

Adaptive Responses to Prochloraz Exposure That Alter Dose-Response and Time-Course Behaviors

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Dose response and time-course (DRTC) are, along with exposure, the major determinants of health risk. Adaptive changes within exposed organisms in response to environmental stress are common, and alter DRTC behaviors to minimize the effects caused by stressors. In this project, we are analyzing how several feedback regulatory loops in fathead minnows compensate for endocrine stress due to the fungicide Prochloraz. Affected endpoints include estradiol (E2) levels, ovarian aromatase mRNA, and vitellogenin levels. The data show, for example, a significant decrease in E2 levels followed by a return to baseline during prolonged exposure to Prochloraz. Characterization of the mechanisms that underlie these kinds of adaptive changes will build toward a refined description of DRTC behavior for Prochloraz, thereby helping us to better understand when exposures pose health risks and when they do not. In addition, this project will help us to evaluate the possibility that activation of stress response pathways is itself a useful regulatory endpoint, i.e., the possibility that it is appropriate to regulate exposures such that stress response pathways are not overwhelmed and without explicit consideration of downstream, more apical endpoints.

This work was reviewed by EPA and approved for publication but does not necessarily reflect official agency policy.