The purpose of environmental enrichment is to provide animals the opportunity to express basic behavior needs, promote species-typical, non-injurious behavior and promote physical and mental health thus enhancing animal welfare. The environmental enrichment provided should be biologically relevant (e.g., hiding, socializing, searching) so that it does not lose its enriching value over time. For social species such as mice and rats, social housing should be the default housing arrangement when possible. Specific areas of enrichment that should be addressed include social, structural, sensory, food, and manipulanda.

Exceptions to Social Housing/Enrichment Policy Requiring PACUC Protocol Approval:

Instances will arise when social grouping or enrichment items may be inappropriate for the scientific goals of the study. If an investigator believes that social grouping or providing cage enrichment would have a negative impact on the study or be detrimental to their animals, an exception to the policy for such social housing or addition of enrichment items may be granted by the PACUC at the time of protocol review. For AAALAC’s position statement on Social Grouping, see the last page of this document.

Food enrichment will be discussed with investigators to ensure that it is appropriate for the study.

Exceptions to Social Housing Not Requiring PACUC Protocol Approval:

Social animals may need to be singly housed for a variety of reasons. The following include general categories of exceptions to social housing not requiring PACUC protocol approval. Examples of such situations include:

- Separation of aggressive or incompatible conspecifics—for example: male rabbits. However, females that demonstrate to be aggressive or socially incompatible will be housed individually.
- Individual housing due to attrition of cage/pen mates or uneven number of animals
- Animals used for PACUC approved rodent breeding and is either a breeder male between mating, a pregnant female that is near delivery, or a juvenile that has just been weaned and is the sole male or female in the litter.
- Individual housing in preparation for pending parturition
- Quarantine prior to entering or reentering a facility
- Animals housed singly for short term recovery post-operatively; single housing must be for the minimum amount of time post-operatively necessary for recovery and/or healing as determined by the PI in consultation with LAP veterinarians
- Individual housing when an animal is considered a danger to other animals, to itself or personnel

For farm animal / agricultural species housed in an agricultural setting, the Guide for the Care and Use of Agricultural Animals in Research and Teaching, Chapter 4, Environmental Enrichment, should be followed.

Clinical reasons: LAP veterinary staff may require individual housing of animals when it is for medical concerns. In such cases, PACUC approval is not required. The responsible veterinarian will record the period of single housing and the

Last Approved 08/21/2019
frequency of re-evaluation in the animal’s medical record, will monitor the animal as noted and re-house the animal when the clinical concern is resolved. These cases will be reported to the PACUC at the discretion of the Attending Veterinarian. If an animal falls under one of these exceptions, a sticker or a tag will be placed on the cage card indicating the corresponding exception.

Social Group Housing & Cage Enrichment

Mice: Mice should be group-housed in breeding or compatible unisex groups on contact bedding with nesting material. Unfamiliar males or animals separated due to fighting should be housed singly on contact bedding with nesting material. It is not required that mice housed on Tek-Fresh bedding have nesting material provided. A portion of the nesting material will be transferred to the clean cage with the animals at time of cage change, with additional nesting material provided as necessary. Examples of nesting material: nestlets; crinkle paper, tissues, paper towel. A total of 8g of nesting material must be provided. A hut is recommended for strains or disease models causing poor nesting behavior. Sunflower seeds or manazita wood chews may be given for mice that grind their food, study permitting. The provision of food treats by lab members is encouraged if the study permits (examples include cheerios, raisins, sunflower seeds, Bioserv treats).

Rats: Rats should be socially housed on contact bedding. For rats, a PVC pipe section of appropriate diameter or other equivalent shelter or retreat equivalent must be provided. A chewing device should also be provided (manazita wood, nylabone). The provision of food treats by lab members is encouraged if the study permits (examples include cheerios, raisins, sunflower seeds, Bioserv treats). A total of 16g of nesting material should be provided (crinkle paper, nestlets) for breeding dams. For wire housing, see the PACUC Policy on Wire Bottom Caging for Rodents. When housed on wire, enrichment should be provided. It is recommended to provide a rat retreat (for large cages) and a small nylabone chewing device if it would not interfere with the research being conducted. For single housed rats, it is recommended to provide socialization by the provision of rat tickling. This is ideally performed for 3 days, then on a weekly basis by lab staff. Rats should be acclimatization prior to study use by either rat tickling or gentle handling techniques.

Guinea Pigs: Guinea pigs should be kept in social groups and provided shelter space sufficient to contain all of the pen inhabitants simultaneously. Soft, classical-type music or nature sounds may be played during normal work hours. Food enrichment of fresh produce and foraging enrichment maybe offered. This may include paper bags or boxes containing treats, hay balls, and other options to promote quality use of the animals’ time.

Rabbits: Animals >4 months of age should be housed singly with the ability for visual, auditory and olfactory association with conspecifics. Rabbits should be a provided a shelter, ideally in which they can perch on top of as well. Rabbits housed singly must be provided a toy or other manipulanda on the outside and on the inside of the cage on a regular basis to allow for exploratory behavior, to be rotated at least at each cage change. Soft, classical-type music or nature sounds may be played during normal work hours. Food enrichment of fresh produce and foraging enrichment may be offered. This may include paper bags or boxes containing treats, hay balls, and other options to promote quality use of the animals’ time. Other enrichment may include weekly brushing (if temperament allows) and weekly floor pen exercise. Brushing should be included as part of the acclimation process.

