out of sight from each other to avoid agonistic encounters is encouraged. Perches and resting platforms should accommodate animals huddling and sleeping in pairs or groups, providing thermal and mental comfort.
- Most species worked with in research are arboreal/partly arboreal and they require enclosures that permit vertical flight. Some species also require sufficient space for brachiation. Enclosure modifications, such as tunnels, pop-outs, and verandas may be added to provide opportunities for animal choice and control in their environment.
- Provision of puzzle devices and manipulable objects (e.g. mirrors, balls, rings, etc.) can provide engagement and cognitive stimulation for animals, but should be safe and rotated on a regular basis to reduce boredom.
- Primates thrive on routine in captive settings, which includes predictable schedules for feeding, cleaning, training, and experimentation, as well as familiar caregivers. Consistency in personnel managing care and treatments also helps to promote better care in that personnel who are familiar with the primates they work with are more aware of individual animal temperament, social hierarchy, and past experiences, and can adjust their approach accordingly.
- Careful handling using non-aversive techniques that animals are habituated to, and use of positive reinforcement training to promote voluntary cooperation with procedures are highly recommended. These help to reduce stress in animals and personnel and can be a form of cognitive engagement for animals when performed appropriately.

Rabbits

Although inherently social creatures, rabbits are a highly territorial species and social incompatibility issues often arise when they are not provided with sufficient space in their home enclosure. Intact adult males may not always be suitable for social housing because of behavioral aggression, but juvenile rabbits, castrated male rabbits, and intact adult females may often be socially housed (generally in same sex groups in research settings). Does with litters should not be group housed with other adult rabbits, but kits can be mixed between litters at weaning. It is essential to provide hiding places or visual barriers and escape routes when introducing adult females to minimize agonistic encounters. As relationships between animals can evolve due to changes in physiological status, age, and experimental manipulation, ongoing observation of rabbit interactions is needed to detect and promptly address significant signs of social incompatibility.

Other factors that may improve the Behavioral Management of rabbits include:

- Sufficient space to allow rabbits to express natural behaviors and postures, such as multilevel enclosures or elevated resting platforms (appropriate to allow the animal to lie, sit, and easily move underneath), and sufficient enclosure height without their ears touching the enclosure top when seated on the cage floor.
- Regular opportunities for rabbits to dig, explore, and chew. For example, offering free choice roughage, hay, or chewing-sticks allows animals to forage, helps them to control their own microclimate, helps to keep teeth worn, and promotes good gut health.
- Habituation of rabbits to regular gentle handling.

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- Solid floors with bedding or molded plastic perforated floors are preferable. Grid, stainless steel slatted, or wire floors should only be used if a resting area large enough to hold all of the rabbits at any one time is provided.

Rats

Rats are highly intelligent and social animals that respond well to positive human interactions. Consideration for housing and optimal Behavioral Management for rats in research settings has not generally kept pace with other species. As for other species, rats benefit from opportunities to perform a full range of postural adjustments and movements, including climbing, stretching vertically, hopping, and running and facilitation of such behaviors should be considered. Except for stud males kept long term for breeding, it is rare for rats of either sex to require separation due to intolerable agonistic encounters. As for other species, rats require sufficient space and enclosure furnishings (e.g., tunnels or huts) to be able to move out of sight and avoid agonistic encounters. Other factors that may improve Behavioral Management of rats include:

- Regular opportunities for rats to dig, explore, and chew. For example, scattering small amounts of seed or other tiny food items in the bedding at cage change can promote foraging and exploration, and nylon or destructible materials can be offered to promote chewing.
- Regular access to a play cage can promote exercise, free movement, and exploration – these can be particularly useful when housing enclosures are more restrictive in space.
- Rats will build nests when provided with materials they prefer, such as long strands of shredded paper. Materials need to be provided in a sufficient quantity to construct nests or comfortable resting places.
- Healthy, normal rats are meticulous about grooming and juvenile rats commonly engage in rough and tumble play when provided with sufficient space.
- Rats respond well to gentle, non-aversive handling techniques, and are readily habituated and trained to cooperate with experimental procedures using positive operant conditioning methods.

Most AAALAC-accredited facilities will already have many aspects of a Behavior Management program in place. These should be incorporated into a coherent program, expanded where needed, and tailored to each species housed within the facility. A key means of improving current programs is to employ an ‘outcomes-focused’ approach, that is, one that asks what behaviors are normal for a given species and should be promoted. Addressing some needs may require structural modifications of housing enclosures; however, other needs can be met with simple materials or procedural changes. This will remain an evolving area within the field and one that accredited units should continue to monitor to ensure they are promoting good animal welfare and quality science.