

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

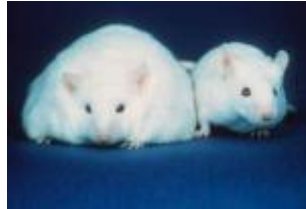
- Individual investigators are responsible for managing their own colonies.
- Keep one male and two females for an ideal breeding.
- Once females get pregnant, move one pregnant female to a new cage.
- Once pups are 21 days old, separate them from mother



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 litter
 - 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 litters
 - 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/collect 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

SEPARATED CAGE

P.I. NAME: _____ PROTOCOL # _____

DATE FLAGGED: _____ DATE SEPARATED: _____

ROOM # _____ RACK ID# _____

NOTIFICATION ID: _____ # OF CAGES MADE _____

COMMENTS _____

MEDI -LAB & LABEL CU181

SPECIAL REQUISITION CARD

INVESTIGATOR: _____ DATE: _____

PROTOCOL #: _____ EXTENSION: _____

CAGE CHANGE BY P.I. ONLY START DATE _____ END DATE _____

SPECIAL DIET START DATE _____ END DATE _____

MEDICATED WATER START DATE _____ END DATE _____

FAST-NO FOOD START DATE _____ END DATE _____

FAST-NO WATER START DATE _____ END DATE _____

MEDI -LAB & LABEL CU183

SICK ANIMAL

Building _____ Room _____

PI _____ Rack/Cage _____

Reported by _____ Date _____

Vet Med Comments/Date _____

PI Comments/Date _____

MEDI -LAB & LABEL CU182

Cage cards

TRANSFER

BUILDING OF ORIGIN: _____

INVESTIGATOR: _____

ROOM: _____

.....

