Sunscreen chemicals in water may harm fish embryos

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For most people, a trip to the beach involves slathering on a thick layer of sunscreen to protect against sunburn and skin cancer. However, savvy beachgoers know to reapply sunscreen every few hours because it

eventually washes off. Now researchers, reporting in ACS' journal *Environmental Science & Technology*, have detected high levels of sunscreen chemicals in the waters of Shenzhen, China, and they also show that the products can affect zebrafish embryo development.

A painful sunburn can ruin a vacation, and too much sun can also lead to more serious problems like premature skin aging and melanoma. Therefore, manufacturers have added ultraviolet (UV) filters to many personal care products, including sunscreens, moisturizers and makeup. Scientists have detected these substances in the environment, but most studies have concluded that individual sunscreen chemicals are not present at high-enough levels to harm people or animals. Kelvin Sze-Yin Leung wondered if combinations of UV filters may be more harmful than individual compounds, and whether these chemicals could have long-term effects that previous studies hadn't considered.

Leung and his team began by analyzing the levels of nine common UV filters in surface waters of Shenzhen, China —- a rapidly growing city with more than 20 popular recreational beaches. They found seven of the nine chemicals in Shenzhen waters, including public beaches, a harbor and, surprisingly, a reservoir and tap water. Next, the researchers moved to the lab where they fed zebrafish, a common model organism, brine shrimp that had been exposed to three of the most prevalent chemicals, alone or in mixtures. Although the adult fish had no visible problems, their offspring showed abnormalities. These outcomes were mostly observed for longer-term exposures (47 days) and elevated levels of the chemicals (higher than what is likely to occur in the environment.) The effects of different UV filters and mixtures of these substances varied in often-unpredictable ways, suggesting that further studies are needed to determine how these chemicals impact living systems.

More information: "Joint Effects of Multiple UV Filters on Zebrafish Embryo Development" *Environmental Science & Technology* (2018).

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