

Assessing the health and wellbeing of the breeding mouse dam

Andrea Leuthardt

Institute of Veterinary Physiology, Vetsuisse Faculty, University of Zurich, Winterthurerstrasse 260, 8057 Zürich, Switzerland

Summary

Current breeding practices in mice are designed to maximize breeding productivity and have not been evaluated from the perspective of the health and wellbeing of the rodent mother, or dam. In a previous exploratory study investigating the impact of current breeding practices on the mouse dam's nutritional, metabolic, and behavioral profile, dams experiencing four continuous pregnancy and lactation cycles showed higher body weight, reduced exploratory behavior, and lower trabecular bone mineral density compared to dams with one cycle, while stress- and metabolism-related parameters showed no major differences (manuscript in preparation).

The present project aims to confirm key findings from this exploratory study in three studies using female breeding mice from commercial and in-house colonies. **Aim 1** compares multiparous retired pregnant dams with first-time pregnant dams. Hypothesis: Multiparous pregnant dams have increased body weight, reduced exploratory behavior, and reduced bone mineral density. **Aim 2** compares multiparous non-pregnant retired dams with age-matched virgin females. Hypothesis: Retired breeding dams show increased body weight, reduced exploratory behavior, and decreased bone mineral density. **Aim 3** assesses the fecal corticosterone levels, as an indirect readout of the Hypothalamus-Pituitary-Axis activity, across breeding cycles in Swiss Webster and C57BL/6J colonies. Hypothesis: Fecal corticosterone levels do not differ with the number of breeding cycles.

For Aims 1 and 2, body weight will be monitored three times per week during the lactation period. After weaning on postpartum day 21 (PPD 21), dams will undergo an elevated plus maze test on PPD 23 ± 2 and an oral glucose tolerance test on PPD 25 ± 3 . Animals will be euthanized on PPD 28 ± 3 for tissue collection. Group differences within each aim will be analyzed using unpaired t-tests.

For Aim 3, fecal samples of breeding dams will be collected at each weaning time point in ongoing breeding colonies and analyzed for corticosterone content. Statistical comparisons will be conducted across low (1–3 litters), medium (3–5 litters), and high (≥ 6 litters) parity groups. Similarity between groups will be analyzed using test of equivalence.

Registration details	
Status of the study	Registered
Date of registration	2026-01-07
Notified date of accessibility	2028-12-31
DOI	10.17590/asr.0000422
Planned start of the study	2025-11-25
Planned end of the study	2026-03-02
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