PRINCIPLES OF MOUSE HUSBANDRY

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Overview

- Mouse reproductive milestones
- Mouse cage density
- Breeding cage set up and schemes
- Factors affecting breeding performance
- Data collection and good colony management
- Cryopreservation
Mouse reproductive milestones

- Gestation of the mouse: 19-21 days
- Weaning age: About 21 days.
- Litter size: 2 to 12 pups/liter
- Sexual maturity: 5 to 8 weeks
- Productive breeding life: 8 months
Mouse cage density

• 5 compatible adult mice in one cage
  (mouse weighs 25 grams or less)
• 4 compatible mice in one cage
  (mouse weighs over 25 grams)
• 3 compatible mice in one cage
  (mouse weighs over 45 grams)
• Mice that are observed fighting must be separated
Breeding cage set up

- Individual investigators are responsible for managing their own colonies.
- Keep one male and two females for an ideal breeding.
- Once females get pregnant, move one pregnant female to a new cage.
- Once pups are 21 days old, separate them from mother
Overcrowded cages

- “Overcrowded” stamp will be applied to the back of the cage card.
- PI will receive the notification by phone/email by building supervisor

ICM will split the cages within 24-hours of finding them to be overcrowded.
Influence of Genetic Background on Breeding Performance

- Behavior
- Hybrid vigor
- Birth defects
Mutation/transgenic-associated breeding problems

- Infertility (either gender)
- Mammary function
- Embryonic lethality
- Abnormal behavior
  - poor mothering instinct
  - aggression
- Shortened breeding life span
  - tumor development
  - neurodegeneration

Severity may be affected by genetic background
Non-genetic Factors that Influence Breeding Performance

- **Environment**
  - Temperature
  - Light intensity and light cycle
  - Noise and vibrations (construction, equipment)
  - Air pressure
  - Odors (toxic fumes, perfumes)

- **Handling consistency**
  - Over handling-leave pregnant mothers alone
  - Caretaker changes

- **Nutrition**

- **Health status**
Data Collection and Record Keeping
Critical for successful colony management
Data Collection and Record Keeping

• Collect breeding statistics
  - birth dates for every liter
  - interval between litters
  - litter size
  - number of mice that wean (wean:born ratio)

• Monitor genotype and gender frequencies for each breeding unit

• Pedigree records
Non-productive Breeder Criteria

• No litter produced
  - 40 days from date of first mating
• No new liters
  - 40 days from last born date
• No weaned pups
  - 2-3 litters with no wean
Tips for colony management

• Mate mice early, between 7-12 weeks of age
• Establish/collection breeding statistics
• Replace breeders on a rotation (weekly, monthly)
  - breeding life span typically 7-8 months
  - have young breeders available
• Keep good records, evaluate data regularly
• Remove non-productive breeders ASAP
Tips for colony management

• Record and investigate deviations immediately

• In shifting genetic backgrounds, expect fertility changes
  - keep older generations available

• Choose breeders carefully
Setting up cages

- Tail clipping can be done after 18 days of age.
- When separating the pups from the mother, isolate males and females in different cages.
- When the mice are 7 weeks of age, put them together for breeding.
Labeling the cage

- P.I.: Dr. Ira Tabas
- Investigator:
- Protocol No.:
- Account No.:
- Lab: PH9-405/406
- Tel.: (212) 305-5669/3133
Cage cards
Cage cards
Mouse numbering system

R
1
2
4
3

L
10
40
20
30

R
4+1=5
4+2=6
4+3=7
1+2=8
1+2+3=9

L
4+1=50
4+2=60
4+3=70
1+2=80
1+2+3=90
Observe your colony almost everyday for the proper management
Cryopreservation

- Cryopreservation is an efficient tool for managing colonies
- Cryopreservation = More Space
- Replaces thousands of square feet of animal room space
Cryopreservation = Less Risk

- Contamination
- Disease
- Genetic drift
- Disaster
- Breeding cessation
- Loss of copy number
- Lower cost
Cryopreservation
Things to consider

• Strain
  - Genetic background
  - Freezing characteristics

• Technique
  - Reliability
  - Time
  - Cost

• Recovery
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