Against the tide: Fish quickly adapt to lethal levels of pollution

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Evolution is allowing some urban fish to survive in a lethal, human-altered environment, according to new results published in the journal *Science*.

While environmental change is outpacing the rate of evolution for many other species, Atlantic killifish living in four polluted East Coast estuaries turn out to be remarkably resilient. These fish have adapted to levels of highly toxic industrial pollutants that would normally kill them.

The killifish is up to 8,000 times more resistant to this level of pollution than other fish, scientists found. While the fish is not commercially valuable, it is an important food for other species and an indicatl bt s s s9sts fo9(e)10(he l)6(et)21.24 (e)-6(m)-9(.)]TJ2(l)9c 0 Tw 4.95 0 T

Killifish genomes

The scientists sequenced complete genomes of nearly 400 Atlantic killifish from polluted and non-polluted sites at New Bedford Harbor in Massachusetts; Newark Bay in New Jersey; Connecticut's Bridgeport area; and Virginia's Elizabeth River.

The sites have been polluted since the 1950s and 1960s by a complex mixture of industrial pollutants including dioxin, heavy metals, hydrocarbons and other chemicals.

At the genetic level, the tolerant Atlantic killifish populations evolved in very similar ways. This adaptation suggests that these fish already carried the genetic variation before the sites were polluted, and that there may only be a few evolutionary solutions to pollution.

The study lays the groundwork for future research that could explore which genes confer tolerance of specific chemicals. Such work could help better explain how genetic differences between humans and other species may contribute to differences in sensitivity to environmental chemicals.

"If we know the kinds of genes that can confer sensitivity in another vertebrate animal like us, perhaps we can understand how humans, with their own mutations in these important genes, might react to these chemicals," Whitehead said.

-- Cheryl Dybas, NSF

-- Kat Kerlin, UC-Davis

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