

Association of Primate Veterinarians' Socialization Guidelines for Nonhuman Primates in Biomedical Research

Background

In the U.S., the Animal Welfare Regulations require facilities housing nonhuman primates to implement plans to address the social needs of species known to exist in social groups in nature (U.S. AWR, 2017). Despite this, some research facilities continue to house nonhuman primates in single cages (Baker, 2016). Reasons given for single housing of nonhuman primates include protocol concerns, incompatibility, lack of availability of appropriate housing, and insufficient staff to conduct socialization (Baker, 2016). While lack of suitable housing equipment, and lack of sufficient staff may be organizational hinderances to socially housing nonhuman primates there should be plans in place to facilitate social housing as soon as possible. A written plan should be developed and revisited and updated annually, and progress or improvements should be documented.

The benefits of social housing to nonhuman primates are well established (DiVincenti and Wyatt, 2011; Coleman, 2012; Capitano et al, 2017)). Socially housed nonhuman primates are able to cope more effectively (Gilbert and Baker, 2011; Gust et al., 1994), and they display more species-typical behaviors (Baker et al., 2008; Crockett et al., 1994; Doyle et al., 2008) and less abnormal behaviors, such as hair-plucking and self biting (Bayne et al., 1992; Novak and Suomi, 1991) than singly housed primates. The presence of chronic psychological distress adversely impacts animal welfare and may result in confounding research results as well as increasing the numbers of animals required for biomedical research (Seelig, 2007). Behavioral management programs should include continued monitoring of social pairs and groups for changes in dynamics that may be indicative of group instability or aggression requiring separation of animals.

The EU Directive (Directive 2010/63/EU) and the 8th edition of The Guide for the Care and Use of Laboratory Animals (NRC, 2011) both emphasize the need to provide social housing for nonhuman primates as the default housing method. Scientists, laboratory animal veterinarians, animal caregivers, and IACUCs/ ethical review committees must work together to fully implement regulatory expectations to provide the most appropriate environment for captive nonhuman primates.

Purpose

The Association of Primate Veterinarians supports the responsible use of nonhuman primates in biomedical research. All nonhuman primates should be housed in a manner that provides for expression of species-typical behaviors to promote animal well-being. Thus, it is essential to have an understanding of the behavioral biology for each species housed in a facility. Social housing is widely regarded as the best form of enrichment for laboratory nonhuman primates (Hannibal et al, 2017). Introducing singly housed macaques into isosexual pairs has been shown to decrease expression of abnormal and anxiety-related behaviors and to permit expression of a broader range of social interaction (Baker et al, 2012). Institutions should design and implement a plan to provide for the social needs of nonhuman primates in a way that promotes their psychological well-being while consistent with the objectives of the research. This is best achieved by supporting an active, engaged behavioral management program to help direct socialization, enrichment, and training of captive nonhuman primates. These guidelines are

intended to provide basic information for veterinarians, animal caregivers, behavior and enrichment specialists, scientists, and Institutional Animal Care and Use Committee (IACUC) or ethical review committee members to consider when designing and implementing this program.

Guidelines

1. Captive nonhuman primate species known to exist in social groups in nature should be socially housed in compatible pairs or species-appropriate groups in research facilities unless there is a veterinary-related welfare concern or suitable scientific justification that has been reviewed and approved by the facility's IACUC resulting in a need for single housing. Animals in protected contact housing situations are considered to be singly housed (NRC, 2011).
 - a. Scientific justification for single housing must be included in the research protocol, and reviewed and approved by the IACUC/ethical review committee.
 - i. Nonhuman primates used in studies that require surgical implants, food or water scheduling or restriction, use of tethers or jackets, and/or drug dosing may be safely socially housed without compromising the validity of these studies (Roberts and Platt, 2005). Similarly, nonhuman primates on infectious disease studies with similar health status should not be precluded from social housing opportunities.
 - ii. The IACUC/ethical review committee should review scientific justification for single housing to ensure that nonhuman primates are singly housed for the minimum period necessary for completion of the study objectives and all other alternatives for social housing have been thoroughly explored.
 - b. Veterinary-related exemptions to social housing requirements must be reviewed and approved by the Attending Veterinarian.
 - i. In the U.S., unless the condition is permanent, the AV must review these exemptions every 30 days (U.S. AWR, 2017) and document continued approval of the social housing exemption.
 - ii. Veterinary exemptions may be based on demonstrated incompatibility of an individual animal with multiple potential partners. The AV should use discretion when determining whether an individual is incompatible. Because individual animals may show specific cagemate preferences, multiple partners should be considered before an animal is permanently singly housed.
 - iii. Heterosexual pairing may be considered when the animals are compatible and contraceptive management techniques are employed.
 - iv. An animal's social housing history, including rearing history (where available), partners, and failed attempts,

should be documented in the animal's permanent record.

- v. Temporary veterinary exemption from social housing may be based upon an animal's medical condition or prescribed treatment plan.
- c. When animals must be singly housed, they may benefit from more space than is required for pair or group housed primates, as well as the provision of additional enrichment, such as increased human interaction or periodic use of activity cages (NRC, 2011). The use of protected contact between compatible animals (for example, grooming bars) in these situations may be a means of improving their environment.
2. Group composition is critical and numerous factors such as age, behavioral repertoire, sex, natural social organization, breeding requirements and health status should be taken into consideration when forming social groups (NRC, 2011; Truelove et al, 2017). An appropriate familiarization period that affords animals an opportunity to establish a relationship while minimizing agonistic encounters is essential to minimize injury.
- a. The familiarization period should allow for animals to have visual, auditory, and olfactory contact with one another. This familiarization period may not be needed for all primate species nor for very young animals. Protected physical contact strategies, such as using a grid between connected animal cages, may also be employed. If a single animal is purchased and quarantined, one available strategy for social housing includes assigning an established animal to go through quarantine with the newly arrived animal to be either socially housed or at minimum, provide conspecific contact and companionship.
- b. Behavioral markers of appropriate dominant-subordinate relationships may be used to help determine social compatibility. For macaque species, these may include: rump presenting, withdrawing, and fear grins in the subordinate animal and assertive postures in the dominant animal. Signs of overt fearfulness in one partner, such as screaming and cowering, may indicate incompatibility.
- c. Initial incompatibility and injuries are not always indicators of outright failure for eventual pairing, but rather demonstrate the importance of having a flexible socialization protocol in which animals are given multiple opportunities to find compatible social partners. A large number of ultimately compatible rhesus macaque pairs exhibit aggression after initial pairing (Reinhardt, 1998); although successful introductions are generally associated with a low rate of wounding (Truelove et al, 2017).
- d. Ideally, animals undergoing pair-housing introductions should be given additional space to reduce or eliminate territorial disputes and increase escape opportunities in the event of a confrontation.

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