IACUC Default Social and Environmental Enrichment Program for Research Animals at NYUSoM

Prologue
In order to enhance animal wellbeing, minimize animal stress, promote consistency, and comply with regulatory requirements, the following default enrichment standards, specifically defining housing conditions and socialization opportunities, for all species used in research at NYUSoM with the exception of nonhuman primates (addressed separately). Persons interested in the NYUSoM Environmental Enrichment Policy for nonhuman primates are referred to: http://www.med.nyu.edu/dlar/assets/environment.pdf

Introduction
The environment may influence the validity, reliability and replicability of experiments by introducing abnormal animals into studies, increasing variability within the population, and altering the number and type of individual animals between laboratories, respectively (Garner, 2005). In the context of the research animal, the environment consists of both physical attributes (e.g., lighting, temperature, cage design and complexity) as well as the nature of social interactions. In the proper care and use of research animals, the availability or suitability of enrichment must be considered in the provision of the environment and specifically with opportunities to exhibit species-typical behaviors and activity (Clark, et al, 1996).

When animals are unable to perform species typical behaviors and control their environment, unintended stress results and may become manifested as abnormal behaviors, both maladaptive and malfunctional (Garner, 2005). Abnormal behaviors in a population are similarly potentially confounding to science because they are usually expressed inconsistently across the spectrum of the group (Garner, 2005). Their expression varies by genetic background and developmental experience and may be difficult to mitigate with aging (Garner, 2005). As such, successful enrichments reduce or prevent the occurrence of malfunctional and maladaptive behaviors (Garner, 2005) through appropriately lifelong (e.g., from development onward) social and environmental enrichment (Baumans, 2005; Garner, 2005).

An important enrichment caveat is that social, environmental, dietary and other supplementations intended for improvement of animal well-being may alter important aspect’s of an animal’s physiology and development in ways not easily predictable based on what is already known (Benefiel, et al, 2005; Hutchinson, et al, 2005). Enrichment is a research variable that must be sensibly managed and must be biologically relevant. The effective delivery of enrichment minimizes or removes all non-research-related variables, while ensuring the scientific validity, repeatability and replicability of research (Garner, 2005; Weed and Raber, 2005). In essence, enrichment enables “good welfare” to equal “good science”.

Abbreviations and Definitions
“Animal” – for purposes of the default enrichment program, “animal” is defined as to comprise
all vertebrate species used in research at NYUSoM with the exception of nonhuman primates covered by a separate policy and program.


“Social Animals” – within the context of use at NYUSoM, the following species are defined as being social: dogs, pigs, rabbits, guinea pigs, gerbils, mice, and rats. Although not necessarily social species, amphibians do have biological needs for certain environmental enrichments.

General Principles

1. Social animals will be housed in compatible pairs or groups, rather than individually, provided such housing is not contraindicated by the protocol in question and does not pose undue risk to the animals in question (Clark, et al, 1996).

2. The structural habitat will include objects that increase opportunities for the expression of species-typical postures and activities and enhance the animals’ well-being (Clark, et al, 1996).

3. Particularly when social animals must be housed alone, other forms of enrichment must be provided to compensate for the absence of other animals unless scientifically contraindicated (Clark, et al, 1996).

4. Exemptions from some or all of the requirements of the default enrichment program for scientific reasons, and if for all or part of the time maintained at the university, must be documented in the protocol and specifically approved by the IACUC (Institutional Animal Care and Use Guidebook. 2002. 2nd edition, ARENA/OLAW, p. 50).
   a. For example, it is known that changes to environment enrichment can have profound effects on neurobehavioral parameters in mice and may effect the offspring of such mice (Li, et al, 2006 and Arai et. al, 2009).

5. Qualified institutional veterinarians have the authority to exempt specific animals from inclusion in the enrichment program for reasons related to health, condition or well-being. The exemption and rationale must be documented in a medical record. Veterinarians doing so are obligated to review the status of the exemption at least every 30 days and renew it or void it accordingly (AWAR §3.8(d), §3.81(e)).

6. This program should be revised with the addition of new species to the census or in the case where significant new information emerges or approaches to enrichment come to be the norm.