DESTINATION BUILDING: _____

INVESTIGATOR: _____

ROOM: _____

DATE OF TRANSFER: _____

MEDI -LAB & LABEL CU180

P.I. _____ **SPECIES:** _____

PROTOCOL: _____ **ACCOUNT:** _____

ARRIVAL DATE: _____ **REPLACEMENTS:** _____

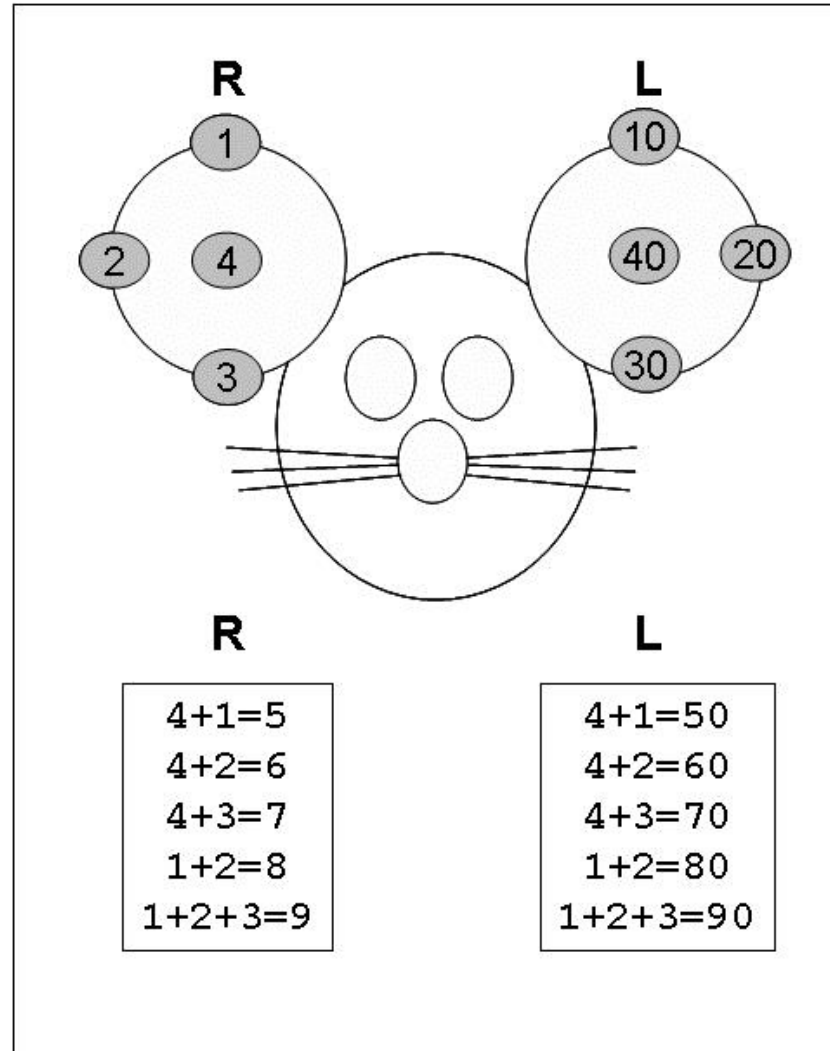
**SENTINEL
DO NOT MOVE**

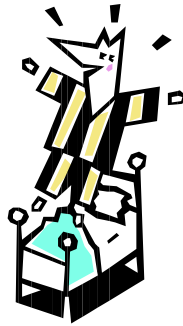
ROOM/Number: _____ **RACK/Number:** _____

*THE OLDER ANIMAL IS EAR NOTCHED WHEN REPLACEMENTS ARE ADDED

MILLSIC

Mouse numbering system





Observe your colony almost everyday
for the proper management



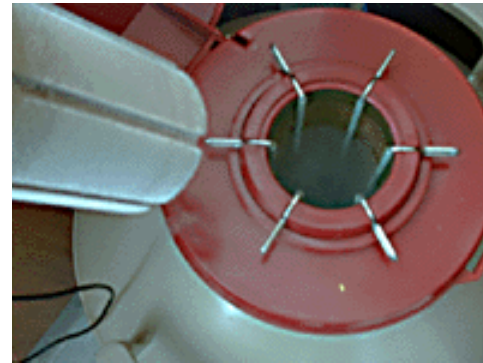


Cryopreservation

- 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

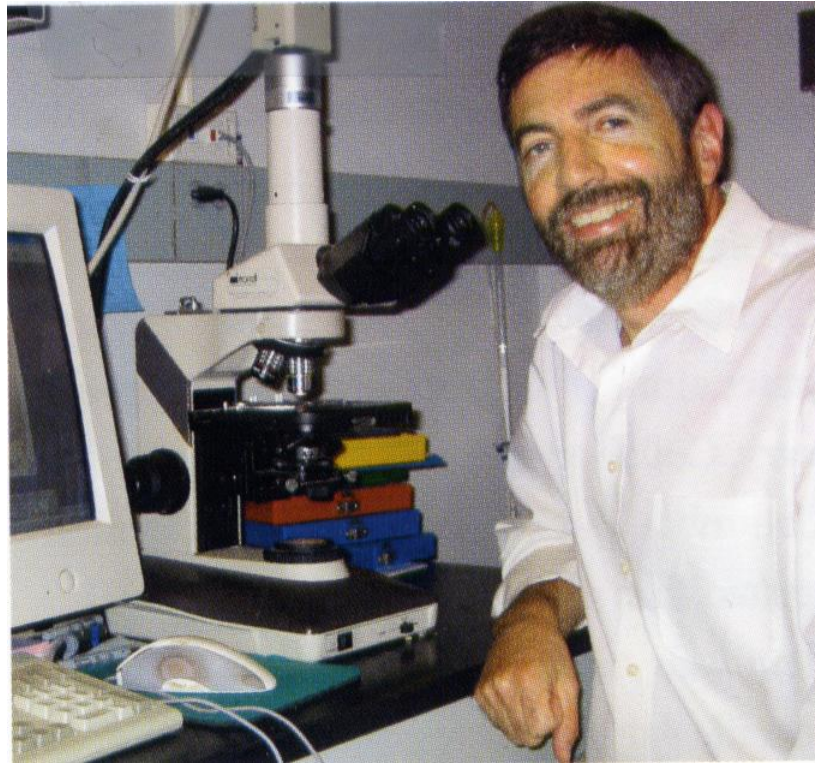
- Strain
 - Genetic background
 - Freezing characteristics
- Technique
 - Reliability
 - Time
 - Cost
- Recovery

Acknowledgements



Jackson Laboratories
Institute of Comparative Medicine
Columbia University

Thanks
to



Dr. Ira Tabas