Bridging the Gap Between Data Sciences and Toxicologic Pathology: Chemical Screening and Prioritization

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Abstract: The current regulatory framework in toxicology is expanding beyond traditional animal toxicity testing to include new approach methodologies (NAMs) like rapidly generated dose-response information from the US Environmental Protection Agency’s Toxicity Forecaster (ToxCast) and the interagency collaborative Tox21 initiative. These programs have provided new opportunities for research but also introduced challenges in application of NAM data to current regulatory needs. One such challenge is linking in vitro chemical bioactivity to adverse outcomes like cancer or other complex diseases. To utilize NAMs in prediction of complex disease, information from traditional and new sources must be interoperable for easy integration. The work presented here describes the development of a database of traditional toxicity information with improved interoperability, and efforts to use these new bioinformatic tools to inform prediction of cancer and complex disease. The findings demonstrate that increased interoperability between data resources is necessary to leverage the large amount of data currently available to understand the role environmental exposures play in etiologies of complex diseases. The views expressed in this abstract are those of the authors and do not necessarily reflect the views or policies of the U.S. EPA.