

Guidelines to Promote the Psychological Well-Being of Non-Human Primates

The University of Texas at Austin Institutional Animal Care and Use Committee

These guidelines have been written to assist faculty, staff, and students in performing vertebrate animal procedures in a humane manner and complying with pertinent regulatory requirements. Under some circumstances deviations from these procedures may be indicated but such variances must be approved in advance by the IACUC.

This document provides information to be used when planning and performing procedures utilizing the use of non-human primates to be used for research, teaching, or other purposes at The University of Texas at Austin. It is organized into four sections:

Section A – Background

Section B – Implementation: General Objectives

Section C – Implementation: Species Specific

Section D – References and Acknowledgements

Section A – Background

The existing USDA regulations on the care and use of non-human primates state that “...research facilities must develop, document, and follow an appropriate plan for environmental enhancement to promote psychological well-being of non- human primates.” In addition, the plan must:

- “Be in accordance with the currently accepted professional standards as cited in appropriate professional journals or reference guides, as directed by the attending veterinarian”;
- Be available upon request to the Animal and Plant Health Inspection Service (APHIS);
- Be available to appropriate Federal agencies if the institution receives federal funds.

At a minimum, the plan must address each of the following: 1) social grouping; 2) environmental enrichment; 3) special considerations; 4) restraint devices; and 5) exemptions.

1. Social Groupings

The regulations require that the enrichment plan must include specific provisions to address the social needs of non-human primates of species known to exist in social groups in nature. Provisions must be in accordance with currently accepted professional standards, as cited in professional journals and reference guides. Compatibility of non-human primates must be determined in accordance with generally accepted professional practices and actual observations, as directed by the Attending Veterinarian, to ensure that the animals are in fact compatible.

Individually housed non-human primates must be able to hear and see primates of their own or compatible species unless the Attending Veterinarian determines that it would endanger their health, safety, and well-being.

Non-human primates exempt from social grouping requirements in the regulations include the following:

- Primates exhibiting vicious or abusive behavior.
- Primates that are debilitated as a result of age or other conditions (e.g., arthritis).
- Primates that have or are suspected to have contagious diseases.
- Primates that may be incompatible when housed together.
- Primates on research protocols in which exemptions from social grouping have been scientifically justified and approved by the Institutional Animal Care and Use Committee (IACUC).

2. Environmental Enrichment

The regulations require that the physical environment in the primary enclosure must be enriched by providing means of expressing noninjurious species-typical activities. Species should be considered when selecting type of methods of enrichment. Examples of environmental enrichment include: perches, swings, mirrors, objects for food foraging, task oriented feeding methods, interaction with caretaker or other familiar individuals.

3. Special Considerations

The regulations require that special environment enrichment considerations should be given to the following groups of non-human primates:

- a) Infants and young juveniles.
- b) Primates showing signs of being in psychological distress through behavior or appearance.
- c) Primates used in research for which IACUC approved protocols require restricted activity.
- d) Individually housed primates that cannot see or hear other non-human primates of their own species.
- e) Great apes weighing over 110 lbs.

The ARC staff and Attending Veterinarian will monitor the colonies to identify animals in category “b” during routine health observation rounds. As monkeys are imported or room transfers occur, the ARC managers will watch for situations triggering the situations listed in “d”. It is unlikely that categories “a, c, or e” will occur, but these triggers will be monitored as part of the IACUC’s protocol review as new or modified studies are proposed.

4. Restraint Devices

The regulations state that non-human primates must not be maintained in restraint devices unless required: 1) for health reasons as determined by the Attending Veterinarian; or 2) by an approved protocol. Primates in restraint devices must be kept for the shortest duration possible. For long-term restraint (more than 12 hours), the animal must receive the opportunity of one continuous hour of unrestrained activity during the time period of the restraint.

5. Exemptions

The Attending Veterinarian and the IACUC may exempt an individual non-human primate from the environmental enrichment plan because of health or condition, or in consideration of its well-being, or for scientific reasons. In the case of scientific reasons, exemption to the plan will be documented in the research protocol. Full documentation must be provided in the animal’s personal record by the Attending Veterinarian for each non-human primate exempt due to health or condition or in consideration of its well-being. Unless the basis for exemption is permanent, the Attending Veterinarian or their designee must review the exemption every 30 days.

