



Florida State University Animal Care and Use Committee

Environmental Enrichment – Rodents & Amphibians

The *Public Health Service Policy (PHS) on Humane Care and Use of Laboratory Animals* endorses the *U.S. Government Principles for the Utilization and Care of Vertebrate Animals Used in Teaching, Research and Training*. Principle VII. states in part "The living conditions of animals should be appropriate for their species and contribute to their health and comfort. " Based upon this, the *Guide for the Care and Use of Laboratory Animals* emphasizes that proper animal housing is essential to animal well-being as well as to the production of quality research data. The Guide specifically states "Animals should be housed with a goal of maximizing species-specific behaviors and minimizing stress-induced behaviors."

In an effort to address these issues, the current edition of the *Guide* has included a section on behavioral management. Behavioral management for laboratory animals encompasses the structural environment (cages, bedding and objects added to the cage), the social environment (communication and physical contact among conspecifics) and provision for both physical as well as cognitive activity. It should be noted that for social species the Guide states "It is desirable that social animals be housed in groups; however, when they must be housed alone, other forms of enrichment should be provided to compensate for the absence of other animals, such as safe and positive interaction with the care staff and enrichment of the structural environment."

The goal of environmental enrichment is to provide stimuli to promote species-specific behaviors as well as to enhance the physical and psychological needs of individual animals. Primarily, environmental enrichment focuses on the cage – its size, volume and provision for (or lack thereof) items that will allow animals to conduct 'normal' daily activity for its species. This includes nesting, foraging and social organization. Provision of environmental enrichment items must be weighed against the important issues of ergonomics (for animal care staff), cost and any potential impact to on-going research. Where changes to the environment may impact research, animal welfare concerns should be balanced with study objectives.

There are many choices for environmental enrichment. These may include group (conspecific) housing as well as items or procedures that encourage species specific behaviors (e.g. foraging, exploring, nesting) as well as those that decrease stereotypic behaviors. Studies show that mice tend to benefit most from items that permit nesting behavior, while rats prefer items that increase the structural complexity of their environment. Enrichment options must have been shown to meet (or decrease) one or more of these behaviors to be considered. Enrichment devices or options must also be

practical, easy to use and either disposable or easily sanitized. They should not be harmful to the animal and should be cost effective.

Enrichment should not be added to groups of experimental animals already under study to avoid introduction of an additional variable. The type of enrichment should not be changed at any time during an experimental period to avoid introduction of an additional variable; enrichment options should be consistent throughout an experimental period unless dictated otherwise for reasons of animal health or experimental design. All rodent species will be housed in solid bottom cages with contact bedding, unless specifically described in a research protocol and approved by the ACUC.

Based upon an evaluation of available literature and products, the following guidelines will apply to all rodents and amphibians housed under FSU approved protocols. Group housed animals must be provided with a minimum of one device for enrichment; singly housed animals must have a minimum of two enrichment options. Listed below are the most common choices for environmental enrichment. Additional options may be suggested by investigators for approval by the LAR Attending Veterinarians.

Hamsters

- Hamsters should be group housed whenever possible, although mature females may be aggressive in groups (pair housing these may be preferable).
- Hamsters may receive a tunnel/hiding device (e.g. PVC tube or Y-tube).
- Provision of a second bedding material (e.g. non-treated paper towels, Enviro-dri[®], Nestlet[®]) may be considered.
- For gnawing, nylon balls or bones or sterilized wood blocks may be offered.
- Pregnant and nursing females should be supplied with a second choice nesting material.
- All singly housed hamsters must be provided with two or more enrichment options, one of which must be a gnawing device.

Leopard Frogs

- *Ranas* may be group housed.
- Live crickets and mealworms are to be fed on a pre-determined schedule.
- Cages should permit access to water for swimming and a dry area for 'sunning'. Cages should be sloped and have a textured surface (e.g. Astroturf mat) for traction.
- Cages may contain a hiding area (e.g. PVC tube) or burrowing substrate.

Mice

- Mice should be group housed whenever possible
- A Nestlet (or second bedding material alternative such as Enviro-dri[®]) will be placed in each cage at the time of cage changing. Large mouse boxes should be provided with 2 or more Nestlets or suitable amount of second bedding choice, depending on the housing density.

- Additionally, the cage may contain a solid nest box or PVC tube. One or more solid nest boxes may be required for high density cages.
- All singly housed mice should be provided with two or more enrichment options, one of which must be a second choice bedding material or hiding device.

Rats

- Rats should be group housed where possible.
- Rats may receive hiding devices (e.g. PVC tube or ½ tube) or may be given a resting platform.
- Provision of a second bedding material (non-treated paper towels, Enviro-dri®) may be considered.
- For gnawing, nylon balls or bones or sterilized wood blocks may be offered.
- All singly housed rats must be provided with two or more enrichment options, one of which must be a gnawing device.

Xenopus

- Xenopus are a prey species, therefore it is highly important to provide them with a form of shelter in which to retreat and hide. Cover can be provided by use of PVC tubes or by providing cover from above in the form of floating objects (plastic lily pads or shredded and bound black plastic liners). Objects placed on the surface of the water however, must still allow frogs to easily access the surface of the water to breathe. Opaque tanks are preferable to completely transparent tanks, however some mechanism to readily view the inhabitants (such as one clear side) must be provided.
- Tank dimensions must allow adequate space for a suitable volume of water per animal.
- Animals of disproportionate sizes should not be housed together to avoid predation.

In addition to exemptions required by study objectives (see below), exceptions to the above policy may include single housing for pregnant mice or rats, incompatible animals, animals during the immediate post-surgical recovery period or animals isolated for medical reasons by veterinary staff.

There may be occasions where use of environmental enrichment devices may interfere with research objectives. In these cases, investigators may request an exemption for animals on study. All requests must undergo review and approval by the FSU Animal Care and Use Committee. Please fill out the 'Exemption from Environmental Enrichment' form and submit to the ACUC Secretary for inclusion on the next agenda.

References: There is an ever increasing body of literature related to environmental enrichment in laboratory animals that is not limited to cats, dogs or non-human primates. Below is a partial listing of documents reviewed during the process of formulating the above policy.

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Refining rodent husbandry: the mouse. Report of the Rodent Re@nement Working Party. Laboratory Animals Ltd. Laboratory Animals 32: 233-259 (1998).

The behavior and enrichment of laboratory mice. Garner, Joseph. Presented at the 2004 SCAW meeting, San Antonio, TX.

The development of science-based guidelines for laboratory animal care: Proceedings of the November 2003 International Workshop. National Research Council. (2004)
<http://www.nap.edu/books/0309093023/html>

Request for Exemption Of Animals/Experimental Groups From Environmental Enrichment

Investigator Name:

Department:

Campus Address:

Phone Number:

Protocol Title:

Protocol Number:

Date:

1. List the specific animals and/or experimental groups to be granted an exemption. Indicate total number of animals.
2. Identify time frame that above animals/groups are to be exempt. Any duration greater than one year will require annual application, review and approval.
3. Describe why, per animal or experimental group, the above animals are to be exempted from any form of environmental enrichment. Reasons must be based upon experimental or other scientific justification.