

## LAB\_051 PhenoMaster (Expiry: March 2026)

### I. OBJECTIVE

To ensure the safe housing of live mice in a metabolic phenocage system (PhenoMaster and acclimatisation chamber) for continuous recording of experimental data via the use of non-invasive sensors. These sensors continuously measure temperature, food and water consumption (including totals as well as frequency of consumption), O<sub>2</sub> and CO<sub>2</sub> 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.

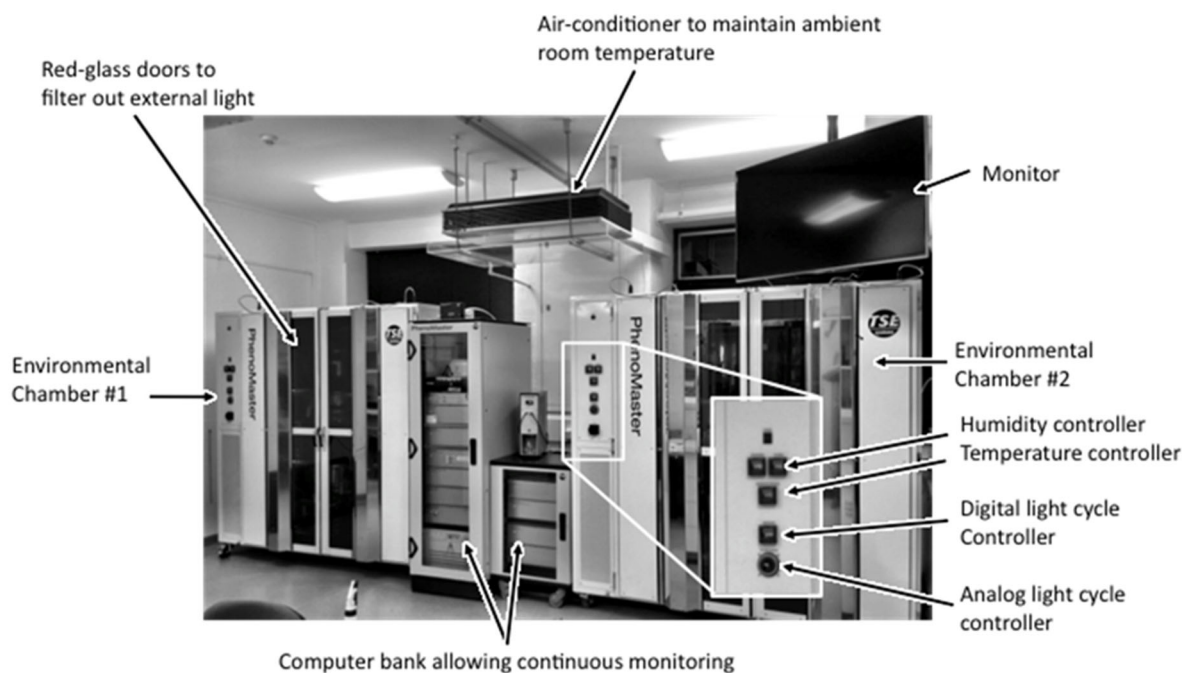


Figure 1: PhenoMaster layout within the Integrated Physiology Facility.

### II. COMMENTS / RECOMMENDATIONS

- Holding mice within the PhenoMaster system is broadly considered to have a negative impact on animal wellbeing given the stress associated with transport, isolation, and often reduced availability of environmental enrichment material. This must be taken into consideration when planning to use this infrastructure.
- Relative to animal ethics applications, when using this SOP, the following must be described in the individual ethics application: any variation to this SOP (e.g. dietary changes/restrictions or altered light cycles), any specific procedures (e.g. injections or treatments), maximum duration of phenotyping (i.e. the duration within the PhenoMaster).
- This procedure has been written with specific reference to the Integrated Physiology Facility (IPF). The IPF PhenoMaster includes both software and hardware (TSE PhenoMaster) components and may only be used by an IPF approved experienced operator. *Warning: failure or improper setup of any one component may lead to malfunction and damage to the system.*
- Never exit or turn off the PhenoMaster software.