Section B – Implementation: General Objectives

The goal is to provide an optimum environment for its research animals. The University (acting through the IACUC and Attending Veterinarian) will continue to periodically modify this plan in response to the evolving best practices in the field based on what has been scientifically demonstrated to benefit the animals.

This written plan has been prepared to document our program for meeting the requirements contained in 9 CFR Part 3, Section 3.8.1 which was published in the Federal Register on February 15, 1991.

Each use of non-human primates must be reviewed and approved by the IACUC. The IACUC will assure that each use of non-human primates complies with the provisions of this plan as part of protocol review and the semi-annual inspection process. Investigators proposing to utilize non-human primates in the conduct of their research are provided with a copy of the “Plan to Promote the Psychological Well-Being of Non-human Primates” and must agree to abide by the plan and provide scientific justification in their research protocols for any special considerations, use of restraint devices, or exemptions from the program.

Upon arrival at UT-Austin, non-human primates are subject to health status verification screening. Depending upon the source, primates may be isolated and quarantined for a 30-60 day period. The Attending Veterinarian has determined that it is necessary to singly house non-human primates during quarantine in order to perform daily individual health assessments, observation, and treatments.

For safety related reasons, non-human primates that have been surgically implanted for experimental purposes with exposed instrumentation (e.g., catheters) would be considered poor candidates for social housing and should be individually housed. Exceptions to this policy should be reviewed and approved by the Attending Veterinarian prior to pairing attempts.

Non-human primates are housed such that they will have olfactory, visual, and auditory contact with other non-human primates. The ARC and the primate research labs maintain an inventory of environment enhancement devices and provides for the training of animal care staff that have daily contact with non-human primates. Please refer to the Section C, below for further details with regard to the implementation of UT’s plan.

Non-human primates housed at UT are not to be maintained in restraint devices unless scientifically justified in an approved research protocol that specifies, at a minimum, type of restraint device utilized, need for use of restraint device, and average and maximum duration of stay in the restraint device.

The Attending Veterinarian and/or the IACUC may exempt an individual non-human primate from the enrichment plan because of health or condition, or in consideration of its well-being, or for scientific reasons. In the case of scientific reasons, exemption to the plan will be documented in the research protocol. Full documentation must be provided in the animal's personal record by the attending veterinarian or their designee for each non-human primate exempt due to health or condition or in consideration of its well-being. Unless the basis for exemption is permanent, the Attending Veterinarian or their designee must review the exemption every 30 days.

Section C – Implementation: Species Specific

Old World Monkeys – Macaques

1. **Housing.** Social interaction is an important factor influencing the psychological well-being of non-human primates. However, forming stable pairs or groups of animals must be done carefully to avoid injurious aggression. Various published strategies have been used to identify compatible pairs or groups of monkeys.

The PI is encouraged to review these publications with the goal of increasing social interaction within the group. Attempts should be made to identify and establish compatible pairs or groups where such efforts appear to have a chance for success. The IACUC will review the social housing status of subcolonies during semi-annual inspections of primate areas to assure that good faith efforts have been made. Even if full pairing is not possible, social-type caging can be used to allow social contact across grooming grids, etc. so investigators should specify this type of caging when new equipment is obtained.

PLEASE NOTE: The probability of being able to identify and establish a compatible, long-lasting pair bond is highest when the subcolony in question is composed of a large primate group of various ages and sexes that are being kept on long-term studies. Most subcolonies at UT-Austin are either relatively small or are composed of predominately mature male animals. It is unlikely that a high percentage of macaques will ever be pair-housed on campus. However, the University has been able to establish a relationship with the nearby M.D. Anderson primate center, and our investigators have been successful in obtaining known-compatible pairs from those colonies. This is one of the reasons that the Bastrop primate center should be the first choice source for those obtaining macaques. Alternatives would include comparable centers that can provide pre-socialized monkeys whenever possible.

