

IACUC Policy on the Housing of Aquatic Species

Purpose

Department of Laboratory Animal Resources (DLAR) provides housing and husbandry for animals used in research and teaching at the University. Some species, such as aquatic animals, may need to be housed outside of the DLAR facility to best accommodate the needs of the research and to provide optimal care for the animals. Maintaining fish outside of DLAR requires Institutional Animal Care and Use Committee (IACUC) approval PRIOR to housing fish in this manner. The purpose of this policy is to provide guidance on what criteria is required to house fish at the University. This policy is based on the recommendations and requirements of the 2011 Guide for the Care and Use of Laboratory Animals.

USC Aquatic Animal Housing Guidelines

1. Water Quality
 - a. Water quality parameters and life support systems for aquatic animals will vary with the species, life stage, total biomass supported, and the animals' intended use.
 - b. Characteristics that may affect the appropriateness of water quality include temperature, pH, alkalinity, nitrogen waste products, phosphorus, chlorine/bromine, oxidation-reduction potential, conductivity/salinity, hardness, dissolved oxygen, total gas pressure, ion and metal content, and the established microbial ecology of the tank.
 - c. Appropriate water quality characteristics should be recorded daily. Records should be available at the housing site for IACUC inspection at all times.
2. Life Support System
 - a. Life support system refers to the physical structure used to contain the water and the animals, as well as the ancillary equipment used to move and/or treat the water.
 - b. The type of life support system should be appropriate for the intended use. Its selection and/or design should be based on the natural habitat of the species, age/size of the species, number of animals maintained, availability and characteristics of the water required, and the type of research.
3. Temperature, Humidity, and Ventilation
 - a. Most aquatic animals are poikilothermic and depend on the temperature of their environment to sustain physiologic processes.
 - b. Temperature should be controlled at the appropriate level and monitored regularly. If the temperature falls outside the appropriate range, a system should be in place such that the person responsible for the animals and/or DLAR is notified immediately.
 - c. The volume of water contained in a room can affect room temperature, temperature stability, and relative humidity. Air handling systems must be adequate to compensate for these thermal and moisture loads.
4. Illumination
 - a. Aquatic species are often sensitive to changes in photoperiod, light intensity, and wavelength.
 - b. Lighting should be appropriate to support normal physiological function.
5. Noise and Vibration
 - a. Aquatic species may be sensitive to noise and vibration, which is transmitted through the water
 - b. Effects of noise and vibration may be present, but subclinical.
 - c. If noise and vibration are suspected as the cause of adverse outcomes, the system must be placed on isolation pads (or otherwise modified) or moved to another location.
6. Housing must:
 - a. Allow for the normal physiological and behavioral needs of the animals, including excretory function, control and maintenance of body temperature, normal movement and postural adjustments, and, where applicable,

reproduction. In some poikilothermic reptiles and amphibians, microenvironmental temperature gradients may be needed for certain physiologic functions, such as feeding and digestion.

- b. Allow conspecific social interactions (i.e., schooling in fish species).
 - c. Provide a balanced, stable environment that supports the animals' needs.
 - d. Provide the appropriate water quality and characteristics, and permit monitoring, filling, refilling and changing of water.
 - e. Allow access to adequate food and allow removal of food waste.
 - f. Restrict escape or accidental entrapment of animals or their appendages.
 - g. Be free of sharp edges and/or projections that could cause injury.
 - h. Allow for observation of the animals with minimal disturbance.
 - i. Be constructed of nontoxic materials that do not leach toxicants or chemicals into the aquatic environment.
 - j. No present electrical hazards.
7. Space
- a. Space recommendations and housing density vary extensively with the species, age, and size of the animals, the life support system, and the type of research.
 - b. The needs of each situation must be evaluated by the IACUC in consultation with the Principle Investigator to determine appropriate housing space. Advice from outside experts may be indicated.
8. Husbandry
- a. Food should be stored in a type-appropriate manner to preserve nutritional content, minimize contamination, and prevent entry of pests.
 - b. The animal room should be regularly cleaned and disinfected.
 - c. Animals must receive daily care from qualified personnel who have sufficient understanding of the housing system to identify malfunctions and, if they are unable to address a system failure of such magnitude that it requires resolution before the next workday, access to staff who can respond to the problem.

Implementation

1. Potential housing sites for aquatic species must be inspected and approved by the IACUC PRIOR to acquisition of animals. If the principle investigator obtains animals prior to IACUC approval, he/she may be required to transfer the animals to an appropriate location or euthanize them, if appropriate housing is not available.
2. Exceptions to this policy are considered to be exceptions to the Guide and require a written scientific justification in the Animal Use Protocol. The exception request must provide adequate scientific justification for not following the Guide and will be reported, as required, to accreditation and regulatory agencies.

IACUC Policy on Social Housing and Environmental Enrichment

Background

This policy outlines the types of standard housing used for laboratory animal species at IACUC 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.

The *Guide for the Care and Use of Laboratory Animals* states that:

"A good management program provides the environment, housing, and care that permit animals to grow, mature, reproduce, and maintain good health; provides for their well-being; and minimizes variations that can affect research results."

"Animals should be housed with the goal of maximizing species-specific behaviors and minimizing stress-induced behaviors."

"Depending on the animal species and use, the structural environment should include resting boards, shelves or perches, toys, foraging devices, nesting materials, tunnels, swings, or other objects that increase opportunities for the expression of species-typical postures and activities and enhance the animals' well-being."

"Consideration should be given to an animal's social needs. The social environment usually involves physical contact and communication among members of the same species (conspecifics), although it can include non-contact communication among individuals through visual, auditory, and olfactory signals."

"Social animals should be housed in stable pairs or groups of compatible individuals unless they must be housed alone for experimental reasons or because of social incompatibility."

"Appropriate social interactions among members of the same species (conspecifics) are essential to normal development and wellbeing."

The Animal Welfare Act (AWA) mandates "environmental enrichment" for nonhuman primates by specifying that there must be a "program for the psychological well-being of nonhuman primates". Exercise requirements for dogs are also specified in the AWA.

Definitions

Standard housing refers to the type(s) of housing approved by IACUC and DLAR for housing the species concerned.

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 the following:

- Allowing control over the environment, such as providing opportunities for:
 - nest-building
 - areas for animals to hide from threatening situations
 - exercise
- Novel items (e.g. food, toys, climbing structures).
- Group housing to allow interaction with conspecifics.

The type of environmental enrichment provided depends on the species of animal, type of housing, space available, research needs, husbandry practices, and other operational needs.