Enhancing Rigor and Reproducibility of Animal Research by Studying and Managing Environmental Extrinsic Factors

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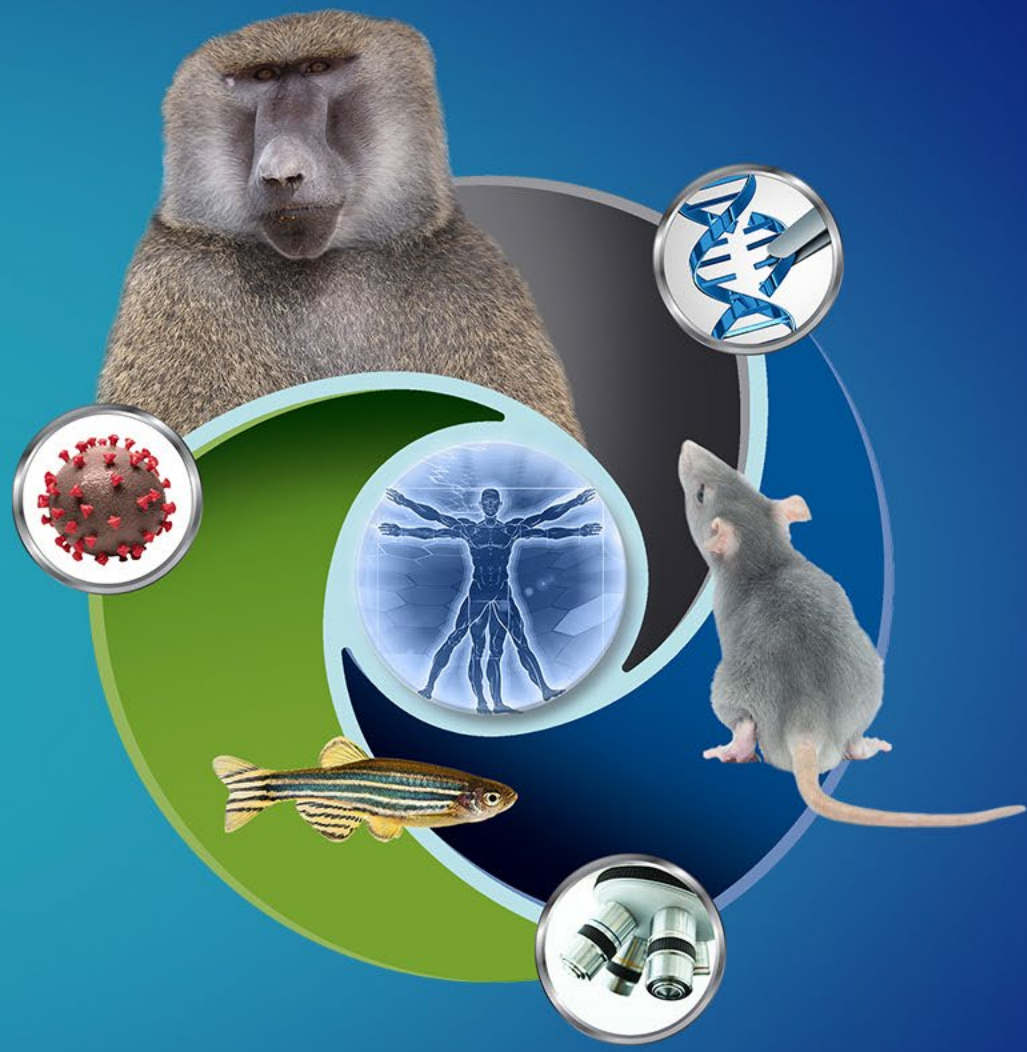

ORIP
OFFICE OF RESEARCH INFRASTRUCTURE PROGRAMS

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Concept Clearance: New

Enhancing Rigor and Reproducibility of Animal Research by Studying and Managing Environmental Extrinsic Factors

