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Concept Clearance

Branch: ERTB

Council Period: 202605

Concept Title: Micro and Nanoplastics Research Coordination Center

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Introduction

Emerging evidences shows that microplastics (MPs) and nanoplastics (NPs) pose a risk to human health. Humans get exposed to MPs and NPs through oral, inhalation, and dermal routes, with major sources being drinking water, foods, air, clothing, and soil. Studies show that exposure to MPs or NPs can also cause humans to experience secondary exposures to other toxicants that the particles adsorb, both during their original processing or through environmental transport and degradation. Experimental studies show that MPs and NPs induce oxidative stress, inflammation, cell toxicity and damage. Recent studies showed presence of MPs and NPs in a wide array of human tissues and organs including blood, brain, lung, heart, liver, kidney, intestine, and placenta.

In 2020, NIEHS sponsored a NASEM workshop that highlighted the need for future studies that use controlled and focused approaches, apply advanced technologies, and incorporate cross disciplinary methods. The workshop strongly emphasized expanding research to understand potential health effects associated with exposure to the understudied NPs.

As an initial effort to promote research on MPs and NPs, NIEHS issued a Notice of Special Interest (NOSI) (Expired NOT-ES-23-002: Notice of Special Interest (NOSI): Understanding Exposure and Health Effects of Micro and/or Nanoplastics) solicitating R01 and R21 applications. NIEHS continues to support investigator initiated research applications across various mechanisms that address the human health impacts of MPs and NPs. NIEHS has also supported research on the environmental fate and bioactivity of MPs and NPs through the NIEHS-NSF Centers for Oceans and Human Health program.
To gain a broader perspective on the health effects of MPs and NPs that transcend current research silos, this concept proposes establishing a resource and research coordination center for MPs and NPs research as a multidisciplinary team science approach including promoting data sharing, and open communication about best practices.

Research Goals and Scope

This initiative aims to solicit proposals to establish a robust resource and research coordination center that will coordinate multidisciplinary efforts among MPs and NPs researchers, provide leadership, and build a community research program promoting best practices to better understand the exposure and health effects of MPs and NPs. Key activities may include:
•Coordinate efforts among biomedical and material science, and exposure science researchers to promote and enable standardization and consistency in sampling and analytical methods.
•Establish best practices for physicochemical, physiochemical, and biological testing, and develop, adopt, and promote specific and sensitive methods for detecting and quantifying MPs and NPs in diverse environmental and biological matrices.
•Distribute experimental standards across the MP research field and assist researchers in building focused expertise and scientific capacity.
•Establish resources that maximize current efforts and coordinate the use of multiple technologies.
•Provide leadership in guiding the broader community on data collection, storage, common data elements, data sharing, data harmonization, and database development.

•Disseminate best practices to the research community in a timely and effective manner.
•Foster collaborations across the MPs and NPs research community and lead frequent outreach and consensus-building activities among relevant researchers.

Mechanism and Justification

The Make America Healthy Again (MAHA) report identifies the need to continue studies on MPs to better understand their health effects. With NIH renewing its focus on rigor and reproducibility and recognizing the unmet need for advanced tools, standards, and protocols for MPs and NPs research, the field requires a focused and coordinated effort to accelerate progress in this emerging area.

This resource and research coordination center will strengthen and focus the MPs and NPs research community by conducting frequent outreach and consensus building activities among relevant groups and communities. It will disseminate commonly agreed upon technologies and best practices for MPs and NPs research to the broader biomedical community for adoption. By building shared resources, the center will improve accessibility to key tools and approaches across previously siloed research areas.

This coordination center will build the required expertise and capacity and serve as a resource to promote team science, enabling more joint and targeted research efforts that directly address the challenges of this emerging public health problem.