

SOP Title: IVC Rodent Husbandry	SOP #: AH104
Effective Date: October 1, 2021	Revision #: 02
<i>Veterinary Resources Program in Comparative Medicine</i>	

1. PURPOSE

- 1.1. The purpose of this Standard Operating Procedure (SOP) is to ensure the highest quality of animal care and to preclude the development of spontaneous animal health or welfare issues at The University of Maryland, Baltimore (UMB).
- 1.2. To ensure personnel handling rodent species (mice, rats, hamsters, gerbils) in Individually Ventilated Cages (IVC) and static microisolator caging perform their duties in a manner that complies with all current governing laws, regulations, and guidelines at UMB.

2. RESPONSIBILITY

- 2.1. Veterinary Resources (VR) husbandry staff are responsible for providing the animal care and maintenance of the vivarium facility.
- 2.2. Veterinary Resources (VR) facility managers ensure implementation of all procedures.
- 2.3. Veterinary Resources (VR) veterinarians oversee all aspects of animal health with the assistance of all animal care staff.
- 2.4. Campus Facilities is responsible for maintaining proper temperature and humidity, and overall pest management in the vivarium facility.

3. MATERIALS AND EQUIPMENT

- 3.1. Personal Protective Equipment (PPE) including but not limited to:
 - 3.1.1. Facility specific scrubs
 - 3.1.2. Disposable gloves
 - 3.1.3. Closed-toed facility specific shoes
 - 3.1.4. Disposable gown
 - 3.1.5. Face mask
 - 3.1.6. Hair bonnet / bouffant cap (optional)
 - 3.1.7. Protective eyewear (optional)
- 3.2. Rodent caging supplies

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- 3.2.1. Species-specific caging with appropriate bedding, feed, water, feeder, and enrichment items
- 3.3. Cleaning supplies
 - 3.3.1. Paper towels
 - 3.3.2. Room specific floor broom and dustpan
 - 3.3.3. Room specific mop and mop bucket
 - 3.3.4. Waste can liners
 - 3.3.5. Disinfectant (i.e., MB-10, mild detergent)
- 3.4. Red light flashlight (optional)
- 3.5. Red 'Request for Vet Staff Evaluation' cards
- 3.6. Pink 'Cage Separation Notice' cards
- 3.7. Purple 'Weaning' card
- 3.8. Technical service card
- 3.9. Feed chopper
- 3.10. Cage change device (optional)
- 3.11. Forceps (optional)
- 3.12. Thermohygrometer
- 3.13. Dissolvable labels (i.e., secondary container, equipment sanitization, rack sanitization)

4. DEFINITIONS

- 4.1. IVC – Individually Ventilated Cage. Cage level barrier providing HEPA filtered air from a rack to each individual cage. The rack provides cage level supply and exhaust ventilation.

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- 4.2. Static Microisolator – An isolator cage that includes a cage bottom and lid with a filter which isolates each cage from the outside environment.
- 4.3. Feeder – A modular diet delivery system

5. PROCEDURE

- 5.1. Daily Animal Health and Room Checks
 - 5.1.1. Don appropriate PPE prior to entering the animal room (i.e., disposable gown, face mask, disposable gloves).
 - 5.1.2. Upon entering the room, perform cage side observations on each animal, looking for signs of obvious health concerns as outlined in *SOP AH115, Reporting Animal Health Problems*.
 - 5.1.2.1. Flashlights can be of assistance to help visualize animals in the cage.
 - 5.1.3. Examine each cage for evidence of excessive soiling, dampness, condition of bedding, and general condition.
 - 5.1.3.1. If intervention is necessary, perform cage change.
 - 5.1.4. Check each cage population to ensure cages are not overcrowded per [UMB Comparative Medicine SOP, Cage Population Densities for Rodents](#).
 - 5.1.4.1. If intervention is necessary, follow notification and/or separation procedures as described in *UMB Comparative Medicine SOP, Cage Population Densities for Rodents*.
 - 5.1.4.1.1. When separating animals that require VR to wean, a purple weaning card (*Appendix C*) will be filled out and split. The top portion is placed on the original parent cage and the bottom portion(s) are placed on the newly weaned cages.
 - 5.1.4.1.2. Fill out and place a new request for a barcode cage card on the new cage(s). Note: When cage cards

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are created in Elements, the date they are created is the day prior to separation.

5.1.4.1.3. In addition, fill out a technical service card and submit to your supervisor so the respective lab can be billed.

