Advancing Adverse Outcome Pathways for Integrated Toxicology and Regulatory Applications

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This session focuses on the use of the Adverse Outcome Pathway (AOP) concept as a framework to characterize, organize, and define predictive relationships between measurable key events reflecting the progression from a chemical-induced perturbation to an adverse outcome relevant to regulatory decision-making in ecotoxicology. A toxicological pathway-based vision, which makes greater use of in vitro systems and predictive models and reduces reliance on traditional whole animal toxicity testing for chemical hazard evaluation, was initially advocated for human health risk assessment. However, this approach is equally applicable to ecological risk assessment. Similarities in molecular initiating events and key events that lead to toxicological outcomes across taxa provide a defensible framework for extrapolating chemical effects across species, even if the specific adverse outcomes differ between them. Additionally, consideration of pathway conservation, rather than the taxonomic origin of the test system, opens the door for much more integrated approaches to chemical hazard evaluation in support of either ecological or human health risk assessment, allowing enhancement of the predictive utility of available information and test data that can be generated most efficiently and cost-effectively. Thus, using the AOP concept as a framework, human health-oriented data, as well as data from non-mammalian vertebrates, invertebrates, plants, lower eukaryotes and in vitro systems, may be effectively employed to provide toxicological information for a wide range of species with ecological and human health relevance. Recent efforts are focused on further development of these promising approaches for using pathway-based data in hazard screening and risk assessment. We invite abstracts reporting on the studies advancing the use of cross-species extrapolation and interchangeability of pathway-based ecological and human health data to support hazard assessment using AOP framework. This session will also highlight the outcomes of a week-long workshop on the topic that will be held in Ispra, Italy, in March 2014. Organized in partnership with SETAC, OECD, EU JRC, Environment Canada, US EPA, US Army Corps of Engineers, as well as a number of research and industry partners, the main objective of the workshop is to provide consideration and expert opinion on the critical next steps required to advance the use and acceptance of the AOP framework to support integrated toxicology and regulatory decision-making. Specific topics addressed by the workshop include: (1) research priorities for development of AOPs across taxa, (2) strategic approaches to AOP development, (3) weight of evidence evaluation to define uncertainties associated with predictive relationships represented in an AOP, (4) "acceptance" of AOPs for regulatory applications, and (5) applying AOPs to support Informed Approaches to Testing and Assessment.

Keywords: Adverse outcome pathways; cross-species extrapolation; hazard evaluation; risk assessment.

SESSION TYPE: Platform and Poster

COMMENTS: The proposed session aims to present the outcomes of a week-long workshop on the topic that will be held in Ispra, Italy, March 2014, and organized in partnership with SETAC, OECD, EU JRC, Environment Canada, US EPA, US Army Corps of Engineers, as well as a number of research and industry partners. The session will also be open for solicited and non-solicited papers to ensure broad contribution and recent developments within this area of science.