Institutional Animal Care and Use Committee

Policy Title: Exception to the **Guide**’s Recommended Standards for Cage Density

**Purpose:** This policy is based on guidelines given in the National Research Council’s Guide for the Care and Use of Laboratory Animals (Guide) and has been designed to ensure that mice and rats are housed in a social manner that promotes their health and well-being and avoids overcrowding. Cage overcrowding usually occurs in mouse breeding colonies when: litters are not weaned on time, excessive number of breeder animals are housed in a small cage, or weanling mice are not separated as they get older. Overcrowding can occur also with rats as they get older and bigger, thus growing beyond the set standards by the Guide.

Breeding cages exceeding the below listed limits are considered to be non-compliant/overcrowded cages. Preventive measures can be taken to avoid an overcrowded cage by weaning animals in a timely manner and by removing dams prior to giving birth. The capacity is also set to reduce the incidence of morbidity and mortality due to trampling by older animals in the cage. Because of the health concern, overcrowded cages are considered to be an animal welfare issue.

**Policy:** Exception to the **Guide**’s Recommended Standards for Cage Density Guidelines

Exceptions to this policy are considered to be exceptions to the Guide and require a written scientific justification in the protocol/ACUP. The exception request must provide adequate scientific justification for not following the Guide and will be reported, as required, to accreditation and regulatory agencies. Approved exceptions will be posted on the exterior of the animal room door.

**Mice**

Density recommendations in the Guide (see pp 56-58) are for a 75 square inch cage which would allow up to 5 adult mice, 2 adult mice with up to 7 offspring less than 10 grams body weight (weaning age) or 3 adult mice with up to 5 offspring less than 10 grams body weight.

However, the KUMC IACUC recommends the following:

1. Five adult (5) female mice or five (5) male mice allowed per shoe box cage.
2. One adult male and one adult female with or without a nursing litter (monogamous pair).
3. One adult male and maximum four (4) adult females without litters (harem cage).

**Rats**

Density recommendations will follow the Guide (see pp 56-58) with the following standing exemption:

1. In the Green Techniplast caging (138 sq inches floor space), a total weight of 1400 grams will be allowed. This will allow two large males up to 700 grams a piece to be housed together. The IACUC accepts the social nature of rats and importance of allowing social contact over decreased floor space. Historical evidence supports that animal health and welfare is not compromised based on the current twice a week change schedule for animals this size in the caging noted above. If larger animals are needed, it will be left to the judgment of the Attending Veterinarian or his/her designee to assess the welfare of the housing conditions and set the standard in those cases.
Notes:

1. Unless the PI is willing to weigh the mice weekly to ascertain that the actual weight is <25 g and document these data, mice are classified as adults at 6 weeks of age and older.
2. When mice are weaned, they are weaned to adult specifications (i.e. maximum of 5 per cage) to avoid needing to separate them and re-house them in 2-3 weeks.
3. Occasionally when females have small litters or do not lactate well it may be beneficial to house two lactating females together in one cage so they can raise their litters cooperatively. This must be pre-approved by IACUC.

Breeding Schemes: Two different breeding schemes are acceptable. In either case, the Designated Colony Manager (research staff or LAR staff) is responsible for carefully monitoring of pregnancies. The above individuals must be identified to the LAR.

A. Monogamous Pairs

Postpartum estrus occurs within 24 hours of parturition; thus if male is left in the cage, the female is likely to become pregnant again while lactating and nursing new the litter. One male and one female are housed together for mating. Multiple males in a cage with one female are not permissible. Nesting material is provided in the cage. The mice are not separated when the female becomes pregnant or delivers the pups. This model takes advantage of postpartum estrus and allows the female to become pregnant and nurse at the same time. Litters are born approximately 21 days apart. The 3-week old litter must be weaned prior to the birth of the new litter. This will prevent trampling of newborn pups by the weanling pups, mother rejection of either litter, and prevent the cage from being overcrowded.

B. Harem Mating

This method houses maximum four (4) females in a cage with one male. Multiple males in a cage with up to (4) females are not permissible with Harem Mating. During routine health/breeding checks, each noticeably pregnant female is removed and placed in her own individual cage. When the pregnant female is separated from the harem cage, she is given nesting material in her delivery cage to make a nest for her pups. The pregnant female will deliver her pups and nurses them for 21-28 days or until pups reach body weight of 10-12 grams, whichever comes first. Only one nursing female and litter is allowed per cage. After the pups are weaned, the female may be returned to a harem cage.

Responsibilities: The Designated Colony Manager has primary responsibility for checking for pregnancy and birth and for recording these events on the “breeding” cage card(s). When the litter is born, the Date of Birth (DOB) and projected weaning date is documented (breeding cage card). However, if LAR staff discovers the birth of litters when checking and changing cages, they will record the DOB on the breeding cage card.

After the pups are born, the cage is left undisturbed for at least three (3) days except for replenishing of food and water as needed. In case the bedding gets very dirty or wet and the cage must be changed sooner, the following procedure will be followed. The female is transferred first, and then the litter plus a small amount of the dirty bedding (so the smell in the clean cage will be familiar) is scooped up altogether with a gloved hand and transferred to the new cage. The same procedure is followed until the pups start moving around the entire cage.

In cases where LAR has identified a non-compliant cage, the overcrowding should be corrected by the research laboratory personnel within two business days of LAR notification. Office of
Animal Welfare tracks the incidences of such non-compliances and presents their findings for IACUC review and actions described in the Policy “Investigation of Non-compliant Situations”.

**Standing Exemptions to Social Housing of Rodents:** Rodents are considered social animals. All animals will be group or paired housed as the standard practice. Animals that maybe single housed are pregnant females awaiting parturition, aggressive/breeder males that cannot be housed together, and sentinel animals that maybe needed for confirmatory testing. Other single housing situations may occur at the direction of the veterinary staff due to medical reasons. All other situations related to single housing rodents will need scientific justification via the ACUP and approval by the IACUC.

**IACUC Approval:** June 25, 2013

**References:**

The Guide for the Care and Use of Laboratory Animals, National Research Council, National Academy Press, 8th ed, 2011


Hunt, C. and Hambly, C. Faecal corticosterone concentrations indicate that separately housed male mice are not more stressed than group housed males. Physiol Behav. 87:519-526, 3-30-2006.


Sharp, J., Azar, T., Lawson, D. Does cage size affect heart rate and blood pressure of male rats at rest or after procedures that induce stress-like responses. Contemp Top Lab Anim Sci 42: 8-12, 2003


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