2. **Caging.** The ARC will provide a minimum of one durable manipulatable cage enhancement device per cage. These are sanitized and replaced during routine and non-routine cage exchange, which normally occurs a minimum of once every two weeks. Examples of cage enhancement devices may include:

- Mirrors
- Knobby Dummies®
- Nylaball Wolf®
- Gumaball Wolf®
- Space Ball®
- Other toys as approved by ARC veterinarians.

The PI will provide at least one additional durable or novel cage enhancement device. Novel cage enhancement devices include products that are designed to be used once (e.g. cardboard/paper products) or for short periods of time (< 2 weeks). The same kind or style of cage enhancement device may be introduced at alternating time points (e.g. every month) and still be considered novel. In the latter case the devices must be sanitized between uses.

The PI will provide one perch or perch-equivalent per cage.

3. **Room environment:** All animals are housed such that non-human primates will have olfactory, visual, and auditory contact with other monkeys of the same species. If only one animal is received as part of an import shipment, and if quarantine isolation is required, then additional cage enhancement devices shall be placed in the animal's cage.

The ARC will coordinate audio or visual enrichment within each room in the form of audio or video media at least once a week, with the specific schedule arranged to avoid interference with research activities.

4. **Feed.** Animals are fed a standard nutritionally balanced non-human primate diet, and are offered a variety of food treats including fruits (dried or fresh), vegetables, and grains to promote their psychological well-being. These supplemental foods are provided a minimum of two times per week by the ARC. If the PI needs to control when food supplement are provided because of experimental reasons, then his or her laboratory shall provide these supplemental foods with the same frequency (2x per week) unless an exemption has been approved by the IACUC. Additionally, the PI is expected to provide food treats delivered using devices that are manipulated to expose food (e.g. puzzle feeders or foraging devices) to

each animal at least once per week. During quarantine isolation, novel food presentation will be provided by the ARC, but at every other week intervals.

5. **Human contact.** Animals receive routine, daily contact with trained animal care personnel from both the research group and the ARC. Training for animal care personnel includes general biology and behavior of macaques, intent of regulations with regard to the "psychological well-being" of non-human primates, and implementation of the institutional environmental enrichment program.
6. **Documentation.** The provision of environmental enrichment will be captured as part of the room logs (ARC) or study records (research labs) so that routine documentation of these activities takes place.

Prosimians – Mouse Lemurs

These very small animals are technically classified as primates, although they are among those farthest removed from humans. They are considered less inquisitive than other primates, and are poor candidates for manipulatable toys as enrichment. Mouse lemurs do not typically socialize in large family groups, but instead are often managed in groups of 2- 3 animals, with additional related juveniles being included in some cases. The females are dominant and may bully the males outside of the receptive breeding season. Scent marking is important in this species, as is the provision of climbing surfaces and nest boxes, which help them take advantage of the vertical and horizontal space provided. The following components are to be provided to support this species environmental and social needs:

- Visual and olfactory contact with other mouse lemurs is always provided, unless an animal has been relocated and isolated temporarily for medical care supervised by a veterinarian.
- Housing in socially compatible groups should be attempted, and is often successful in the case of related females and juveniles. Males can carefully be introduced into female groups during the breeding season, but will generally need to be kept separated at other times.
- Housing consists of either a large, "gang"-type room where a single compatible social group is maintained, or a more conventional room where multiple cages of mouse lemurs are kept with a single animal or small social group in each. In both areas there are climbing substrates installed as a substitute for the vines and branches the animals would utilize in nature. Nest boxes are also provided. Sanitation is performed to keep the area free of grossly evident soiling and to periodically disinfect equipment and surfaces, but due to the importance of scent marking behavior it is recognized that it is in the best interest of the animals to avoid over-cleaning, which can act as a stressor.
- The daily food allotment for each animal is very small compared to larger primates, and careful dietary adjustment and monitoring is required to maintain health and to support the annual physiological cycles needed to support reproduction in this species. For this reason food treats are not a significant component of the enrichment plan. However, it should be noted that the standard diet provided is not a homogenous "biscuit" but consists of a variety of food items individually prepared in small batches. In addition, animal care staff may periodically present a small treat (such as a grape) to the animals in order to provide some positive reinforcement in the context of human interactions and to identify animals that may show signs of anorexia or distress indicative of illness.

