Heavy metal exposure threatens salmon

SUPERFUND RESEARCH PROGRAM
ENVIRONMENTAL & OCCUPATIONAL HEALTH SCIENCES

Exposure impairs salmon's sense of smell

Salmon rely on smell to survive. New research shows that exposure to metals like cadmium impair that sense, threatening salmon survival.

Salmon have a sense of smell thousands of times stronger than that of a dog. They depend on smell to find food, avoid predators and return to their birthplace to spawn. The lab of Professor Evan Gallagher, Director of the University of Washington Superfund Research Program (UW SRP), has shown that exposure to even small amounts of metals like cadmium permanently reduces the ability of salmon to smell. This means that as young salmon make their way through Puget Sound to the ocean, the heavy metal exposure they experience may be enough to affect a lifetime of smell-dependent behaviors in the fish.

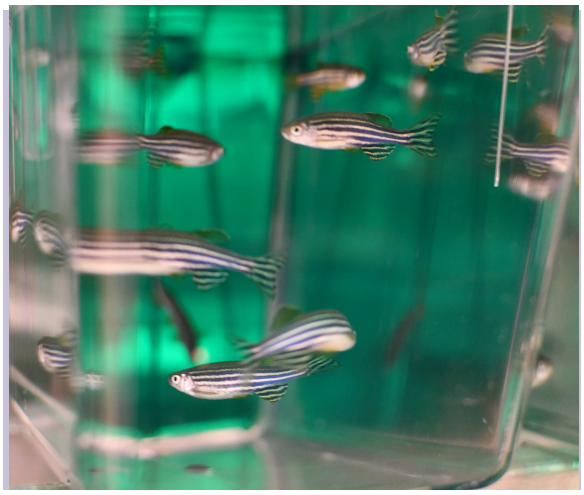
This is your caption. Place information about the photo or graph here. Photo credit goes at bottom of page 2.

Protecting salmon and those who eat them

Contamination of surface water is one of the most pressing issues facing Puget Sound salmon and the local orcas that depend on them. Humans can also be affected by eating contaminated fish. Work from the Gallagher lab has already helped to inform state and federal regulatory processes such as the 2010 Washington State law reducing the use of toxic material in automotive brake pads and shoes and the restrictions placed on the use of several heavy metals and asbestos in 2015. In 2018 and 2019, Gallagher's results were shared with Governor Inslee's Orca Recovery Task Force.

Cadmium

Cadmium is a natural metal found in the Earth's crust and in all rocks. Cadmium has many uses including in batteries, pigments such as those used in some paints and cosmetics, metal coatings such as auto paint, and plastics. Most cadmium used in the United States is extracted during the production of other metals like zinc, lead and copper. Exposure to cadmium is known to cause cancer and neurological problems. For people, this exposure comes primarily through smoking cigarettes, which approximately doubles the levels of cadmium in the body. Near historical and current industrial areas like the Duwamish River, cadmium can be found in elevated concentrations in water sources and can be accumulated by aquatic organisms, potentially allowing it to enter the food supply. People who fish in in local waters should be cautious and abide by any health advisories. People who work in industries that involve heating cadmium should be sure to use personal protective equipment and good industrial hygiene practices. *Information provided by ATSDR*



Using zebrafish as a model

Zebrafish are an important model for studying fish neurobiology and behavior. Unlike salmon, they can be kept easily in the lab and they have a fast rate of development and reproduction. This allows for experiments that would be nearly impossible to conduct in salmon. By using zebrafish the Gallagher lab has been able to test the effects that exposure to combinations of metals has on smell, showing that co-exposure to zinc and cadmium can mitigate some of the damage caused by cadmium exposure alone. They are also able to test the role that particular genes play in both sense of smell and chemical sensitivity.

Zebrafish in the Gallagher lab provide an excellent model system for testing the effects of heavy metal exposure of fish. .

THE UW SUPERFUND RESEARCH PROGRAM

The University of Washington Superfund Research Program is an interdisciplinary program that conducts and communicates research on the impacts of metal neurotoxicity on human and ecological health. Our research focuses on metals that commonly occur at Superfund hazardous waste sites for which there is incomplete understanding of their neurotoxic effects on human and ecological health. The physiological processes we study include adverse effects on cognition, olfaction, and neurobehavioral processes, and are associated with the risk of developing Alzheimer's and dementia, Parkinson's disease and other neurodegenerative diseases.

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