University of Cincinnati
Animal Care and Use Program

Rodent Colony Management Guidelines

These guidelines are to assist Animal Care and Use personnel in basic care and breeding procedures for mice and rats.

Questions

1. Contact LAMS Husbandry for questions related to animal housing and weaning processes.
2. Contact LAMS Veterinary for questions related to animal health, poor breeders, or animals too small to wean.
3. Contact IACUC office for questions related to IACUC protocol, exceptions, do not disturb and extended weaning approvals, offspring reporting, or animal welfare concerns.

Definitions

1. **Dam** – female parent
2. **Sire** – male parent
3. **Dystocia** – abnormal or difficult birth
4. **Stork/birth card** – LAMS generated card to identify pregnancy and litters at cage level
5. **Weaning** – separating healthy adult animals (21 days of age) from parents, into gender-specific caging

Responsibilities

It is the responsibility of research staff to:

1. Set up mating: monogamous, trio, or harem; ensure compatibility, appropriate age, sex and strain.
2. Routinely monitor experimental and breeder animals.
3. Report animal health concerns to the LAMS veterinary staff.
4. Place stork card when female visibly pregnant, and document DOB when a litter is born.
5. Wean animals with proper cage set up (floor chow, water bottle, primed drinker valve, food in hopper).
6. Ensure Overcrowding does not occur (e.g., wean at appropriate age, separate visibly pregnant females for trio and harem breeding and do not disturb cages).
7. Ensure enrichment is available for all animals, 2 forms of enrichment for single housed animals.
8. Report offspring numbers.

It is the responsibility of LAMS staff to:

1. Receive incoming animals and set up cages.
2. Perform routine husbandry care and daily animal checks (e.g. cage changes, monitoring food/water levels, identifying health issues).
3. Place stork card when female visibly pregnant, and document DOB when a litter is born.
4. Report animal health concerns to the LAMS veterinary staff.
5. Place overcrowded notices on cage at day 21 (standard weaning) or day 28 (extended weaning).
   Notify labs of overcrowding and separate if multiple litters.

Housing

Guide for the Care and Use of Laboratory Animals (the Guide) recommends a minimum of 51 in2 (330 cm2) for a female mouse with a litter and 12 to over 15 in2 (77 -97 cm2) for a group-housed mouse, depending on body weight (pg. 57). This equates to at least 63 to 66 in2 (407 – 426 cm2) of cage space for two adults and one litter. Our standard mouse cage provides floor space for 5 adult mice or two adult mice and one litter.

Mouse

1. **Non-Breeding**
    a. Separate by sex
    b. Up to 5 adult mice (same sex) are permitted in the NexGen Allentown cages
2. **Breeding**
    a. Monogamous – adult male and adult female pair
    b. Trio – 1 adult male, and 2 adult females
    c. Harem – 1 adult male and up to 3 adult females
        i. For both trio and harem breeding schemes, female(s) **must** be placed in separate cage when visibly pregnant.
        ii. If separation is not performed by research staff, LAMS will separate visibly pregnant females and charge a supplemental fee to the lab. The research team will not be contacted, but the cage will be appropriately marked.
        iii. The **maximum** capacity for a cage is two adults and one litter.
        iv. No more than 1 male may ever be in breeding set.

Rat

1. **Non-breeding**
    a. Separate by sex
    b. Up to 3 rats are permitted in a standard cage if they are less than 300g each.
        i. Research staff are responsible for monitoring weight regularly and separating rats when they exceed 300g. Separations done by LAMS will incur a supplemental fee.
    c. 2 rats are permitted in a standard cage if under 500g each.
        i. When rats exceed 500g, they must be moved to the larger sized rat cage.
        ii. Research staff are responsible for monitoring weight regularly and separating rats when they exceed 500g. Separations done by LAMS will incur a supplemental fee.
2. **Breeding**
    a. Monogamous – one adult male and one adult female.
    b. Male must be removed prior to the birth of the litter.

Overcrowding

1. Cages are considered overcrowded when adults exceed normal occupancy limit, or multiple litters (without IACUC or veterinary approval) are present.
2. Overcrowding is not permitted and can result in animal welfare concerns.
3. It is the responsibility of the researcher to ensure they house their animals appropriately.
4. Overcrowded cages are a non-compliance; continued occurrences may be reported to the IACUC.

Breeding

1. Breeding must be described in the IACUC protocol.
2. Tracking of sire/dam, relevant strain information; date of litters, number of litters, number of offspring, and final disposition is recommended.

3. Breeding animals should be mated and retired at appropriate ages for the species and strain.
    a. Breeding set up is generally between 6 to 12 weeks of age.
    b. Retire breeders between 6-12 months of age.
4. Do not recombine adult male mice that have been separated for breeding; adult males have strong tendency to fight.
5. When female(s) appear visibly pregnant a "stork" card should be placed on the cage by the individual who identified the pregnancy, e.g. LAMS, research staff.
6. When litter is born the stork card should be flipped and DOB filled in by the individual (LAMS or research staff) who identified the birth: date of birth, date of wean (21 day vs 28 day), and animal ID.
7. Multiple litters are not permitted in a cage unless there is an **IACUC-approved exception** or the animal(s) are under the care of the veterinarian (e.g. too small to wean, fostered litter).

    Obtain an IACUC-approved Multiple Litter Exception:
    a. Submit a protocol amendment for multiple litters; provide justification in the amendment.
    b. If approved, communicate to husbandry by submitting LAMS Service Request and identifying cages with LAMS approved sticker.

