

**Research Translation Plan for
University of Washington Superfund Research Program**

Project 1: Mechanisms and Biomarkers of Metal Olfactory Injury in Salmon

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Research translation goals:

- Better protection for endangered species and all that salmon represent for this region, economically, culturally and ecologically.
- Improved health of Puget Sound
- Improved understanding at a mechanistic level of how chemicals affect health.
- Identify sites and species that are at risk from contamination.
- Communicate human health implications of mechanistic controls to improve early detection and help identify genetic targets.

Intended audience:

- Groups interested in salmon health—Tribes, U.S. Environmental Protection Agency, National Oceanic and Atmospheric Administration, U.S and Washington Fish and Wildlife Service, Washington Department of Ecology, and Washington Sea Grant.
- Groups who create policy—elected officials.
- Human health researchers and practitioners.

What might interest the intended audience about this research:

- Scientists: Mechanisms of how metals block neurons, how animals sense, and how cadmium affects behavior in salmon.
- Managers: We see that low levels of cadmium in the environment alter behavior (and ultimately fitness) in salmon. Thus, protection from this type of contamination is important to salmon population health. (Protection may be mitigation of run-off to important salmon habitat.)
- Health care practitioners: Exposure to cadmium leads to a loss of smell in salmon. A loss of smell is linked to neurodegenerative disorders. Therefore, this work suggests that environmental exposure to cadmium may lead to loss of smell and other neurodegenerative diseases.

Three main points:

1. Aquatic organisms have a highly developed sense of smell that's critical to their survival.
2. Exposure to certain pesticides and metals in low concentrations can interfere with smell in fish.
3. By studying salmon and zebra fish we can better understand how chemicals affect vertebrate physiology and generate early biomarkers of olfactory injury that can be used in a variety of ways, including to identify species or sites that are at risk.

Opportunities to engage:

- Develop a continuing education course for health practitioners in partnership with Xia and UW SRP Project 2.

- Continue to provide lab tours for the Duwamish Youth Core.
- Develop information sheets for elected officials.
- Develop a toolkit including biomarkers that resource managers could use to determine whether a fish is losing smell or to evaluate the impacts of remediation efforts.

Next steps:

- Provide lab tours for interns this summer.
- Develop an information sheet for elected officials.
- Give a talk at an International conference in Calgary in three weeks on non-chemical stressors.

Impacts on audience:

- Alerting policy makers to the issue and to the fact that our center is a resource.
- Informing resource managers of the potential for biomarkers and gauging interest in this possibility.
- Make transgenic strains of zebrafish.

Impacts on myself and other scientists:

- To feel that our research is relevant.
- To feel that our work can inform work on different species.
- To contribute to the protection of natural resources.

Gathering feedback:

- Conversations after talks.
- Online surveys.
- Numbers in the audience.
- Follow up with elected officials.

Responding to feedback:

- Prioritizing those activities that meet a need.
- Pulling back from efforts that are not as well-received.
- Increasing visibility and reach.