



## Animal Facility SOP 16.2

### Environmental Enrichment

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**I. Purpose:** To establish procedures for Environmental Enrichment to enhance animal well-being and facilitate species-specific behaviors.

### II. Scope

This compilation of MSU Animal Research Facility Standard Operating Procedures (SOPs) is a reference for investigators, Institutional Animal Care and Use Committee (IACUC) members, and facility staff.

### Overview

The primary aim 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-specific behaviors and promote psychological well-being through physical exercise, manipulative activities, and cognitive challenges according to species-specific characteristics.<sup>1</sup>

### Definitions

**Standard housing** refers to the type(s) of housing approved by IACUC and provided by MSU FACILITY for general use (varies by species).

**Environmental enrichment** refers to additions to an animal's environment with which it can interact. The goal is to allow animals to express a range of species-typical behaviors which may enhance their well-being. Examples of environmental enrichment include:

- o Group housing of compatible animals
- o Providing animals with a means for control over their environment (e.g., nest-building materials, hiding places, gnawing blocks)
- o Novel items (e.g., toys, special food treats)
- o Opportunity for exercise (e.g., running wheels, climbing structures)

The appropriateness of specific environmental enrichment is determined by the species used, type of housing, space available, research needs, standard husbandry practices and other operational issues.

## Policy

### Social Housing

The *Guide*<sup>1</sup> states that single-housing of social species should be the exception. Social housing will be considered by the IACUC 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. Social species maintained at MSU include all mice and rats. When necessary, single housing of social animals should be limited to the minimum period necessary. Common exceptions to social housing are:

- Any animal that has demonstrated aggression/fighting behavior, or animals known to have a propensity for fighting (e.g., male DBA mice).
- Breeders not currently in use.
- When a companion animal is not available (e.g., a single animal of a particular sex at weaning, or the last animal remaining in an experimental cohort).
- Animals in the immediate post-surgical period (i.e., before normal activity has resumed or when surgical sites could be compromised). However, animals must be returned to social housing again as soon as possible.
- Animals that are too large to be housed with other animals due to cage size limitations.
- Scientific necessity as reviewed and approved by the IACUC.

Rodents that are approved for single-housing must receive enrichment in addition to the usual nesting material, such as diamond twists or shredded paper for mice or gnawing blocks for rats.

### Environmental Enrichment

To provide for the physical and social needs of research animals, the IACUC requires that appropriate environmental enrichment be provided as part of standard animal housing unless there is scientific justification, approved by the IACUC, that precludes the use of environmental enrichment materials or practices. This policy outlines the types of standard housing used for laboratory animal species at MSU and the types of environmental enrichment materials or practices that may be used to enhance species-specific behavior and reduce distress and anxiety in laboratory animals.

All mice and rats will be provided with food, water and nesting material (unless an exception is specifically approved for scientific reasons by the Institutional Animal Care and Use Committee) as well as items to chew on and enough bedding to hide from light and keep warm. Suitable nesting materials for mice are cotton squares (e.g. Nestlets™) that can be shredded to make a nest. Suitable nesting materials for rats are bags of shredded paper (e.g. Enviro-dri™). No more than three rats or 5 mice should be in a

cage to avoid fights and cramping (please refer to the Rodent Cage Density Policy). The temperature in the room should not be higher than 72° F.

## Implementation

- Investigators have the responsibility for providing and sterilizing materials for environmental enrichment not included by the MSU facility. These are outlined in the attached document
- Changes to the standard housing and environmental enrichment described in Table 1 below are not permitted except under the following circumstances:
  - Changes are described in the animal use protocol and approved by the MSU IACUC.
  - Changes are prescribed by the MSU FACILITY Veterinary Services group for animal health or welfare reasons.
- Enrichment materials or practices should not significantly alter the species-appropriate standards for husbandry, nutrient requirements or housing, as described in The Guide, unless these deviations are described and approved by the IACUC in the animal use protocol.
- Provision of environmental enrichment other than the Standard or Allowed Environmental Enrichment described in the Appendix must be described in the IACUC protocol. If the standard housing and enrichment for the species cannot be used, a justification must be submitted and approved by the IACUC.

## References

<sup>1</sup> [Guide](#) for the Care and Use of Laboratory Animals (National Academies Press, 2011), page 52.

<sup>2</sup> Animal Welfare Regulations, 9 CFR Chapter 1, Part 3, Subpart D, Section [3.81](#)

<sup>3</sup> Animal Welfare Regulations, 9 CFR Chapter 1, Part 3, Subpart A, Section [3.8](#)

## Acceptable Enrichment Types

<https://docs.google.com/document/d/1FZqLk8YvH-gq8oNO7oJup0ybjaEBaNmtua8yrwqRykw/edit?usp=sharing>