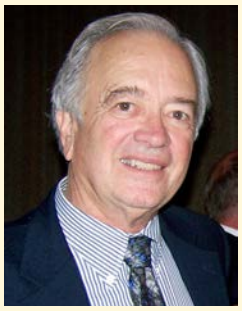
To the Point

UW-SRP* Research Snapshots



Dr. Clem Furlong

Today, some of the most important scientific research informs us about how our actions really can make a difference in living healthier lives. Some metals have dangerous neurotoxic impacts associated with them. Most of us are familiar with lead in drinking waterand mercury exposure but are unaware of many other neurotoxic metals. **Clement Furlong** and his colleague, **Lucio Costa**, have designed research questions to discover more about thehuman health risks from exposure to manganese and cadmium. For several years, Furlong and Costa have studied the role that two enzymes, the paraoxonases PON1 and PON2,play in defending one's body against the toxic effects of oxidative stress from metal exposure. The experiments that Drs. Furlong's and Costa's labs are currently undertaking will provide important information on the potential detrimental effects of exposure to manganese and cadmium on PON1. Oxidative modifications of this enzyme are expected to result in cardiovascular disease, diminished resistance to infection, and diminished ability to metabolize another important class of neurotoxicants, the organophosphorus insecticides.

The researchers will investigate how the presence of different levels of PON2 in the body may render individuals to be either more or less susceptible to central nervous system toxicity from manganese and cadmium. The research team has found that PON2 can be modulated by diet, environmental factors, and most significantly by gender, with females displaying higher levels than males.

Dr. Lucio Costa

What are neurotoxicants?

Heavy metals, metalloids and chemical compounds are neurotoxicants that can cause damage to the nervous system in humans and other animals. Drs. Furlong's and Costa's research focuses on exposures to the neurotoxic metals manganese and cadmium.

How do neurotoxicants enter the environment?

Manganese and cadmium can be naturally occurring in bedrock and soils. Most often these metals can enter the air as manufacturing and industrial emissions. Cadmium and manganese are also products of motor vehicle exhaust and tobacco smoke.Exposure to neurotoxicants usually happens through contact with contaminated water or soil, or through inhalation of contaminated air particles.

What does this research have to do with Superfund site hazardous chemicals?

The Superfund is a federal program that was established to clean up the nation's priority hazardous waste sites. A list of the most harmful chemicals has been established by the Agency for Toxic Substances and Disease Registry (ATSDR) and the UW-SRP researchers address exposure to chemicals at the top of this list. http://www.atsdr.cdc.gov/toxprofiles/tp.asp?id=48&tid=15

What is already being done to protect the environment?

The UW-SRP research has informed federal regulatory policy about neurotoxic exposures so that actions taken can make us safer. If you want to learn more about the laws that protect our health see the Toxic Substance Control Act link below.

Linked resources for further information:

University of Washington Superfund Research Program: http://depts.washington.edu/sfund/
NIEHS Superfund Research Program: http://www.niehs.nih.gov/research/supported/srp/index.cfm
ATSDR ToxFAQs™: http://www.atsdr.cdc.gov/substances/toxchemicallisting.asp?sysid=39
EPA Superfund sites information: http://www.epa.gov/superfund/sites
EPA summary of the Toxic Substances Control Act: http://www.epa.gov/lawsregs/laws/tsca.html

*University of Washington Superfund Research Program