Default Enrichment Program Description by Species

Dogs: Canines should be socially housed in compatible pairs or small groups. Each home enclosure must have a platform, bench, step, bed, etc., to allow each dog an elevated and/or partially enclosed resting space. Likewise, each dog should have access to at least one toy when in their home enclosure. These toys should be rotated to maintain interest. If dogs cannot be
compatibly housed continuously, intermittently. Social housing of 30 minutes per day, 5 days per week is allowable. Dogs housed individually must be within sight of other dogs. Those kept singly for more than 2 weeks should be given extra human interaction including petting, soothing speech, playing, and grooming for at least 10 minutes, 3 days per week. An exercise program for dogs per AWAR is also in place and described elsewhere.

Gerbils: Behaviorally compatible gerbils should be housed socially with nesting material. However, unfamiliar males should not be combined. Gerbils should be provided a substrate for gnawing such as cardboard or pieces of wood, and may be fed in an open container on the cage floor to allow for hoarding behavior. Nesting material in the form of hay, straw, paper products, or nestlets is necessary to craft a nest, but enrichment items must be provided to fulfill burrowing needs. Some examples for items to fulfill burrowing needs would be igloos, Shepherd Shack, plastic tubing or PVC tubing. Bedding should have a depth of approximately 2 inches to allow for digging, and the height of the cage should be high enough so that the gerbil can stand erect on top of the substrate (at least 7 inches).

Guinea Pigs: Guinea pigs are to be kept in social groups contained within pens and provided shelter space sufficient to contain all of the pen inhabitants simultaneously.

Hamsters: Behaviorally compatible hamsters should be housed socially with nesting material. Aggressive females will need to be singly housed.

Mice: Mice are to be group-housed in breeding or compatible unisex groups on contact bedding with nesting material. Unfamiliar males, such as those acquired as adults from commercial breeders or breeding males given sexual rest, should be housed singly.

Rabbits: Food treats: Each rabbit will receive a handful of Timothy hay, hay cubes, or treats in the form of blocks or sticks at least three times each week, preferably on a predetermined schedule of nonconsecutive days. Vegetables or fruit will be provided on the other two days when hay is not given. Whenever possible, rabbits should be group housed. In many cases, this may not be possible due to caging limitations, inter-animal aggression or study limitations. In this situation, the rabbits will be provided “supervised” socialization in compatible couples outside of the cage for a period of 10 minutes once a month. In the event that rabbits are not found to be compatible, a single rabbit will be supervised while roaming freely outside of the cage, about the housing room for 10 minutes, once a month. Toys such as mirrors or balls suspended on a chain within the cage will also be used for enrichment on a rotating schedule to be determined by Veterinary Services. Once per month, rabbits receive positive human interaction including brushing and nail trimming as needed.

Rats: Rats should be socially housed unless scientific justification for not doing so is provided by the investigator. When single housing is required, enhanced environment enrichment meeting the needs of retreat space must be provided. Housing in high density ventilated caging systems with filter tops meets this need. Otherwise, for rats in open polycarbonate cages a PVC pipe section of appropriate diameter or shelter equivalent will suffice.
Swine: Behaviorally compatible pigs must be socially housed including, if necessary, combining pigs of compatible size and disposition to meet this need. Substrates should be provided to enable rooting behavior. Examples of such substrates include: plastic or bowling balls loose on the cage floor or suspended above it, baby pools or equivalent filled with balls and treats. Pigs housed on solid floors are provided with aspen chip bedding.

Xenopus laevis: African clawed frogs must be housed in tanks with a population density not exceeding one per 2 liters tank water volume and as otherwise stipulated by facility SOP. With respect to the latter, water treatment, circulation and quality may stipulate that greater volumes be accorded per head. For animals housed with direct exposure to room light, refuges or retreats must be provided in the form of pipes, flower pots, or submerged plastic boxes unless the environment is already sufficiently dark.

REFERENCES

Cited References


General References

Dog References

Gerbil References


Guinea Pig References


Rabbit References


Rodent References


Swine References


Xenopus laevis References


