TITLE: R3PEATS: Research **R**igor and **R**eplication to **P**romote **E**xcellence, **A**ccuracy, and **T**ranslation in **S**cience

BACKGROUND: R3PEATS addresses the critical need for increased rigor and replicability in biomedical research—key factors in advancing reliable and innovative knowledge acquisition to improve health outcomes and extend healthy lifespan. NIH has shown a strong commitment to rigor and replicability through initiatives in research quality, data sharing, education, and community outreach; however, direct replication efforts and cross-sector coordination remain limited within and beyond NIH (see Appendix). This goal-driven program builds on prior lessons learned to create unprecedented opportunities for collaboration and systematic investigation into the factors that shape experimental replicability. R3PEATS seeks to create a synergy of **research, partnership, engagement, and coordination** to drive culture change to better promote rigorous, transparent, and replicable practices that broadly benefit NIH-funded research, the wider scientific community, and the general public.

PROGRAM GOALS: (1) deliver an accessible, well-documented knowledgebase of high-priority replicated biomedical research, its outcomes, and factors/practices that enable or hinder replicability; (2) unite a broad spectrum of public partners (e.g., academia, publishing, industry, nonprofits) to test and refine infrastructure and incentives that enable and reward rigorous, replicable research; and (3) engage researchers and the public through training and outreach on the drivers and health impacts of replicability. These novel, synergistic efforts will advance rigorous science and provide unprecedented insight into research replicability, reform future scientific practice through sustained culture change, catalyze health science discoveries, foster new public-private partnerships, and transform how this topic is communicated to scientists and the public.

PROPOSED INITIATIVES:

1. Replication Centers (Research): (1) provide infrastructure, expertise, and leadership to conduct and openly share multiple independent, multi-site replications of high-impact biomedical studies; and (2) identify sources of experimental robustness and compile best practices to catalyze replicability in the broader scientific community.

2. Metascience Testbed (Partnership): (1) develop, validate, and apply metrics to assess, promote, and predict replicability; (2) leverage cross-sector partnerships to test novel infrastructure, incentives, and culture change interventions for enhancing research replicability (e.g., publishing, researcher assessment, institutional resources); and (3) quantify adoption and impact of these interventions within the broader scientific enterprise.

3. Education and Outreach Center (Engagement): (1) centralize existing educational offerings on rigor and replicability, evaluate their pedagogical effectiveness for scientists at all levels of research experience, and prioritize approaches and incentives for implementation in various contexts (e.g., classroom, laboratory); (2) integrate lessons learned from Initiatives 1 & 2 to refine materials and synthesize best practices; (3) train researchers at all stages in best practices for rigorous and replicable science; and (4) develop novel outreach programs to enhance communication with scientists, organizations, and the public to foster awareness and culture change around replicability.

4. Coordinating Center (Coordination): (1) establish and maintain a centralized web portal/knowledgebase to compile program outcomes and lessons learned; (2) coordinate meetings and foster strong communication within the program, including an awardee-based **Consortium** for day-to-day operational decisions and a **Steering Committee** of internal and external experts for strategic direction; and (3) organize merit-based peer review for proposed Replication Center projects; and (4) provide administrative and logistical support to the other Centers.

DELIVERABLES: (1) a publicly accessible evidence base of rigorously replicated, NIH mission-relevant studies; (2) a knowledgebase of important and broadly applicable experimental and biological contributors to variability, heterogeneity, and replicability; (3) novel validated metrics for assessing replicability; (4) a curated collection of effective educational resources to strengthen rigorous and replicable research practices; and (5) a network of strategic partnerships to test, champion, and sustain community-wide efforts to promote rigorous, transparent, and replicable research in order to catalyze reliable scientific discoveries and transform human health outcomes.

BUDGET: $175M in total costs over 5 years.

TABLE 1 - BUDGET SUMMARY.

TABLE 1

	Lead IC	FY27	FY28	FY29	FY30	FY31	Total
Initiative 1 – Replication Centers	TBD	$20M	$20M	$20M	$20M	$20M	$100M
Initiative 2 – Replication Metascience Testbed	TBD	$8M	$8M	$8M	$8M	$8M	$40M
Initiative 3 – Education and Outreach Center	TBD	$5.5M	$5.5M	$5.5M	$5.5M	$5.5M	$27.5M
Initiative 4 – Coordinating Center	TBD	$0.75M	$0.75M	$0.75M	$0.75M	$0.75M	$3.75M
RMS – for NIH staff salary and travel; NIH-organized workshops	TBD	$0.75M	$0.75M	$0.75M	$0.75M	$0.75M	$3.75M
TOTAL		$35M	$35M	$35M	$35M	$35M	$175M

APPENDICES – PORTFOLIO ANALYSIS AND ASSESSMENT OF NEEDS, GAPS AND OPPORTUNITIES.

APPENDIX 1: Replication Landscape Analyses