Objective: To support research projects to characterize the effects of extrinsic factors that affect physiological and behavioral outcomes in experimental conditions using animal models

Funds Available and Anticipated Number of Awards: Contingent upon NIH appropriations and the submission of meritorious applications

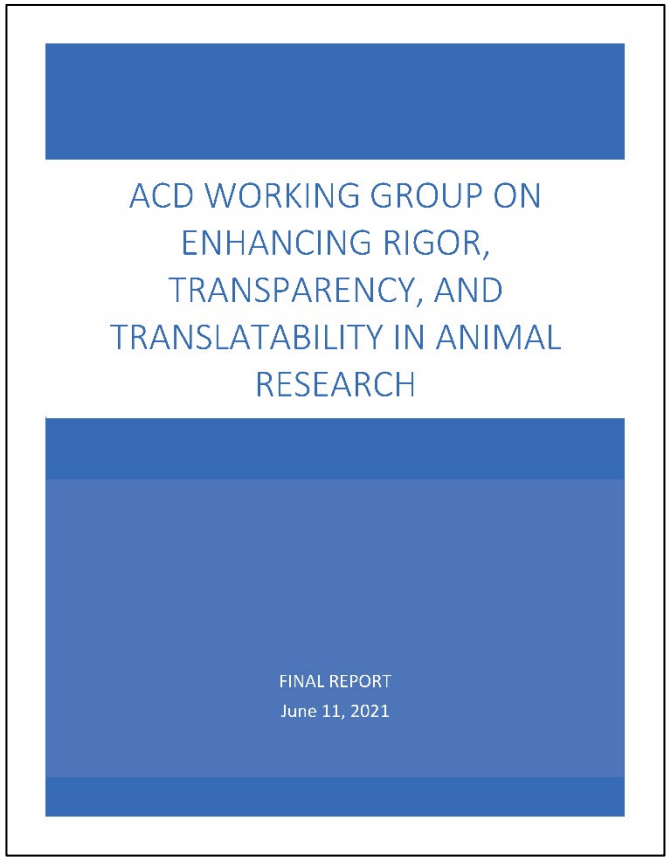
Award Project Period: 3–4 years

Council Action: Vote for approval of the concept for "Enhancing Rigor and Reproducibility of Animal Research by Studying and Managing Environmental Extrinsic Factors"

Background

Key recommendations of the 2021 Advisory Committee to the Director:

- NIH should encourage and support work to better understand, monitor, record, and report important extrinsic factors related to animal care that may affect research results.



Background

ORIP Strategic Plan 2021–2025

- Facilitate the development and ensure the availability of the highest-quality and most useful animal models and related resources for the advancement of research on human disease.
- Improve and disseminate the best models for human conditions and diseases that are of interest to multiple NIH Institutes and Centers (ICs).
- Advance the application of new technologies to support research resources and improve the generation, care, preservation, and distribution of animal models.