Chinchillas: Animals housed singly should have the ability for visual, auditory and olfactory association with conspecifics. Chinchillas must be provided a retreat structure and toy or other manipulanda on the inside of the cage on a regular basis to allow for exploratory behavior. A wood block or other option for chewing should also be provided. Dust baths should also be provided at least weekly. Food enrichment of fresh produce and foraging enrichment may be offered. This may include paper bags or boxes containing treats, hay balls, and other options to promote quality use of the animals’ time.

Dogs: Canines for research use may be housed in compatible pairs or small groups. Dogs housed individually must be within sight of other dogs. Each dog should have access to at least one toy when in their home enclosure. These toys

Last Approved 08/21/2019
should be rotated to maintain interest. If dogs cannot be compatibly housed continuously, intermittent social activity of 30 minutes per day, 5 days per week is allowable, e.g., during pen sanitation or walking. Dogs should be given human interaction including petting, soothing speech, playing, grooming, and positive reinforcement training. A bed should be provided at all times unless the animal is destructive. Soft, classical-type music or nature sounds may be played during normal work hours. Additional food enrichment may be offered. Options for providing normal feed in a creative manner should be considered.

**Cats:** Behaviorally compatible cats should be socially housed. Group enclosures must have sufficient resting places off the floor to accommodate every cat. Scratching posts and visual barriers should be considered for group housed cats. Multiple litter boxes, feed and water bowls should be distributed around the enclosure with at least one station for every two to three cats. If a cat is to be housed singly because of social incompatibility or is post-operative, it should be given a hiding place and opportunities for increased human interaction. Cats housed singly for scientific purposes should be within sight and sound of other cats and given opportunities for increased human interaction. All cats should be provided toys within the cage at all times, and an opportunity for interactive play at least once weekly.

**Sheep:** Sheep should be socially housed in compatible pairs or small groups, unless exempted for experimental reasons by the PACUC, or for health or behavioral reasons by the attending veterinarian. If sheep must be individually housed, position them in such a way that they can see at least one conspecific, because visual isolation is stressful for sheep. Stressful research manipulations (e.g., venipuncture, drug application) should be accomplished within the presence of a familiar conspecific. Where there is likelihood of a single sheep remaining on census at a single site, experimental plans should account for the timely use of the remaining animal. Isolated sheep must be provided a mirror and additional positive human interaction. Sheep should be provided a diet high in roughage, to allow species typical feeding and rumination, and to reduce the likelihood of stereotyped behaviors. Manipulanda such as stall balls or balls with grain inside may be provided at regular intervals.

**Swine:** Behaviorally compatible pigs should 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 could include plastic balls loose on the cage floor. Swine should be provided manipulanda suspended from the pen side, such as hanging ropes, chains, tires or rubber tubes, for play and exploration. Food enrichment of fresh produce and foraging enrichment may be offered. Isolated pigs must be provided a mirror, additional positive human interaction, and music during normal work hours.

**Songbirds:** Songbirds should be housed in socially compatible groups with perches, feeders, watering devices, and cuttlebone as appropriate for the species.

**Frogs:** African clawed frogs should 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. Refuges or retreats should be provided in the form of pipes, flower pots, or submerged plastic boxes. For terrestrial frogs, shelters should be provided.

**Pigeons:** Individually caged birds should have ability for visual, auditory and olfactory contact to allow for some social interaction with conspecifics. Behavioral training and associated staff interaction is encouraged.

**Other Enrichment Devices:** The following is a list of other devices that have been successfully used on various species.

**Mice:** Chew sticks/blocks, paper rolls, paper shacks, PVC tubes, Nylabones®, corn husks, plastic pipette boxes, wheels, and critter cubes.

**Rats:** Paper rolls, Nylabones®, PVC tubes, plastic huts.

**Guinea Pigs:** Paper rolls, corn husks, PVC tubes, cardboard boxes, Ferret Balls, bedding bags, Jingle Balls®, “houses” made of old cages.
**Rabbits:** Retreats/hiding shelters, baby rattles/keys, corn husks, Bunny Blocks®, Jingle Ball®

**Frogs:** Ramps, perches, PVC tubes, “J” feeders, floating leaves (*made from trash bags*).

**Fish:** PVC tubes, floating leaves.

**Chickens:** Perches, red marbles in food, red marbles in water, mirrors, plastic chain links, dust baths.

**Chicks:** Astro™ turf covered with feed.

**Birds:** Perches

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**AAALAC Position Statement on Social Housing**

The *Guide* states that single housing of social species should be the exception. Social housing will be considered by AAALAC International 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 (or comparable oversight body). When necessary, single housing of social animals should be limited to the minimum period necessary and, where possible, visual, auditory, olfactory and, depending on the species, protected tactile contact with compatible conspecifics should be provided. In the absence of other animals, additional enrichment should be offered, such as safe and positive interaction with the animal care staff, as appropriate to the species of concern; periodic release into larger enclosures; supplemental enrichment items; and/or the addition of a companion animal in the room or housing area. The institution’s policy and exceptions for single housing should be reviewed on a regular basis and approved by the IACUC (or comparable oversight body) and/or veterinarian.

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**References**

A. Guide for the Care and use of Laboratory Animals-8th edition, NRC

B. [http://www.aaalac.org/accreditation/positionstatements.cfm#social](http://www.aaalac.org/accreditation/positionstatements.cfm#social)

C. Guide for the Care and Use of Agricultural Animals in Research and Teaching; 3rd edition, Federation of Animal Science Societies, Savoy, IL. 2010

D. Cornell University, IACUC Policy # 550: Exemptions to Social Housing of Animals

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