

Alternatives to the Fish Early Life-Stage Test: A Research Strategy for Discovering and Annotating Adverse Outcome Pathways During Fish Development

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The OECD 210 fish early life-stage (FELS) test is the primary guideline test used to estimate chronic fish toxicity, as well as support ecological risk assessments and chemical management programs around the world. As a step toward developing alternatives to the FELS test, a HESI-sponsored expert workshop was convened in May 2012 to continue discussing approaches for screening and prioritizing chemicals for FELS testing. These discussions were built on the tiered testing strategy initially proposed by Volz et al. (2011). While this strategy was first illustrated using three Adverse Outcome Pathways (AOPs) relevant to early fish development, we recognized that the initial screening tier must be expanded to a broad range, or battery, of toxicologically relevant AOPs to account for multiple mechanisms of toxicity within and across chemical classes. Therefore, the primary objective of the May 2012 workshop was to begin identifying and discussing the scope and breadth of potential AOPs during early fish development. Based on discussions prior to and during the workshop, we concluded that, while providing a strong foundation to begin defining AOPs during early fish development, the existing peer-reviewed literature is likely not sufficient for establishing quantitative linkages across multiple levels of biological organization. Therefore, we outlined a comprehensive research strategy to (1) systematically discover, characterize, and annotate AOPs during early fish development and (2) prioritize development of these AOPs based on current restrictions and demands to reduce animal use for toxicity testing, particularly in the European Union. The overall goal of this research strategy is to provide the conceptual and scientific foundation for identification and development of resource-efficient predictive assays that address the toxicological domain of the OECD 210 test. This presentation will provide an overview of key findings from the workshop, as well as a summary of our proposed approach for discovering and annotating AOPs during early fish development. *The contents of this abstract neither constitute nor reflect official US EPA policy.*