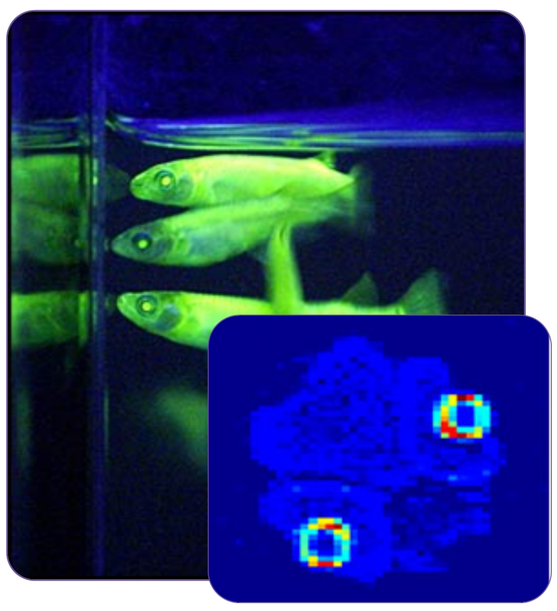
Helping the Environment

Arsenic Poisoning in Bangladesh

Using a synchrotron, scientists from the University of Saskatchewan discovered that if harmful levels of arsenic and selenium are present in the body in equal amounts, they will bind with a naturally-occurring molecule and pass through the body harmlessly. This has important implications for areas of the world such as Bangladesh, where groundwater supplies are contaminated with arsenic. Clinical trials are currently underway to study whether selenium supplements will improve the health of Bangladeshis drinking this contaminated groundwater.

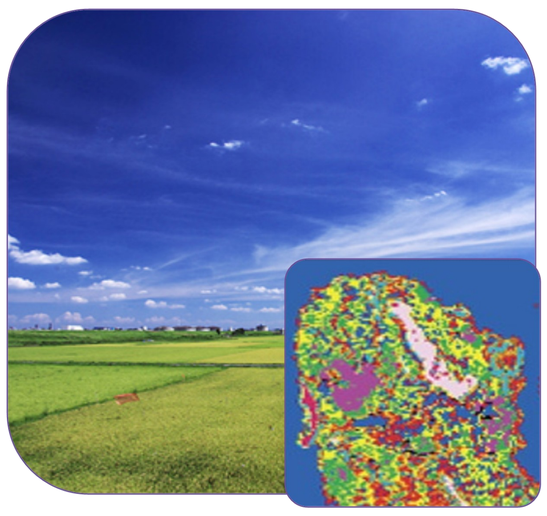
www.canada.com/topics/news/national/story.html?id=27e99b7c-36a8-498b-9eab-d602ab945f87&k=86393



Little Fish and Mercury Poisoning

The dangers of toxic mercury exposure are well known – from the dementia of the Mad Hatter in *Alice in Wonderland* to recent concerns about mercury levels in the fish we eat. While scientists know that mercury is bad for us, the exact mechanism of mercury's toxicity and how it infiltrates cells remains a mystery. Using synchrotron X-ray fluorescence (XRF) mapping researchers observed high concentrations of mercury in tissues made up of rapidly dividing cells – in this case the epithelial cells that grow the eye lens in newly hatched zebrafish. The finding has important implications for understanding the impact of mercury exposure in developing animals, including humans.

www.lightsource.ca/media/zebrafish.php



Cluster map of carbon forms

Understanding Carbon in Soil

Using the CLS and the NSLS in New York, scientists have analyzed soil samples from locations around the world and found that the arrangement of molecules and the ways they adhere to the surface of mineral particles varied at scales of billionth of a metre. This suggests that where particular molecules are located in the soil could be critical to our understanding of how soil absorbs, stores and releases carbon, in response to changes in ecology and climate.

Lehmann et al. (2008). Spatial complexity of soil organic matter forms at nanometer scales. *Nature Geoscience*, **1**, pp. 238-42. DOI: 10.1038/ngeo155

Marine Life and Global Warming

Researchers at the CLS are studying how ocean diatoms, one of the most common forms of phytoplankton, store iron using an enzyme called ferritin. Iron is a key limiting factor in how these organisms grow, and the growth of blooming phytoplankton could be important in the fight against global warming – forcing diatoms to bloom by seeding the ocean with iron has been suggested as a strategy for CO_2 capture.

CLS Activity Report 2008