#### Conditions:

- Investigators named in an animal ethics application, relative to this SOP, must be competent to implement the SOP
- Any variation to this SOP must be described in the relevant animal ethics application
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- Equipment and procedures may vary somewhat in other animal facilities – these variations must be described in the individual animal ethics application, if using this SOP.
- Users should further read and understand the associated Risk Assessments 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 IPF manager immediately.
- A safety step for accessing the top shelf may be used during this procedure and should be done so with awareness. All incidents/injuries should be reported to the IPF manager and via [UQSafe](#) online.
- This procedure involves mouse handling and appropriate care should be taken, refer to [LAB\\_006 Handling and Restraint in Mice 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

- PPE

*Minimum PPE in the IPF includes gloves, gown, eye protection, face mask and closed in shoes. Additional PPE may be required based on additional 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 (see figure 2)
- 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.*

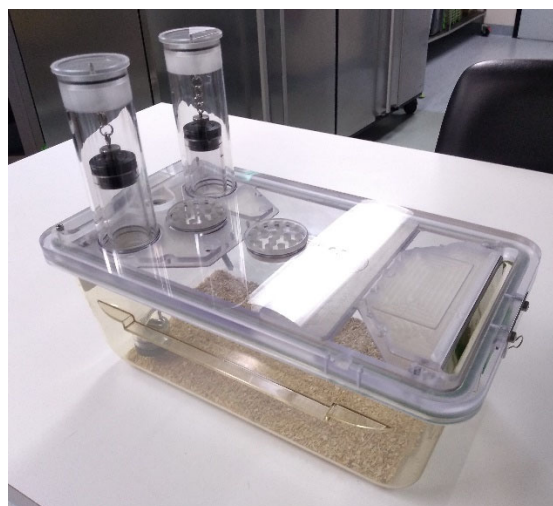


Figure 2: IVC Tecniplast cage base and TSE (acclimation) lid.

- Acclimatisation chamber (this is a TSE PhenoMaster chamber used specifically for acclimatisation)

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- TSE PhenoMaster chamber
- Running wheels (optional)
- Scales
- Purachip bedding
- Mouse pellets and water
- Disinfectant (1-2% Virkon), Ethanol (70%)
- Clinical waste bin

#### IV. PREPARATION

1. Check AEC approvals to ensure that the correct procedure, personnel and facility are approved to undertake the planned work.

*Deviations can occur between approved procedures listed versus what is planned with the animal, check that they match and that the relevant personnel are approved. For example, if dietary modification is intended to occur this must be specified in the AEC application.*

2. Check booking dates and details with the animal facility manager.

3. 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% (see figure 3).

*Do not adjust digital controls.*



Figure 3: Manual light control (left), and digital set (green) and actual (red) temperature and humidity readings on chambers.

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 (Figure 4).

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 <p>THE UNIVERSITY OF QUEENSLAND AUSTRALIA</p> <p>CREATE CHANGE</p>	<p>UQ Animal Ethics Committee - Standard Operating Procedure</p> <p><b>LAB_051 PhenoMaster</b></p> <p>Institutional author: <b>Integrated Physiology Facility (IPF)</b></p> <p>AEC Reviewed and Approved: March 2025</p> <p>SOP Expiry: March 2026</p>	<p>Version #1</p> <hr/> <p>Page 4 of 5</p>
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5. Place occupied cages in the acclimatisation chamber and close the doors. Mice are typically housed in the acclimatisation chamber for 5 – 7 days (Figure 4).

*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 (Figure 5).

*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 (Figure 5).

*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.

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*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.

