

Guidelines for General Species Environmental Enrichment

Overview:

In accordance with the *Guide for the Care and Use of Laboratory Animals (Guide)*, research facilities must provide appropriate environmental enrichment for all animals. The principal goal of environmental enrichment is, “to enhance animal well-being by providing animals with sensory and motor stimulation, through structures and resources that facilitate the expression of species-typical behaviors and promote psychological wellbeing through physical exercise, manipulative activities, and cognitive challenges according to species-specific characteristics” (*Guide*, page 52).

Environmental enrichment should be provided in a consistent manner across an animal program. When discussing the humane care and use of animals with stakeholders, it is important to discuss a balance between animal well-being and the goals of the biomedical research at hand (Weed and Raber, 2005). According to the *Guide*, “enrichment programs should be reviewed by the IACUC, researchers, and veterinarian on a regular basis to ensure that they are beneficial to animal well-being and consistent with the goals of animal use.” (*Guide*, page 53). This document provides the NIH Intramural Research Program (IRP) Animal Care and Use Programs with a generic environmental enrichment framework for developing their own plans. The examples are a starting point, and each Institute/Center (IC) should develop an individualized plan to address and balance the enrichment needs of their animal species with the unique requirements of their research programs. For USDA-regulated species, each IC will develop an individualized plan as specified in the Animal Welfare Act Regulations (AWAR).

Two supplemental documents accompany this document for additional specific guidance regarding enrichment recommendations: [Appendix 1: Environmental Enrichment of Rodents](#), and [Appendix 2: Behavioral Management of Nonhuman Primates](#)

General:

An integrated approach to behavioral management should involve animal facility personnel including veterinary, animal care, facility management, behavioral staffs, and researchers. Personnel involved in behavioral management should understand the “General Indicators of Well-being” for species involved (Table 1). Well-being, or animal welfare, refers to an animal's condition or the treatment it receives to meet both physical and mental needs.

Table 1: General Indicators of Well-Being:

Physical Well-Being	Psychological Well-Being
<ul style="list-style-type: none">• Minimal disease, illness and injury• Body weight maintenance and food consumption• Healthy hair coat	<ul style="list-style-type: none">• Displaying a range of species-typical behavior• Low levels of aberrant behavior• Appropriate response to challenges or stressors• Ability to cope with daily changes in social and physical environment• Presence of balanced temperament• Absence of chronic signs of distress

A **behavioral management program** should also determine husbandry refinements to include environmental enrichment and improvement, socialization of social species, behavior assessment and positive reinforcement training. There is some overlap between these 4 components (Table 2: Husbandry Refinements). The *Guide* recommends the incorporation of positive training techniques, such as Positive Reinforcement Training (PRT), into husbandry and experimental procedures. The behavior management program should also determine the appropriate types of environmental enrichment (Table 3: Types of Enrichment).

Table 2: Husbandry Refinements

Environmental Enrichment/Improvements	Socialization of social species
<ul style="list-style-type: none"> • Promote species specific behavior (i.e., Social housing) • Promote psychologic well-being (i.e., objects for manipulation) • Increases behavioral choice (i.e., objects to hide) • Promote Foraging behavior** • Promote environmental ecology** 	<ul style="list-style-type: none"> • Promote species specific behavior • Promote psychologic well-being • May increase ability to cope more easily • Reduces abnormal behaviors • Increases locomotion • When implementing should understand social system
Behavioral Assessment	Positive Reinforcement Training (PRT)
<ul style="list-style-type: none"> • Observing animal behaviors with people and cohorts • Identifying abnormal behaviors • Treating abnormal behaviors 	<ul style="list-style-type: none"> • Facilitates husbandry, veterinary and research procedures • Reduces behavioral problems • Increases efficiency • Reduces stress • Improves well-being
<p><i>** Critical part of enrichment plan and should be based on the natural histories and normal specific species behavior</i></p>	

Table 3: Types of Enrichment

Social Enrichment	Environment Improvement
<ul style="list-style-type: none"> • Types of Social Enrichment <ol style="list-style-type: none"> 1) Sensory contact (visual, auditory, olfactory) 2) Partial contact with individuals (grooming panels, intermittent social access) 3) Continuous unrestricted pair or group housing 4) Positive interactions with humans where appropriate by species • Considerations for social enrichment <ol style="list-style-type: none"> 1) Species 2) Individual animals' previous social histories 3) Study limitations 	<ul style="list-style-type: none"> • Varied substrate bedding and foraging material • Raised surfaces • Visual blocks • Nest boxes, huts, tubes, gnawing devices • Swings • Changing size and complexity of the enclosure • Manipulanda, toys, puzzle feeders, grooming boards, climbing structures

<ul style="list-style-type: none"> 4) Housing limitations 5) Risk assessment 6) Plan of action when fighting occurs 	
<p style="text-align: center;">Nutritional Enrichment</p> <ul style="list-style-type: none"> • Novel delivery of food • Foraging opportunities - in their natural environments, most laboratory species spend most of their waking hours foraging for a variety of foods • Types of Novel foods <ul style="list-style-type: none"> 1) Foods that are time-consuming 2) Foods that are highly desirable 	<p style="text-align: center;">Sensory Enrichment</p> <ul style="list-style-type: none"> • Visual - television, windows, bubbles, people watching, mirrors • Olfactory - scented sprays, herbs • Auditory - radio, people talking to the animals • Tactile – frozen treats, varied nesting or foraging material
<p style="text-align: center;">Occupational Enrichment</p>	
<ul style="list-style-type: none"> • Positive reinforcement training (PRT) <ul style="list-style-type: none"> 1) Provides “options” 2) Provides ways to cope with stressors 3) Provides opportunity for the animal to have some control 4) Provides the animal with a job 5) Promotes exercise 6) Provides mental stimulation 	

Documentation of the Enrichment Program:

The documentation requirements regarding plans for the appropriate exercise for dogs and provisions for environmental enhancements adequate to promote the psychological well-being of non-human primates are well described in the USDA Animal Welfare Act and Animal Welfare Regulations, Title 9 CFR, Chapter 1, Subchapter A – Animal Welfare (<https://www.ecfr.gov/current/title-9>).

Enrichment programs and plans for non-USDA-regulated species should also be documented according to facility specific standard operating procedures.

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