Guidelines and Policy for Housing and the Use of Environmental Enrichment for Laboratory Animals

Environmental enrichment:

The Guide for the Care and Use of Laboratory Animals states: “The primary aim of environmental enrichment is to enhance animals’ 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 well-being through physical exercise, manipulative activities, and cognitive challenges according to species-specific characteristics”\textsuperscript{1}.

The availability of suitable enrichment devices and practices within the primary enclosure aids in achieving this goal set by the Guide. Each species housed in the Marquette University animal facilities has different requirements and must be evaluated individually.

Factors for assessment of environmental enrichment:

- Enrichment must be conducted in such a way as to not interfere with the research results.

- Enrichment devices utilized will be at the discretion of the Principal Investigator in consultation with the Animal Resource Center, and written into the PI’s IACUC approved protocol.

- If a protocol requires an exemption to exclude environmental enrichment, this exemption will need to be scientifically justified in the IACUC protocol. The PI may consult with the Animal Resource Center or attending veterinarian during protocol development to discuss the special circumstances that might limit participation in the environmental enrichment program.

- Singly housed animals are presumed to need more environmental enrichment than pair or grouped housed animals unless an exception to exclude enrichment is scientifically justified in an IACUC approved protocol.

- Enrichment devices are used to allow animals to express a range of species-appropriate behaviors which may enhance their well-being.

- Animal Resource Center staff will be responsible for the administration of the enrichment program including replacement of all devices.

- All breeding cages \textbf{must} be provided with some form of nesting material or enrichment unless the PI has a scientific justification that has been approved by the IACUC.

\textsuperscript{1} Guide for the Care and Use of Laboratory Animals (National Academies Press, 2011), pages 52, 53, 54.
Housing:

The Guide for the Care and Use of Laboratory Animals states: “All animals should be housed under conditions that provide sufficient space as well as supplementary structures and resources required to meet physical, physiological, and behavioral needs. Environments that fail to meet the animals’ needs may result in abnormal brain development, physiologic dysfunction, and behavioral disorders that may compromise both animal well-being and scientific validity. The primary enclosure may need to be enriched to prevent such effects. An appropriate housing space or enclosure should also account for the animals’ social needs. Social animals should be housed in stable pairs or groups of compatible individuals unless they must be alone for experimental reasons or because of social incompatibility”\(^2\).

MU housing standards:

- All animals housed for research, teaching or testing purposes at Marquette University must be housed in the Animal Resource Center and approved by the IACUC.

- Each animal housing room maintains a single species at any given time unless special housing arrangements have been made for compatible species.

- Compatible animals will be housed in pair or group-housed if space and body weight allows (see recommended minimum space for commonly used laboratory rodents housed in groups).

- Cage complexities and important resources (visual barriers, refuges, food, water, shelter and enrichment devices) should be provided in such a way that cannot be monopolized by dominant animals or elicit aggression between animals.

- In general, social animals must be housed in stable pairs or groups of compatible individuals. Social housing will be considered the default method of animal housing unless otherwise justified based on scientific necessity.
  - The need for single housing based upon experimental requirements is the exception and must be scientifically justified in the animal protocol and reviewed and approved by the IACUC.
    - Certain medical, compatibility or behavioral conditions may require that animals be individually housed.
    - Animals may be segregated from the group if injured or ill.

\(^2\) Guide for the Care and Use of Laboratory Animals (National Academies Press, 2011), pages 51, 52.
### Table of Standard and Additional Enrichment

<table>
<thead>
<tr>
<th>Species</th>
<th>Standard Housing</th>
<th>Approved Enrichment</th>
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<tbody>
<tr>
<td>Mice (breeders)</td>
<td>(For trio-breeding) Large polycarbonate shoebox static open top cages. Static micro isolator compatible. Commerciaely available wood chip bedding. Wire bar lid. Water bottle watering. ARC/IACUC approved feed in a wire bar lid.</td>
<td>Nestlets (for nesting), paper tubes, running wheels, PVC tubing, Shepard shacks, Enviro-dri (for nesting), wood blocks, wood clothespins, refuge huts, and Alpha-dri (for nesting).</td>
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<tr>
<td></td>
<td>(For monogamous breeding) One female + litter and a male up to 15g. Polycarbonate “standard” shoebox static open top cages. Static micro isolator compatible. Commerciaely available wood chip bedding. Wire bar lid. Water bottle watering. ARC/IACUC approved feed in a wire bar lid.</td>
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<tr>
<td>Rabbits</td>
<td>Group housed or social contact if possible. ARC standard rack for rabbit housing. Water bottle watering. Nutritionally complete pelleted food daily.</td>
<td>Plastic balls, plastic dumbbells, paper tubes, and wood blocks.</td>
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<tr>
<td>Fish</td>
<td>Group housed if compatible. Aquaria made of sanitizable materials. Static or flow-through water system. Water filtered or conditioned to remove/inactivate chlorine and chloramine. Nutritionally-complete commercially-available food when provided.</td>
<td>PVC tubing.</td>
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<tr>
<td>Turtles/Frogs</td>
<td>Group housed if possible in aquaria made of sanitizable materials. Fresh water flow-through system.</td>
<td>Sanitizable objects to provide hiding places. PVC tubing.</td>
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</table>

**References:**
1. The University of California San Diego IACUC policies and procedures
2. The University of California Irvine IACUC policies and procedures
3. University of Notre Dame IACUC policies and procedures
4. Marquette University Program Description an IACUC protocol form
5. University of Kentucky IACUC policies and procedures