Report 36: Role of environment in neurodegenerative diseases and healthy aging.

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Brief History:

- Healthy aging is a general aspiration and an economic imperative
- Healthy aging is severely compromised by diseases that affect the aged; some of these, such as Parkinson's disease, have clear environmental risk factors based on epidemiological studies; others, like Alzheimer's disease have no known/clear environmental risk factors identified in epidemiological studies yet the small role played by genetics points towards an obligatory role of environmental factors

Discussion Highlights:

- Environmental risk factors may not have been identified because they were studied in isolation
- Genetic polymorphisms may have small effects but become a lot more significant in the context of environmental exposures
- Understanding the genetic basis of sensitivity or resistance to environmental toxins can be critical to understand the mechanism of neurodegeneration
- Insights into the role of environmental factors in neurodegeneration is likely to come from a basic understanding of DNA repair mechanisms and other defense mechanisms of the cell
- Resources are generated by various institutes that need to be integrated in the study of environmental effects; these include genetic data but also model organisms
- Exposure is difficult to measure/characterize; better assessment measures and biomarkers will help
- When no clear epidemiological data are available, it may be worthwhile to expose model organisms of the disease to a variety of environmental toxins to determine which ones are most likely to synergize with the mechanisms of disease pathophysiology to guide further epidemiological studies to validate their role in humans

Recommendations:

- The NIEHS needs to play a leadership role in bringing the role of the environment into research on neurodegenerative disorders conducted by other institutes. Many investigators are not aware or do not know how to study environmental factors associated with neurodegenerative disorders.

- Conversely, the NEIHS can play a role in increasing awareness of investigators interested in the role of environment about resources generated by other institutes. For example, concretely, generate an RFA designed to study the effects of relevant environmental exposure on model organisms generated by other institutes
- The NIEHS should promote studies that consider the role of genetic risk factors for neurodegenerative disorders generated by GWAS and other studies in the context of environmental exposure
- Peripheral and central inflammatory cells are likely to be a mechanistic link between environmental exposure and neurodegeneration; the institute should promote research at the interface between environment, inflammation, and neurodegeneration
- The NIEHS should take a leadership role in promoting public/policy makers awareness that environmental factors influence the health of the aging population

Discussion Participants:

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