Addressing Complex Challenges Posed by Hazardous Substances

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Primary Objectives - SRP Mandates

Supported by the National Institute of Environmental Health Sciences, the Superfund Research Program (SRP) funds research related to the development of:

- Methods and technologies to detect hazardous substances in the environment
- Advanced techniques for the detection, assessment, and evaluation of the effects on human health of hazardous substances
- Methods to assess the risks to human health presented by hazardous substances
- Basic biological, chemical, and physical methods to reduce the amount and toxicity of hazardous substances
Multidisciplinary research addressing broad, complex issues related to hazardous substance exposure

- Health Effects
- Epidemiology
- Fate and Transport
- Remediation
- Mechanistic Toxicology
- Ecology Studies
- Unifying Theme
- Training
- Community Engagement
- Research Translation
SRP Research Exposure and Health Effects

Tools to assess health effects

Tools to evaluate exposure

Chemical safety evaluation
SRP Research: New Approaches and Alternatives for Toxicity, Fate and Transport, and Ecotoxicity Testing
Zebrafish: health effects of developmental exposures

- Combined panel of zebrafish genes with a rapid testing platform to identify chemicals that induce oxidative stress (University of Washington)

- Found that PBDEs can bind to proteins that regulate thyroid hormones and bone development using zebrafish (Duke University)

- Zebrafish model to define the toxicity of complex PAH mixtures (University)

Learn more from Lisa Truong in Session I of this series
New tools for studying ecotoxicology

- Explored the complex genetics involved in how Atlantic killifish have rapidly evolved to tolerate polluted East Coast estuaries (Boston University)
- Examined mechanisms of olfactory injury and oxidative stress in salmon (University of Washington)
- Developed a 3D liver cell model to screen chemicals for toxicity in fish (Brown University)

Learn more from April Rodd in Session I of this series
Screening for hazardous chemicals in the environment and in human samples

- Cell-based assays combined with imaging and web-based analysis to quickly assess the risks of endocrine disrupting chemicals during environmental emergencies. (Texas A&M)

- Immunoassays using VHH antibodies isolated from alpacas to detect PCBs, pesticides, and other compounds and degradation products. (UC Davis)
New approaches to understand fate and transport

- Developing models to predict vapor concentrations seeping into buildings (Brown University and University of Kentucky)
- Assessing pathways that transport PAHs in the atmosphere using spatial and temporal tracking (Massachusetts Institute of Technology)
- Using novel statistical methods to fingerprint PFAS measured in fish and drinking water (University of Rhode Island)
- Identifying how asbestos forms aggregates and moves through groundwater (University of Pennsylvania)
Computational methods to predict the toxicity and exposure

- **Computational pipeline** to construct chemical networks (Boston University)
- **A novel platform** that can rapidly and automatically analyze environmental samples to screen for chemicals (Texas A&M)

Learn more from Erin Baker in Session II of this series
Computational methods to predict the toxicity

- **Platform** to map the reactivity of environmental chemicals (UC Berkeley)

![Diagram](image)

- A **computational approach using cell-based data** to estimate differences in susceptibility to chemicals based on population variability (Texas A&M)

You will hear more from Weihsueh Chiu
Developing models to integrate diverse data sets

Chemical safety evaluation
Enhancing environmental health solutions through data integration

- Biological response data
- Exposure data
- Fate and transport data
- Sustainable remediation data
- Epidemiology data

Reducing the burden of disease
Past SRP Risk e-Learning Webinars

- Archives are available from related SRP Risk e-Learning webinars
- **Fall 2017: Adverse Outcome Pathways**
  - Introduction to the Adverse Outcome Pathway Framework
  - Assembling and Assessing AOP Information
- **Spring 2017: Analytical Tools and Methods**
  - Field-Ready Biosensors to Assess Bioavailability and Toxicity
  - Techniques for Trace Analysis of Metals and Chemical Mixtures
  - Fate and Transport of Contaminants
- **Current series:**
  New Approaches and Alternatives for Toxicity Testing