8. Factors that may contribute to unsuccessful breeding:
    a. It is recommended to retire breeders between 6-12 months for optimal breeding. Genetic makeup, breeding performance, and behavior may influence retirement.
    b. Dams that show signs poor breeding should be replaced (e.g. cannibalism of neonates, dystocia, unable to nurse, small litters unless expected phenotype).
    c. Offering breeder diet provides higher calorie content for pregnant and nursing dams. Continued prolonged use of breeder diet may result obesity and poor breeding.
    d. Avoid disturbing the cage as best possible after dam gives birth. Disrupting the cage can cause parents to cannibalize or abandon newborns. If justified, your breeders may qualify for "Do not disturb" for 3 days post-birth.

    Obtain Do not Disturb approval:
        i. Submit a protocol amendment for Do Not Disturb; provide justification in the amendment.
        ii. Once approved, communicate to husbandry by submitting LAMS Service Request and identifying cages with LAMS approved sticker.

9. **Cross-fostering litters** – in the event a dam is unable to care for their young, the litter may be fostered to another dam.
    a. Choose a dam with a litter close to the age of the pups being fostered.
    b. Identify foster pups by fur color, or a mark can be placed on their skin/tail using permanent marker.
    c. Mark foster pups with the dam's scent by gently rubbing a small amount of nesting material on the pups, then mix them in with current litter.
    d. The fostered litter's stork/birth card should be moved to the new cage and labeled as "Fostered". Each litter should have its own stork/birth card on the cage to serve as cage level notice of the fostering.

e. Cage should be monitored closely by research staff to ensure dam is nursing and caring for the fostered pup(s).
f. Be mindful of the litter size. The dam may not be equipped to nurse and too many fostered pups can stress and deter her from caring for all pups in the cage.

Weaning

1. Weaning at 21 days is the **default** expectation.
   a. LAMS staff place a green Overcrowded notice on the cage and checks the time to wean box when pups reach 21 days of age.
   b. Research staff must wean between 21-24 days of age or ***before*** a second litter is born.
   c. On day 25 or if a second litter is born, LAMS staff will wean and charge a supplemental fee to the lab. The research team will not be contacted or reminded of weaning, but the cage will be appropriately marked.
      i. In the event research team or LAMS husbandry staff believe pup(s) are too small to wean, they must submit an animal health notice to veterinary staff for evaluation.
2. Extended weaning (28 days) must be justified and approved by the IACUC.
   a. Post-partum estrus is not allowed for cages requiring extended weaning.
   b. LAMS staff place a green overcrowded notice on the cage and checks the time to wean box when the pups reach 28 days old.
   c. Research staff wean between 28-31 days of age.
   d. On day 32, if the animals have not yet been weaned, LAMS staff will wean and charge a supplemental fee to the lab.
   e. Males must be removed from all cages with approved extended weaning to avoid multiple litters and overcrowding. Extended weaning is not allowed if post-partum estrus is used.

      Obtain Extended weaning approval:
      i. Submit a protocol amendment for **extended weaning**; provide justification in the amendment.
      ii. Once approved, communicate to husbandry by submitting LAMS Service Request and identifying cages. Service request must list name of strain.

3. To ensure that all weanlings have access to food and water (regulatory requirement), researchers must place food (minimum of five pellets) on the floor and water bottles of all newly weaned cages. Water bottles remain on newly weaned cages for up to 14 days. This allows easy access to food and water while weanlings adapt to the drinker valve and food hopper.
4. Cages must be labeled with PI, Protocol, and account number. Weaning packets containing new barcode cards are in the animal housing room with the corresponding protocol and account numbers. Request replacement weaning packets by submitting a LAMS Service Request, and include the account number, per diem, and room number.
5. Offspring that are expected to be small may benefit from supplemental nutrition such as diet gel.
6. Offspring must be tracked and captured in RAP AOPS.

Reporting Offspring

Research staff are responsible for reporting offspring in RAP AOPS at least monthly using the Reporting Offspring tutorial.

Categories of offspring that must be reported:

- All offspring used in experimental procedures and/or manipulations, regardless of age (e.g., drug administration, behavioral testing, euthanasia for tissue collection).
- Any offspring that are weaned.
- Any offspring that are culled.

Reporting Frequency:
Reports should be submitted at least once monthly with the total number of offspring since the last report. Monthly reports would include the total number of offspring for the previous month. For example, your November report would include October's data.

Be sure to include any offspring weaned by LAMS in offspring reporting numbers. Offspring weaned by LAMS will have separation notices attached to the weaned cages. Please note that LAMS provided notices of overdue weanings, and that failure to wean in a timely fashion will result in charges incurred for LAMS to wean.

Reporting animal counts is a regulatory requirement outlined in our ACUP policy. Continued occurrences of failure to wean/separate, and/or report offspring may be reported to the IACUC as a non-compliance and is subject to their review. Find more information on colony management at The Jackson Laboratory: General Husbandry Tips.

Related Policies and Guidelines

- Reporting Animal Numbers
- Principal Investigator Responsibility

References

1. National Research Council. Institute for Laboratory Animal Research. 2011. Guide for the Care and Use of Laboratory Animals. Public Health Service, Bethesda, MD.
2. Office of Laboratory Animal Welfare, National Institutes of Health, US Department of Health and Human Services. Public Health Service Policy on Humane Care and Use of Laboratory Animals. 2015. Public Health Service, Bethesda, MD.