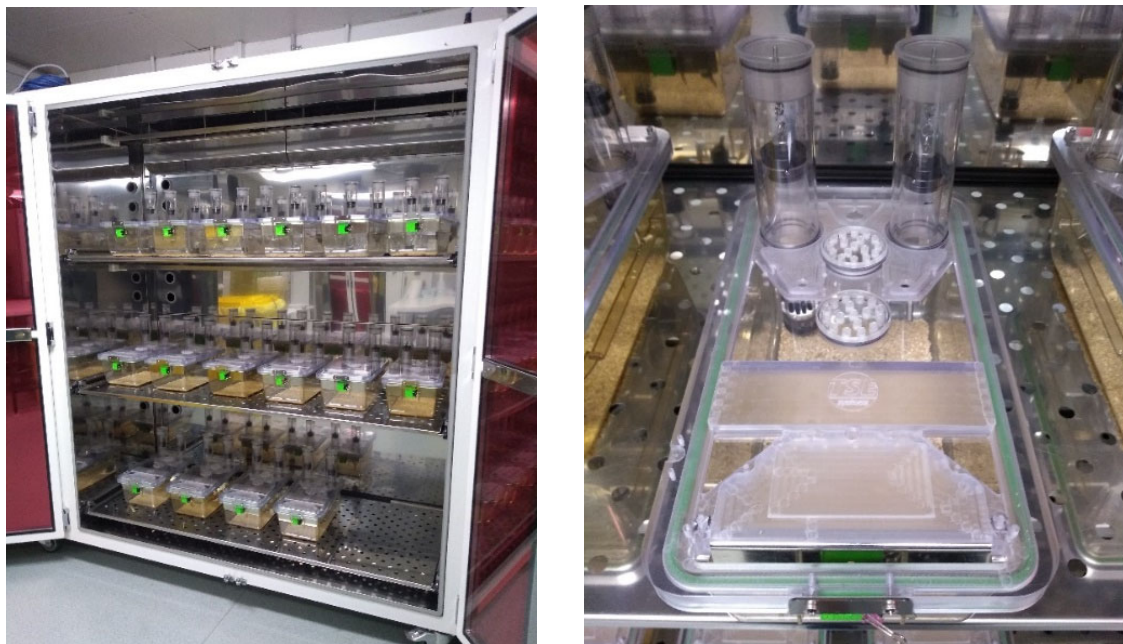


Figure 4: Environmentally controlled acclimation chamber (left) holds 16 individual cages (right), each cage houses one mouse.

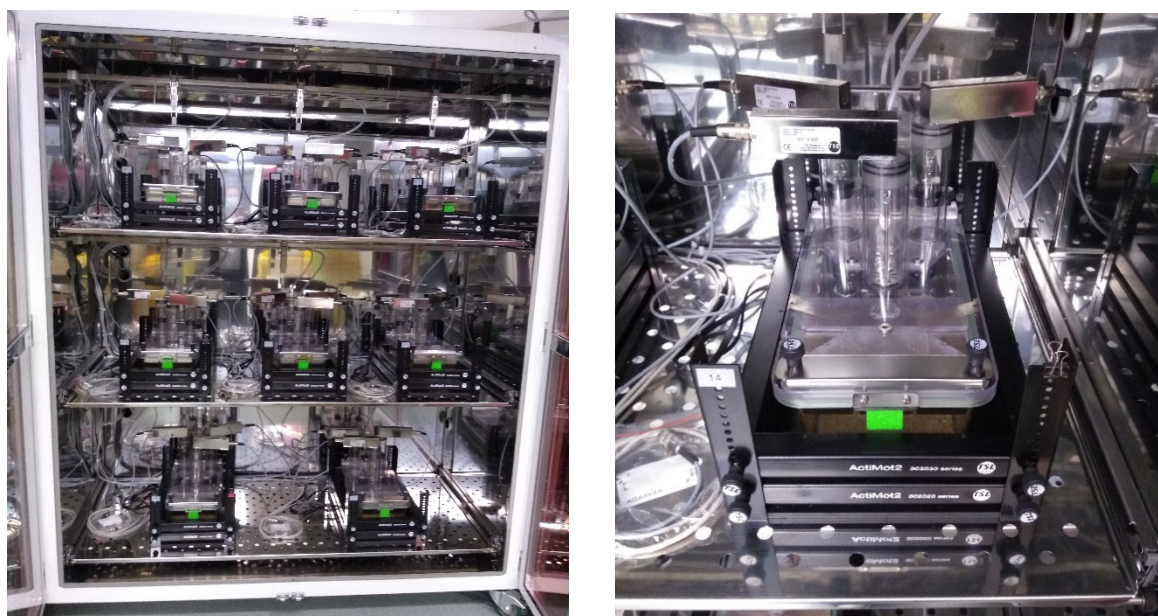


Figure 5: One of the two environmentally controlled PhenoMaster cabinets (left) which each hold 8 individually housed mice during the recording phase of experiments. Each TSE lid contains food, water, bodyweight, and temperature sensors. All IVC cages sit within an ActiMot® frame able to monitor mouse activity (right).

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