5.1.5. Check each cage to ensure sufficient water is accessible. Water is offered ad libitum.

5.1.5.1. Replace any water pouch if necessary.

5.1.6. Check each cage to ensure a sufficient amount of food is accessible. Food is offered ad libitum unless noted otherwise.

5.1.7. Ensure each animal has easy access to species-specific enrichment materials such as nesting materials, toys, wooden chews, etc. unless noted otherwise. Examples of acceptable enrichment can be found in *Appendix A, Rodent Enrichment*.

5.1.8. Verify all cages are placed securely on/in the rack, properly oriented, and clearly identified with a cage card.

5.2. Daily Animal Room Cleaning and Maintenance

5.2.1. Ensure sink and counter area is clean and clear of clutter.

5.2.2. Thoroughly sweep and mop the floors daily, excluding weekends and holidays.

5.2.2.1. All brooms, mops, dust pans, and squeegees must be stored in broom stow.

5.2.3. Replace waste lintens as needed and remove waste from animal room in accordance with SOP AH209, *Waste Disposal*.

5.2.4. Restock supplies (hand soap, paper towels, waste container and liner, sharps container, PPE, etc.) as needed.

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5.2.5. Restock feed bin with a new bag of feed, as applicable. No more than two bags of feed should be in the feed bin: One opened, one unopened.

5.2.5.1. Ensure “secondary container” dissolvable label is on the feed bin. When restocking, denote the content, manufacturer, lot number or mill date if applicable, and expiration date. Ensure “equipment sanitation” dissolvable label is on the bin and denote the start date of use and expiration date (monthly).

Note: Keep the bin closed at all times when not in use.

5.2.6. Check the room for physical plant problems including but not limited to light function and fixtures, plumbing function and fixtures, electrical function and fixtures, air supply and exhaust function and fixtures, wall/floor/ceiling surfaces including doors/locks/hinges, etc.

5.2.6.1. Report any issues in accordance with SOP *AH707, Reporting Physical Plant Problems.*

5.2.7. Record any presence of pests according to SOP *AH102, Pest Management.*

5.3. The animal room corridor or anteroom, if applicable, must also be uncluttered, restocked, organized, and cleaned daily.

5.4. Record the current, min/max temperature (°F) as well as current, min/max humidity (%) on daily activity log. Clear the daily min/max by holding the button down until cleared (button is located on the back top right of the unit). If temperature is out of normal range (between 68°F and 74°F), and/or humidity is out of normal range (30% - 70%), notify Facility Manager. VR Facility managers will report issues to Facilities.

5.5. Record your daily activities on log *AH103.F1, Rodent Husbandry Log.*

5.6. Semiweekly (2x/week) Responsibilities and Tasks

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- 5.6.1. Check the light timers, where applicable, according to SOP *AH703, Light Timer Check*.
- 5.7. Weekly (1x/week +/- 1 day) Responsibilities and Tasks
 - 5.7.1. If there is a biosafety cabinet/animal transfer station in the animal room, perform routine weekly cleaning per SOP *EQ113, Biosafety Cabinet Operation and Maintenance*. If there is not a biosafety cabinet/animal transfer station in the animal room, then enter "N/A" on the log.
 - 5.7.2. Empty and refill disinfectant containers and record expiration date on bottle label. MB-10 disinfectant must be used within 7 days of mixing.
 - 5.7.3. Check the pest zone monitors per SOP *AH102*.
 - 5.7.4. Campus facilities will perform a status check of pest presence and address any observed issues.
 - 5.7.5. Each supervisor and manager of each facility will perform a weekly walk-through of each room (total of 2 walk-throughs per week).
 - 5.7.6. Microisolator Cage Change
 - 5.7.6.1. Static microisolator cages are changed at least weekly (1x/week +/- 1 day) or as needed.
 - 5.7.6.2. Prior to changing cages, collect all supplies and don appropriate PPE (i.e., disposable gown, face mask, disposable gloves).
 - 5.7.6.3. A complete cage change includes new/sanitized cage bottom, top/lid, clean bedding material, water pouch, feeder, and enrichment. Mouse cages are required to have a nestlet and hut unless otherwise noted.

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5.7.6.4. Prepare the biosafety cabinet (BSC) per SOP *EQ113*, *Biosafety Cabinet Operation and Maintenance*.

