ORIP
OFFICE OF RESEARCH INFRASTRUCTURE PROGRAMS

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Animal Model Research: Effects of Laboratory Conditions on Rigor of Experimental Protocols and Reproducibility of Experimental Outcomes

Malgorzata Klosek, Ph.D.
Director, Division of Construction and Instruments

NIH National Institutes of Health
Office of Research Infrastructure Programs

ORIPs Divisions: Working Together

- ORIPs Division of Construction and Instruments (DCI) supports:
  - Research facilities (construction & remodeling, when funds are appropriated)
- ORIPs Division of Comparative Medicine (DCM) supports:
  - Animal models (development & maintenance)
- This proposed **concept - bridging between facility environment and experimental outcomes -** is a collaboration between DCI & DCM


Trends in Cancer
Opinion
Thermoneutrality, Mice, and Cancer: A Heated Opinion
Bonnie L. Hylander[1] and Elizabeth A. Repasky[1,*]
nature neuroscience
Troublesome variability in mouse studies
We urge greater awareness of the potential genetic and environmental confounds involved in
interpreting studies with mice, and encourage the accurate reporting of the study's
Journal of Neuroscience Methods
journal homepage: www.elsevier.com/locate/jneumeth
ELSEVIER
Basic Neuroscience
hat's wrong with my mouse cage? Methodological considerations
deling lifestyle factors and gene–environment interactions in
CrossMark
ELSEVIER
Nutrition
journal homepage: www.nutritionjrnl.com
Basic nutritional investigation
The effects of diet on the severity of central nervous system disease: One part of lab-to-lab variability
Jane E. Libbey M.S. [a], Daniel J. Doty B.S. [a], Jordan T. Sim B.A. [a], Matthew F. Cusick Ph.D. [b], June L. Round Ph.D. [a], Robert S. Fujinami Ph.D. [a,*]
REPRODUCIBILITY
A mouse's house may ruin studies
Environmental factors lie behind many irreproducible rodent experiments.
BY SARA REARDON
Nature, vol 530, 2016
NIH National Institutes of Health
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Laboratory Conditions: Rigor & Reproducibility

- New Concept:

  ORIP proposes to support systematic investigations into the role of standard laboratory environmental conditions on outcomes of animal model experiments.

- Concept deals with two key issues:
  - Essential factors associated with specific experiments
  - Biological mechanisms affected by standard environmental conditions

Topics of Initiative

- **Investigations into effects of standard environmental conditions in specific facilities and laboratories on:**
  - Specific animal models
  - Specific disease areas
  - Protocols
- **Examples:**
  - Lights on/off periods, light color
  - Food (type of feed & formulation, feeding protocols & schedule)
  - Temperature, noise, humidity
  - Quarantine (time, conditions) and animal care procedures (bedding)

Target Audience and Participants

- **Target research community:**
  - Investigators who use animal models
  - Investigators who develop animal models
  - Investigators who work in animal model facilities
- **Participants:**
  - Multi-PI / Multi-disciplinary research team (e.g., subject area scientists with an animal model expert)
  - Cross-institutional collaborations

Anticipated Outcomes

- **Prospective discoveries:**
  - Factors which need to be controlled in specific models and specific experiments
  - Correlations between extrinsic factors and experimental outcomes
  - Biology of mechanisms responsible for the effects of extrinsic factors on experimental outcomes

Anticipated Outcomes

- **Long-term outcomes enhancing rigor and reproducibility:**
  - Identification of conditions and associated mechanisms which must be accounted for will lead to:
    - More rigorous experimental protocols
    - More reliable experimental data with relevant metadata attached
    - Improved method sections
  - Newly identified needs for specialized tools and devices to manage facilities
  - New knowledge about design and organization of facilities to better meet research needs

New Funding Opportunity Announcement

- **Proposed Initiative:**
  - Annual budget: ~$6M /year
  - $250K Direct Costs / year per award for up to 2 years
  - One receipt date / year
  - Funding mechanism such as R24 or U24
    - Exploratory (not necessarily hypothesis-driven)
    - Balance of gained expertise and innovative discoveries
    - Community-wide dissemination of results

Concept Clearance

To develop a new funding opportunity announcement to support research on the role of standard laboratory environmental conditions on the rigor of experimental protocols and outcomes of animal model experiments.