New World Monkeys – Marmosets

1. **Special Characteristics.** Marmosets are small, New World monkeys originating from the forests of South America. They live an arboreal lifestyle and rely on well-developed visual, olfactory and auditory

communication systems. Scent marking is important to these animals, as is the availability of climbing surfaces and nest boxes, which help them take advantage of the vertical and horizontal space provided.

Common marmosets (the species currently housed at UT) have a system of cooperative breeding and infant care whereby the fathers and older siblings participate in infant care and feeding.

2. **Housing.** Non-related marmosets can be highly territorial and aggressive toward unfamiliar marmosets of the same sex. For this reason, individual housing is a common necessity in captive settings involving unrelated individuals, but this can still allow social interactions. A group of singly housed marmosets kept together in one room can establish auditory and olfactory communication amongst themselves. This is generally considered a positive, but consideration should be given to the spacing and grouping of individual cages (and the social status and temperament of the animals in them) to avoid stressful situations.

If the research colony involves breeding, then housing in socially compatible groups should be attempted where possible. This would be expected to be successful in the case of a mating pair and their offspring of various ages. Experience elsewhere has shown that same-sex siblings can sometimes be successfully moved from the family cage into a separate group-housed enclosure, but these pairings must be monitored for signs of incompatibility and should be separated if aggression (or extreme submission) negatively impacts the welfare of either animal.

One report of successful pairing of non-related same sex individuals (Majolo et al., 2003) relied upon an age disparity whereby one of the animals was adolescent, an opportunity that unfortunately may rarely be available in small research colonies.

3. **Caging.** The following components are to be provided to support the environmental and social needs of this species:
 - Visual, auditory and olfactory contact with other marmosets must always be provided, unless an animal has been relocated and isolated temporarily for medical care supervised by a veterinarian.
 - Natural branches or untreated wooden perches must be provided, along with nest boxes placed high in the cage. The floor and some portion of the walls of the boxes should be opaque (e.g. stainless steel or darkly- colored polycarbonate) so that the animals can remove themselves from view and exert control over their visual interactions with the other marmosets.
 - Sanitation is performed to keep the area free of grossly evident soiling and to periodically disinfect equipment and surfaces, but due to the importance of scent marking behavior it is recognized that it is in the best interest of the animals to avoid over-cleaning, which can act as a stressor.
4. **Feed.** The marmosets receive a specialized diet (Mazuri Callitrichid Diet) that is mixed and refrigerated. The marmosets receive a measured portion of their specialized diet daily. In addition, fresh fruit is given two days a week by the animal care staff.
5. **Foraging.** A foraging opportunity must be provide by the research laboratory as least once a week. As an example, a small amount of dried fruit or nuts can be placed in a puzzle ball with paper shavings to simulate foraging behavior. Other enrichment devices that can be considered for this periodic, novel enrichment include artificial gum trees (for foraging), cardboard boxes or gallon milk jugs with large holes cut in them (for exploring) or paper towel and toilet paper (for manipulation). In addition, animal care staff may periodically present a small treat (such as dried cranberry or marshmallow) to the animals to

provide some positive reinforcement in the context of human interactions and to identify animals that may show signs of anorexia or distress indicative of illness.

6. **Documentation.** The provision of environmental enrichment will be captured as part of the room logs and/or study records by ARC and research personnel so that routine documentation of these activities takes place.

Section D – References and Acknowledgements

The Psychological Well-Being of Nonhuman Primates (1998) ILAR. Chapter 5 - Prosimians Enrichment for Nonhuman Primates: Marmosets & Tamarins 2005, NIH Pub No. 05-5747

Majolo B, Buchanan-Smith HM, Morris K. 2003. Factors affecting the successful pairing of unfamiliar common marmoset (*Callithrix jacchus*) females: the preliminary results. *Anim. Welf.* 12:327-337

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