5.7.6.4.1. Liberally saturate the surface of the BSC with disinfectant and wipe away residue.

5.7.6.4.2. Liberally saturate gloves and sleeves with disinfectant and maintain “wet” gloves while opening or manipulating cages.

5.7.6.4.3. Only the items that will be used for the procedure should be in the BSC. Clutter negatively affects the air flow. Only two clean cage setups should be in the BSC at a time. No personal items should be in the BSC (i.e., cell phones, chargers). Keep air intake grate at the front of the BSC clear and free of clutter/debris.

5.7.6.4.4. Any materials and hands entering the biosafety cabinet must be saturated with disinfectant.

5.7.6.4.5. Designate a “clean” and “soiled” side of the BSC to avoid cross contamination.

Note: Only change one cage at a time.

5.7.6.5. Liberally saturate gloves and sleeves with disinfectant.

Clean cages are stacked as sets of two. Apply disinfectant liberally to the clean cage set, and place on the “clean” side of the BSC. Remove the top of the clean cages, placing the cage top with the exterior side down and interior of the lid facing up.

5.7.6.6. Check cage integrity of both cages, including but not limited to, food is clean and accessible, bedding level, no cracks/chips on caging or accessories, filter paper, and

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adequate enrichment is present. Use a feed chopper to break up feed as needed. Ensure the feeder is positioned properly.

5.7.6.7. If cage integrity is unsatisfactory, notify your supervisor if necessary and do not place animals in the cage. Place the cage aside and continue the cage changing process.

5.7.6.8. Add valve and water pouch to the cages.

5.7.6.8.1. Place valve upright in the hole of the feeder. With the vertical seam facing the palm of your hand, lightly squeeze the water pouch to create pressure and place onto the valve, puncturing the pouch. Ensure water flow by gently manipulating the drinking valve.

5.7.6.9. Place a clean cage lid on one of the clean cages and proceed to change the cage.

5.7.6.10. Remove one soiled cage from the rack and liberally saturate with disinfectant. Place it next to the clean cage, leaving as much space between your clean and soiled cages as possible.

5.7.6.11. Remove the top from the soiled cage and place it interior side up, next to the soiled cage.

5.7.6.11.1. Liberally saturate gloves with disinfectant prior to handling the animals.

5.7.6.12. If available, a cage change device can be placed in the BSC and used to change cages. For cage changing stations, the clean cage lid is placed in the slot to the left of the clean cage, with the interior facing the clean cage.

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The dirty cage lid is placed in the slot to the right of the cage, with the interior facing the dirty cage.

5.7.6.13. Transfer the animals. As you transfer each animal, perform a health check. Look for signs of obvious health concerns as outlined in SOP *AH115*.

5.7.6.13.1. Remove one animal from the soiled cage at a time. Do not allow the animal to come in contact with the outside of the soiled cage.

5.7.4.13.1.1. Forceps can be used to transfer animals if preferred.

5.7.6.13.2. Repeat until all animals have been transferred into the clean cage.

5.7.6.13.3. Ensure all animals are on the floor of the clean cage. Double check the dirty cage and ensure no animals are left in the dirty cage.

5.7.6.13.4. Replace the microisolator cage filter lid properly and transfer the cage card holder from the dirty cage to the clean cage.

5.7.6.13.5. Obtain bedding from the soiled cage for the sentinel program, as outlined in SOP *AH201*, *Sentinel Surveillance*.

5.7.6.13.6. Return the clean cage to the rack, exactly where it was previously.

5.7.6.13.7. Reassemble the soiled cage components with the cage filter top in place. Remove the soiled cage from the BSC and place it on a cart designated for dirty cages.

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5.7.6.13.8. Repeat steps 5.7.4.5 – 5.7.4.13.7. until all cages have been changed. Gloves and sleeves are to be changed between cages assigned to different Principal Investigators (PI), changing racks and each side of a rack.

5.7.6.14. Take soiled cages to the dirty side of cagewash.

5.8. Biweekly (every 14 days +/- 2 days) Responsibilities and Tasks

5.8.1. IVC Cage Change

5.8.1.1. IVC cages are changed at least bi-weekly (every 14 days +/- 2 days) or more often, as needed.

5.8.1.2. To change IVC cages, follow steps 5.7.4.2.- 5.7.4.14.

5.8.2. Static microisolator rack change.

5.8.2.1. Bring a clean rack into the animal housing room.

5.8.2.1.1. Ensure “rack sanitation” dissolvable label is on the rack. Denote the date the rack is put into service and circle the frequency of change (biweekly).

