

PhenoMaster

I. Objective

Housing of live mice in a metabolic phenocage system for continuous recording of experimental data via the use of non-invasive sensors. Sensors continuously measure temperature, food and water consumption (including totals as well as frequency of consumption), O₂ and CO₂ levels (for indirect calorimetry), body weight (via a suspended weighing tube that doubles as environmental enrichment), and movement/activity (in an X, Y and Z axis and via the running wheel).

Note: Environmental control chambers maintain light cycle, temperature, and humidity within the desired range

II. Comments and Recommendations

- This procedure has been written with specific reference to the Integrated Physiology Facility (IPF), the PhenoMaster may only be used at this facility by IPF approved experienced operators
- Use of the PhenoMaster and any variation to this SOP must be described in a relevant animal ethics application
- Users should read and understand the associated Risk Assessment prior to operation: 3978 PhenoMaster, 3657 UQBR Handling and restraint of laboratory animals; 3940 Handling rats and mice (available on the [UQSafe](#) website)
- Equipment/software failures and animal escapes need to be reported to the animal facility manager immediately
- All incidents/injuries should be reported via [UQSafe](#) online.
- Spills must be cleaned up immediately
- Use of the PhenoMaster involves mouse handling and appropriate care should be taken, refer to [LAB 006 Handling and restraint in mice and neonates](#), and [LAB 039 Handling and Restraint in Rats and Neonates](#)
- Wild type and genetically modified animals must be transported to equipment as per OGTR guidelines and [LAB 003 Transportation of Laboratory Rodents](#)
- The IPF is a shared space with unknown commensal microbial status. Once transported to a shared space it is often not possible, for biosecurity reasons, to return rodents to their original animal facility. Arrangements for transportation and ongoing care of experimental animals must be made with relevant animal facility managers when planning projects that aim to use a shared facility

III. Equipment

- Minimum Personal Protective Equipment (PPE) consists of gloves, gown, closed in shoes, eye protection and face mask. Additional PPE may be required based on added risk e.g., working with infectious animals (P2 fitted mask and viral gown)
- IVC Tecniplast (greenline) cage base and compatible TSE lid:
 - TSE lid: acclimation lid
 - TSE lid: experimental lid (very similar in design to the acclimatisation lid)

16 mice can be individually housed in the environmentally controlled acclimation chamber and in the PhenoMaster for the duration of each experiment.

- Acclimatisation chamber (this is a TSE PhenoMaster chamber used specifically for acclimatisation)
- TSE PhenoMaster chamber
- Running wheels (optional)
- Scales
- Purachip bedding
- Mouse pellets and water
- Disinfectant (1-2% Virkon), Ethanol (70%)
- Clinical waste bin

IV. Preparation

- Check booking date/s and details with the IPF manager.
- All animal arrivals/departures and euthanasia's must be recorded on the Mosaic movement sheet available in the animal facility.

V. Procedure

Moving mice into the acclimatisation chamber:

1. Ensure acclimation chamber is turned on and light cycle, temperature and humidity parameters are all programmed to, and operating within, the standard settings:

- Light cycle: 6 am lights on/6 pm lights off
- Chamber temperature: 25°C
- Chamber humidity: 50%

Do not adjust digital controls

2. Fill food and water hoppers and ensure proper function and correct position in IVC cage. Mark water level on the side of the hopper with a sharpie

Traditional sized mouse pellets are halved before loading individual food hoppers to avoid blockages

3. Check animal identification, weigh animal and record on score sheet

4. House mice (one mouse per cage) with enough Purachip bedding (50-60 gm) to cover the floor of the IVC cage. Ensure acclimation lid is secure with food and water hoppers facing forward

5. Place occupied cages in the acclimatisation chamber and close the doors. Mice are typically housed in the acclimatisation chamber for 5 – 7 days

The food and water hoppers in the acclimatisation chamber are unfamiliar to the mice and some mice take time to adapt to the equipment

6. Mice need to be checked daily in a methodical manner. Check mice are freely moving and appear healthy and alert

7. Monitor food and water consumption. Check food is accessible through the grate at the base of the hopper and refill if necessary. Check for the presence of faeces in the bedding

8. Check water level has dropped by comparing to the previous days mark. Check water nozzle is functioning and refill if necessary

9. Check water has not leaked from the hopper. Replace wet bedding

10. Weigh your mice daily for the first 3 days

Weight loss of >10% requires investigation and intervention

11. If a mouse is having difficulty adapting to the hoppers provide gel and food/mash on the floor. The use of a generic score sheet is available in this instance. Otherwise, use any project specific score sheets, as approved for the individual model

If you find an unwell mouse refer to LAB_022 UQBR Veterinary Care Program. Report any Unexpected Adverse Events to the AEC

12. Record in the room diary that you have checked your mice and make note of any complications identified

Moving mice into the TSE PhenoMaster:

13. Ensure PhenoMaster cabinets are turned on and environmental parameters are set as per step 1. Ensure wall monitor is on and PhenoMaster software is running

Never turn PhenoMaster software off

14. Check with facility staff that the gas, food/water hoppers and weight tube have been calibrated. (If running wheels are to be used check with facility staff)

15. Fill water and food hoppers and ensure proper function before placing in cage lid. Ensure hoppers are facing forward

16. Use software to enter experimental parameters

17. Retrieve the mice from the acclimatisation chamber. Manually weigh each mouse and enter weight into software

18. Place mice into their individual PhenoMaster cages using enough Purachip bedding (50-60 gm) to cover the floor of the IVC cage and no nesting material

Excessive bedding will interfere with the motion sensors

19. Fully close cabinet doors and use software to start recording measurements

20. Animals in the PhenoMaster must be monitored daily to ensure food and water hoppers remain in working order

Software can be used to monitor eating, drinking, weight and activity

21. Cabinets must be opened at least daily, and each cage visually checked to ensure food hoppers have not become blocked

Food should be visible at the base of the hopper

22. If a mouse has not consumed water in the past 12hours, use the software to establish which box is currently being measured, then physically check the water nipple is still functional

If the individual cage of interest is the one being measured by the calorimetry software wait until the measurement is complete (approximately 3-4 minutes) before inspecting the water hopper

23. On completion of your experiment ensure all animals have been removed from the PhenoMaster and record any movements on the Mosaic movement sheet

24. Export all relevant data

25. DO NOT turn off or exit the PhenoMaster software