Targeted State of the Science Scoping Review for Incorporating Stress Within Experimental Models of Chemical Toxicity

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8:00 AM – 10:45 AM
1260
Workshop Session: Incorporating Stress as a Variable into Toxicological Testing: Advancing Our Understanding of Cumulative Impacts
Convention Center
Room W307A

Abstract:
As the interest in complex cumulative assessments from regulatory authorities increases, considering multi-faceted exposures, including non-chemical stressors, is a necessary but challenging aspect. The impacts of non-chemical stressors, i.e. stress, on basal biology have begun to be characterized but any impacts on the body's ability to respond to additional insults is less clear. Given the interest in ensuring that such assessments are appropriately accounting for the true risk posed to individuals following chemical exposures, the incorporation of non-chemical stressors and an understanding of these impacts is an area of much needed research. Previous investigations provide limited insight about the interaction between stress (elicited by a number of different societal or cultural factors) and chemical toxicity as they lack quantitative impacts on susceptibility and mechanistic understanding. Experimental models offer the potential to address the quantitative susceptibilities and mechanistic underpinnings of such an interaction.

The objective herein is to provide the results from a targeted scoping review of published experimental models that have explicitly incorporated stress as a variable in toxicity studies. Due to the extensive nature of the stress literature, targeted publications were selected and used for citation mining and reference searching. References were screened against inclusion criteria based on model type and how stress was incorporated into the experimental set up. Results from the targeted screening were mapped and examined for trends, limitations, and research opportunities. A variety of studies that attempt to connect stress with chemical susceptibility were found to cover a range of biological species and forms, e.g. rats, zebrafish, and in vitro. Notably, the variety of experimental approaches highlights the need to consider the fit-for-purpose development of the model as some stress models, e.g. stress-induced ulcers, may offer insight into a specific endpoint. Furthermore, such models can also provide key events or adverse outcomes that could be considered when evaluating the potential interaction between chemical and non-chemical stressors. Lastly, this presentation will serve as a primer for the remaining session presentations on non-chemical stressor considerations and stress models within chemical toxicity testing.