5.8.2.2. Place all static microisolator cages on a clean rack.

5.8.2.3. Remove the dirty rack from the room and bring to the dirty side of cage wash to be sanitized.

5.9. Monthly (1x/month +/- 4 days) Responsibilities and Tasks

5.9.1. Sanitize the room according to SOP *AH602, Room Sanitization*.

5.9.2. Sanitize the feed bins, trash bins, and cleaning equipment according to SOP *AH603, Equipment Sanitization*.

5.9.2.1. Ensure “equipment sanitation” dissolvable label is on the bin and denote the start date of use and expiration date (monthly from the start of use date).

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5.10. Quarterly (1x/3 months +/- 7 days) Responsibilities and Tasks

5.10.1. IVC rack change

5.10.1.1. Bring a clean IVC rack to the animal housing room.

5.10.1.1.1. Ensure “rack sanitation” dissolvable label is on the rack. Denote the date the rack is put into service and circle the frequency of change (quarterly).

5.10.1.2. Unplug the dirty rack, remove the blowers, and open the plenum.

5.10.1.3. Wipe down the blowers with disinfectant.

5.10.1.4. Place all IVC cages on a clean rack.

5.10.1.5. Remove the dirty rack from the room and bring it to the dirty side of cage wash to be sanitized.

5.10.1.6. Hook up blowers to the clean rack and plug in the clean rack.

5.11. Record your daily activities on log *AH103.F1, Rodent Husbandry Log*.

6. REFERENCES

- 6.1. [UMB Comparative Medicine SOP, Cage Population Densities for Rodents](#)
- 6.2. AH102, Pest Management
- 6.3. AH201, Sentinel Surveillance
- 6.4. AH115, Reporting Animal Health Problems
- 6.5. AH209, Waste Disposal
- 6.6. AH602, Room Sanitization
- 6.7. AH603, Equipment Sanitization
- 6.8. AH703, Light Timer Check

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6.9. AH706, Room Relative Humidity

6.10. AH707, Reporting Physical Plant Problems

6.11. EQ113, Biosafety Cabinet Operation and Maintenance

7. FORMS AND APPENDICES

Document Number	Title
AH103.F1	Rodent Husbandry Log
Appendix A	Rodent Enrichment
Appendix B	Pink Separation Cage Card
Appendix C	Purple Weaning Cage Card

8. DOCUMENT REVISION HISTORY

Revision Number	Description of Changes	Effective Date
01	Added Facilities overall pest management	September 15, 2021
02	Added disinfectant details and Appendix B and C	October 1, 2021

Appendix A, Rodent Enrichment

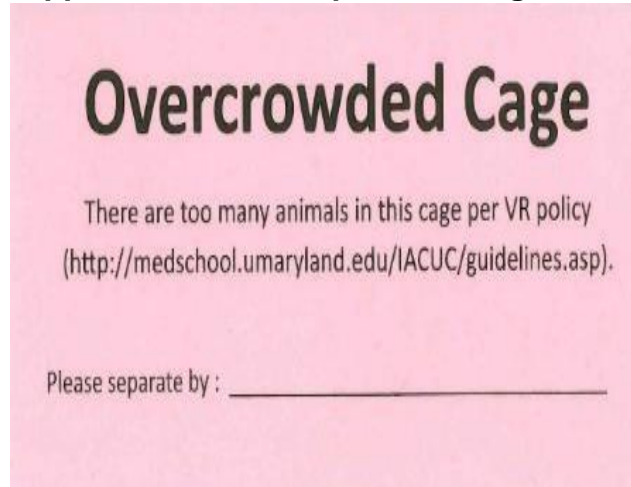
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Species	Shelves/ Perches	Toys/ Manipulanda	Foraging Opportunities	Nesting Material	Swings	Other (Specify)
Mice	Shelf System LifeSpan	Nestlets, Huts	N/A	Corncob Bedding	N/A	Mouse Huts and wheels for specific investigators
Rats, Hamsters & Gerbils	N/A	Wooden Blocks/Sticks, Nylabones, Chew Balls	N/A	Corncob Bedding	N/A	N/A

Source: Program Description, Animal Care and Use Program, 2021. Veterinary Resources and Program in Comparative Medicine.

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Appendix B, Pink Separation Cage Card



Appendix C, Purple Weaning Cage Card

