

ToxCast: A Program for Prioritizing Toxicity Testing of Environmental Chemicals

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Evaluating the potential of tens of thousands of chemicals for risk to human health and the environment is beyond the resource limits of the Environmental Protection Agency. The EPA's ToxCast program will explore alternative methods comprising computational chemistry, high-throughput screening and various toxicogenomics technologies to predict potential for toxicity and prioritize chemicals for detailed toxicity testing. The approach will center on bioactivity profiling of chemicals across a broad range of biochemical assays as well as cell-based assays with phenotypic, genomic, and metabolomic analyses. The proof-of-concept phase will use a set of chemicals with an existing, rich toxicological database including tumorigens, developmental and reproductive toxicants, neurotoxicants and immunotoxicants in order to provide an interpretive context for the ToxCast data. Combining the bioactivity profiling with physico-chemical parameters and predicted biological activities based on existing structure-activity models will yield a multidimensional dataset and informatics challenge requiring appropriate computational methods for integrating various chemical, biological and toxicological data into profiles and models predicting toxicity.

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