https://orip.nih.gov/sites/default/files/ORIP_Strategic_Plan_2021-2025_508.pdf

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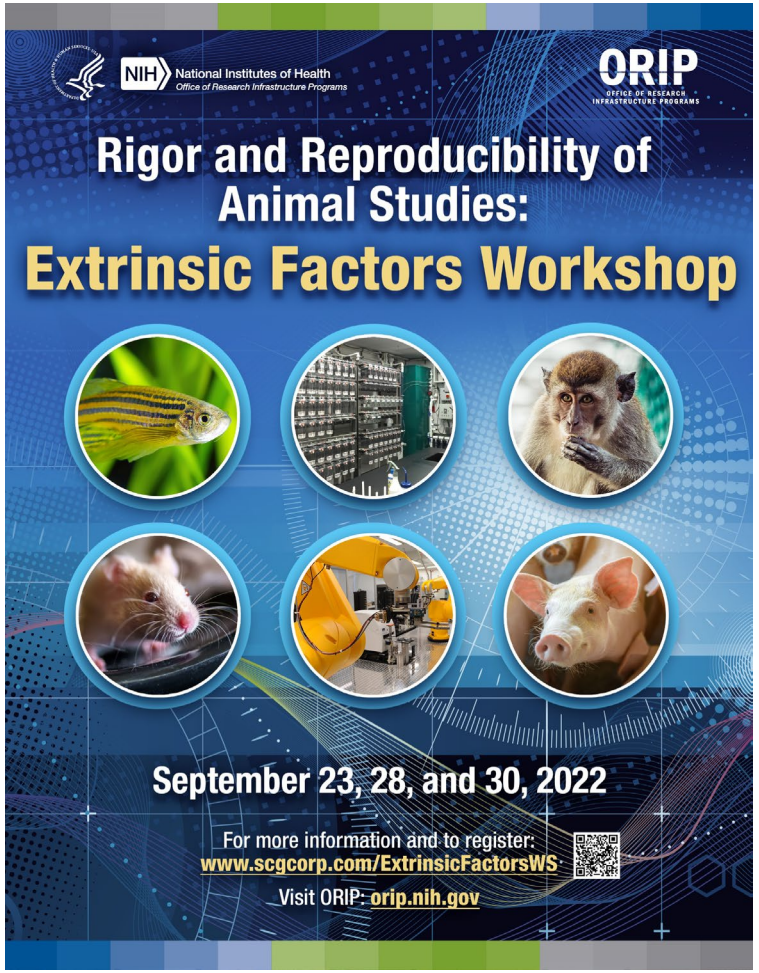
Background

- Organized by ORIP and NIA in collaboration with several ICs as three virtual sessions focused on aquatic models, rodents, and large animals (i.e., nonhuman primates and swine)
- Topics that are relevant to rigor and reproducibility in animal studies included—
  - Extrinsic factors
  - Housing environments
  - Equipment and modern technology



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Conclusions from the Workshop

- Extrinsic factors a play significant role in the rigor and reproducibility of animal studies.
- Various key factors were highlighted for different animal models (e.g., water quality for aquatic animals, lighting/temperature for rodents, social structure for large animals).
- Modern equipment is required to manage, measure, and report relevant extrinsic factors critical for the species selected.
- Systematic studies are needed to provide crucial data regarding the impact of environmental extrinsic factors on rigor and reproducibility of animal research.

Purpose of the New Initiative

- Support research projects from shared facilities, cores, and resources on studying the physiological and behavioral outcomes in animal studies due to extrinsic factors
- Proposed projects must—
  - Be applicable to two or more ICs
  - Be relevant to physiology or diseases that influence multiple body systems
  - Support the purchase of modern equipment to manage, measure, and study extrinsic factors relevant to rigor and reproducibility in animal studies
  - Address significant need for the proposed equipment and the need to study the extrinsic factors by the biomedical research community
  - Inform resource gaps and needs, including key extrinsic factors and housing environments depending on animal model, as well as equipment and modern technology for monitoring and studying impacts of extrinsic factors and housing environments

Examples of Suitable Projects

- Smart tank/cage systems to investigate the experiment outcome under various animal housing, husbandry, and environmental conditions
- Equipment to investigate how biological mechanisms are affected by specific extrinsic factors that are mediating physiological responses and contributing to rigor and reproducibility
- Development of measurable biomarkers, behavioral changes, and physiological parameters affected by extrinsic factors that enhance animal well-being, research reproducibility, and translational relevance of animal models

Potential Outcomes

- Systematic characterization and analysis of effects of extrinsic factors on different biological functions that affect reproducibility of basic and translational studies using animal models
- Recommendations on how to record, document, and report extrinsic factors in a standard, reproducible, and computer-friendly form

Concept Clearance

Vote for approval of the concept for "Enhancing Rigor and Reproducibility of Animal Research by Studying and Managing Environmental Extrinsic Factors"