SCIENCE TO ACHIEVE RESULTS (STAR) RESEARCH GRANTS PROGRAM

The U.S. Environmental Protection Agency's (EPA) Science to Achieve Results (STAR) Program aims to stimulate and support scientific and engineering research that advances EPA's mission to protect human health and the environment. It is a competitive, peer-reviewed, extramural research program that provides access to the nation's best scientists and engineers in academic and other nonprofit research institutions. The STAR program funds research on the environmental and public health effects of air quality, environmental changes, water quality and quantity, hazardous waste, toxic substances, and pesticides.

Since its inception in 1995, EPA's STAR program has awarded more than 7,600 research grants nationwide. The program funds individual research projects and establishes large research centers in specific areas of national concern.

Additionally, the STAR program supports the development of researchers and young scientists across their careers through regular and early career research opportunities. Graduate students, post-doctorate scientists, and early career scientists are also often engaged in STAR research teams, developing their interests and skills and impacting the course of their careers.

Research Areas

STAR research is funded through a competitive solicitation process, or request for applications (RFAs). The RFAs are developed from the EPA Office of Research and Development's Strategic Plan and research plans for specific topics in cooperation with other parts of the Agency. STAR research grants cover six major research areas of interest. Due to the interdisciplinary nature of STAR research projects, RFAs often address more than one of these research areas. Learn more about each of the following research areas: https://www.epa.gov/research-grants/research-grant-areas.

- **Safer Chemicals Research Grants** fund research on methods, data, information, and tools to enable more informed, timely decisions about chemicals, many of which have not been thoroughly evaluated for potential risks to human or ecological health.
- **Air Research Grants** focus on measuring air pollution exposures and effects, as well as developing new technologies to reduce and prevent emissions.
- **Ecosystems Research Grants** fund research to protect ecosystems and the air and water resources that provide numerous benefits for humans and the environment.
- **Health Research Grants** fund research to improve the scientific basis for decisions to improve health, especially for vulnerable groups such as children and the elderly.
- **Sustainability Research Grants** support the research and development of a variety of methods, tools, guidance, and programs that further the application of sustainability within decision-making.
- **Water Research Grants** fund research needed to develop sustainable solutions to water resource problems, ensuring water quality and availability in order to protect human and ecosystem health.

ED_013286A_00000848-00001

Highlights from Current and Recent Safer Chemicals Research Grants

Modeling the Female Reproductive Tract With 'Organ-on-a-Chip' Technology
In cooperation with EPA scientists, STAR researchers at the Vanderbilt-Pittsburgh Resource for Organotypic Models for Predictive Technology (VRPROMPT) developed an innovative "organ-on-a-chip" model that mimics the female reproductive tract. This model enables the study of how chemicals, infections, and other environmental factors contribute to adverse pregnancy outcomes such as preterm birth. The VRPROMPT team is now using the chip to test the effects of reproductive toxicants on reduced male fertility. This technology may more accurately model human immunobiology than animal models and may significantly reduce the need for them. Learn more: https://cfpub.epa.gov/ncer_abstracts/index.cfm/fuseaction/display.abstractDetail/abstract/10439/report/0.

The Effects of Genotype-Phenotype Interactions on Silver Nanoparticle Toxicity
Silver nanoparticles (AgNP) are used in the manufacturing of antimicrobial products. Previous studies have identified AgNP toxicity on airway epithelial cells, but EPA STAR researchers at the University of Washington were the first to use organotypic cultures as an *in vitro* model of the airway to further study toxicity. This model seeks to characterize the effects of gene-phenotype interactions on AgNP toxicity. Researchers derived tracheal epithelial cells to characterize relationships for AgNP-induced adverse respiratory outcomes across genotypes, phenotypes, and exposures. Results suggest that those with chronic respiratory disease are more sensitive to AgNP exposures in occupational settings. Learn more: https://cfpub.epa.gov/ncer_abstracts/index.cfm/fuseaction/display.abstractDetail/abstract/10443/report/0.

Network for Rapid Assessment of Chemical Life Cycle Impact
EPA STAR researchers from the University of California, Santa Barbara developed an open-access, online tool to assess the life cycle impacts and human health risks of novel chemicals. The Chemical Life Cycle Collaborative (CLiCC) tool is expected to help chemical producers understand potential environmental and human health consequences at an early stage of design, enabling informed decisions about design choices. The framework allows multiple levels of analysis for both the layperson and the advanced user to benefit from. It will promote the education of the public via accessible modules designed for use by students and the general public. Policymakers are also able to use the CLiCC tool to screen new chemicals, thereby informing new product restrictions and creating enforceable regulations. Learn more: https://cfpub.epa.gov/ncer_abstracts/index.cfm/fuseaction/display.abstractDetail/abstract/10211/report/0.

Alternatives to Animal Tests for Developmental Neurotoxicity
Exposure to environmental chemicals early in life may contribute to neurodevelopmental disorders such as autism. Animal tests exists for developmental neurotoxicity (DNT), but the high costs and technical difficulties of these tests are prohibitive for routine DNT chemicals screening. EPA STAR researchers at Johns Hopkins University are developing an alternative to animal tests for DNT based on a human-derived brain model where six key events of neurodevelopment and their perturbation will be assessed in one assay. This robust and standardized *in vitro* assay is expected to reduce the costs and accelerate the testing of environmental chemicals and risk assessment. Learn more: https://cfpub.epa.gov/ncer_abstracts/index.cfm/fuseaction/display.abstractDetail/abstract/10983/report/0.

Upcoming STAR RFAs

Assessment Tools for Synthetic Biotechnology Products. EPA is soliciting applications for research to support improved human health and environmental risk assessments of new biotech products, including those developed through synthetic biology, genome editing, and metabolic engineering.

For this and other future STAR funding opportunities, visit EPA's Research Grant funding opportunities website at https://www.epa.gov/research-grants/research-funding-opportunities and sign up for the Research Grants Listserv at https://www.epa.gov/research-grants/research-grants-fellowship-and-sbir-listserv.

—

Explore research results from past STAR grants: https://cfpub.epa.gov/ncer_abstracts/index.cfm/fuseaction/search.welcome.

—

Contact:
osape_communications@epa.gov.

ED_013286A_00000848-00002