

To the Point

UW-SRP* Research Snapshots



Zhengui Xia has spent many years researching the signaling pathways that relate to the generation of new nerve cells in the adult brain (adult neurogenesis) and the normal physiological function of these adult-born cells in memory formation and olfaction (the sense of smell). She is currently investigating if cadmium interferes with these



Dr. Zhengui Xia

processes. Cadmium (Cd) is a heavy metal that is often found at Superfund sites. It is of special interest because humans can be exposed to cadmium through ingestion of contaminated food or water and from breathing polluted air. Recent epidemiology studies have suggested that cadmium may affect cognition and olfaction. Alarmingly, children exposed to cadmium may develop learning disabilities and decreased verbal IQ.

Until now, no studies have examined the effects of chronic exposure to low doses of cadmium on adult neurogenesis or learning and memory function, and little is known about the underlying molecular and cellular mechanisms involved. Dr. Xia's research will provide new insights concerning these mechanisms and may help illuminate the neurotoxicity of other heavy metals.

Her research intends to identify new biomarkers for adult neurogenesis, which will be a useful tool in helping us identify successful approaches to cadmium toxicities. In the laboratory, a biomarker acts as a measure of cellular changes which can indicate a link to a specific environmental exposure to a health outcome.

What are neurotoxicants?

Heavy metals, metalloids and chemical compounds are neurotoxicants that can cause damage to the nervous system in humans and other animals. Dr. Xia's research focuses on the toxic effects of cadmium exposure and its effect on neurogenesis and animal behavior, including learning ability, attention and memory.

How do neurotoxicants enter the environment?

Most often these contaminants are products of industry waste but they can also be produced from vehicle exhaust and tobacco smoke. Exposure to cadmium usually happens through contact with contaminated water or soil, or through inhalation of contaminated air particles. Cadmium is recognized as a high priority contaminant because it is found in air, soil, and water and is present at many Superfund waste sites.

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 Dr. Xia's research addresses exposure to cadmium, which is #7 on the list. The findings of Dr. Xia's study will provide useful information about the risks of exposure to cadmium and possible solutions to help mitigate the issues caused by exposure.

Resources for Further Information:

University of Washington Superfund Research Program: <http://depts.washington.edu/sfund/>
NIEHS SRP: <http://www.niehs.nih.gov/research/supported/srp/index.html#af31506\dbch\af31505\loch\31506x.cfm>

ATSDR Toxic Substance Portal: <http://www.atsdr.cdc.gov/substances/toxsubstance.asp?toxid=23>

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>

Washington State Chapter of the Alzheimer Association: <http://www.alz.org/alzwa/>

Northwest Parkinson's Association: <https://nwpf.org/>