The fundamental philosophy of Superfund Basic Research Program (SBRP) is to bring together scientists from biomedical and non-biomedical fields to tackle scientific issues relating to hazardous waste and environmental pollution that cannot be solved with a single discipline.
The following slides represent just a sampling of the ways that Superfund programs around the country collaborate with one another to further their scientific research.
- Tested hypothesis that the additive effects observed between PCBs and linoleic acid on vascular endothelial cell dysfunction may be due in part to the formation of linoleic acid metabolites, such as leukotoxins and their diol derivatives.

- Several abstracts
- 4 critical publications
Duke University

Bioassay Network at Texas A&M

Testing the utility of killifish and zebrafish embryo development as useful endpoint for sediment screening

University of California Davis

Collaborating on the occurrence of teratogenic aryl hydrocarbon agonists in common waste products

Boston University

Examining mechanisms of teratogenesis in killifish and zebrafish elicited by Superfund chemicals
Working to enhance genomic tools available for Fundulus heteroclitus model. A workshop on this topic resulted in the Burnett et al. (2007)
- Determine level of arsenic in groundwater
- Elicit the primary mobilization mechanism behind this problem
- Design a sampling program to analyze splits of samples and interpret results
- Public information website regarding water quality and supply (ready for beta testing Dec 2008)
The following slides show the common areas of research that the various Superfund programs share.
Arsenic

- Columbia University
- Dartmouth College
- University of California, Berkeley
- University of Arizona
Research Relating to Water Contamination

University of California San Diego - Water born pollutants that cause genomic stress

University of California Davis - Fate and transport of hazardous materials in groundwater

University of Arizona - Hydrogeologic studies relating to metal and organic contaminants

Columbia University - Health effects of Arsenic in groundwater

University of Iowa - Exposure to polychlorinated biphenyls in contaminated water
Common Research:
-Toxicity of common household times such as:
  • Toothpaste
  • Cosmetics
  • Food packaging
<table>
<thead>
<tr>
<th>As</th>
<th>Mn</th>
<th>PCBs</th>
<th>PAHs</th>
<th>Hg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Columbia University</td>
<td>Columbia University</td>
<td>University of Iowa</td>
<td>University of North Carolina</td>
<td>University of Washington</td>
</tr>
<tr>
<td>Dartmouth College</td>
<td></td>
<td>University of Kentucky</td>
<td>University of California Berkeley</td>
<td>Dartmouth College</td>
</tr>
<tr>
<td>University of Arizona</td>
<td></td>
<td>University of Iowa</td>
<td>Duke University</td>
<td>University of California Berkeley</td>
</tr>
<tr>
<td>University of California Berkeley</td>
<td>Brown University</td>
<td></td>
<td></td>
<td>Michigan State University</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Common Superfund Chemicals and the Universities Researching Them

<table>
<thead>
<tr>
<th>Pb</th>
<th>PCE</th>
<th>Various Metals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dartmouth College</td>
<td>Boston University</td>
<td>Duke University</td>
</tr>
<tr>
<td></td>
<td></td>
<td>University of California San Diego</td>
</tr>
<tr>
<td></td>
<td></td>
<td>University of California Davis</td>
</tr>
</tbody>
</table>
# Research Relating to Humans

<table>
<thead>
<tr>
<th>University of Arizona</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Molecular effects of low level As on the human bladder</td>
</tr>
<tr>
<td>- Susceptibility to TCE and Chlorinated Acids in heart development</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>University of California Berkeley</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Biomarkers of chemical exposure and leukemia risk</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>University of Kentucky</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Vascular mechanisms of PCB-induced brain</td>
</tr>
<tr>
<td>- Obesity and PCB toxicity</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>University of North Carolina</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Genomic and genetic analysis of liver and kidney toxicity of trichlorethylene</td>
</tr>
<tr>
<td>- Comparative toxigenomics and individual differences in the Human response to dermal exposure to pyclic aromatic hydrocarbons.</td>
</tr>
</tbody>
</table>
### Research Relating to Humans cont...

**University of Washington**

- The effect of mercury exposure on the central nervous system
- The role of PON1 and PON2 in various neurodegenerative diseases including Parkinson's
- Working with elderly population to characterize the genetic traits and environmental exposures that may increase Parkinson’s disease.

**Duke University**

- Neurobehavioral mechanisms of cognitive and affective impairment from fetal exposure to superfund chemicals
- Mechanisms of environmental stress-induced developmental abnormalities

**University of California San Diego**

- Yeast genetics and stress response genes
- Toxicogenomic analysis of nuclear xenobiotic receptors, PXR and CAR, in chemical metabolism and human health

**Columbia University**

- Health effects of As cohort study
- Consequences of arsenic and Mn exposure on Childhood Intelligence
Research Relating to Humans cont...

Brown University

- Testicular sensitization and co-exposure synergy
- Genetic stress and toxicant-induced pregnancy disruption

Boston University

- Neurotoxic effects of PCE exposure during gestation and childhood
- Environmental phthalate toxicity in the immune system
- CYP genes and developmental toxicity
Outreach Projects

University of Washington-
- Working with elderly population to characterize the genetic traits and environmental exposures that may increase Parkinson’s disease.

University of California San Diego-
- Supporting the Tribal Environmental Health Collaborative (TEHC), which identifies, prioritizes, and addresses environmental health concerns and issues affecting Tribal Nations.
- Engaging with community organizations to tackle health and justice issues along the San Diego-Tijuana border region.
- Educating the public about environmental and global health issues
The following slides show how some of the Superfund programs have interacted with other agencies.
University of Washington

- Superfund presented a telecon PowerPoint to the EPA related to PON1 status and sensitivity to diazinon or chlorpyrifos.

Dartmouth College

- Collaborated on local concerns to find workable solutions.

University of Arizona

- U of A and the EPA worked to examine the toxicants found in groundwater, which is an important source in this dry region.
International Collaboration

University of California San Diego and Mexico

- Addressing health and justice issues near the Tijuana border.
- Preparing a documentary about the links of poverty, environmental toxicants, and health issues along the Mexican border.

University of Washington & Australian Government & UK government

- Working to resolve contaminated aircraft cabin issues
- Educating about the issues of diazinon for sheep dipping.
University of Washington’s Collaborations with Governmental Agencies

ATSDR & CDC
- OP exposures
- Tricresyl phosphate exposure in contaminated aircraft cabins.

FDA
- Workshop for real-time biosensing

Department of Defense
- Developmental treatment for nerve agent exposure

Washington State Department of Health
- Materials to aid pesticide applicator training programs