

Report 24: Nutritional modulation of environmental insults (or: Interplay of nutrients with toxicants to modulate health and disease)

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Brief History:

Nutrition is currently of significant public awareness and a topic of interest to the general public (as well as to politicians). The general public and health professionals are interested in improving diet and nutrition to counteract the obesity and diabetes epidemics, etc. Some nutrients or bioactive nutrient metabolites can improve health and down-regulate the pathology of diseases.

Nutrition is a modifying parameter to modulate toxicological insults. Certain nutrients, such as high-fat diets, can amplify an environmental insult, whereas antioxidants or anti-inflammatory nutrients can buffer metabolic events associated with pathologies linked to exposure to environmental toxicants.

Discussion Highlights:

Metabolically, nutrition and toxicology share many mechanistic pathways involved in the pathology of various diseases.

There is a need to develop a metabolic platform that allows to interpret how nutrition can either increase or buffer environmental insults.

Certain diseases, such as atherosclerosis, are inflammatory diseases with pathologies progressing throughout life: thus, diet and nutrition as well as exposure to persistent environmental pollutants can interact to influence the kinetics of such inflammatory pathologies.

There is a great need to understand how nutrients interact with toxicants to modulate molecular pathways, metabolism and health/disease parameters. Animal models are needed to understand these complicated metabolic interactions; for example, the microbiome is influenced both by nutrients and environmental pollutants.

The importance of nutrition (nutritional modulation) spans across all age groups. Infants and the elderly have changing nutrient requirements. This has implications in cumulative risk assessment and risk management paradigms because nutrients can either act as stressors or buffers. Thus, diet can modify risks associated with pollutant exposure.

Data bases are needed to combine the complexity of information related to diet or nutrition, genetics, environmental exposure, etc., to risk of environmental pollutions and compromised health and disease pathologies (need to understand the significance of metabolic variations).

Nutrition fits well into aspects of research translation and community engagement activities.

Recommendations:

NIEHS is the appropriate institute to include nutritional parameters for studying disease potential of exposure to environmental pollutants. The mission of NIEHS is not limited to a particular disease or group of diseases. Also, NIEHS is interested in metabolism and whole-body effects. This is important because nutrition (nutrients), as well as environmental pollutants, can impact overall health and pathologies of numerous disease states.

Diet and nutritional interventions can be used to buffer hazardous exposure and associated risks. The question is “how can nutrition fit into the risk assessment paradigm”? This has implications for impacts on public health statements at the national and global level; nutrition includes global health.

Discussion Participants:

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