Evaluating High Throughput Toxicokinetics and Toxicodynamics for IVIVE

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High-throughput screening (HTS) generates *in vitro* data for characterizing potential chemical hazard. TK models are needed to allow *in vitro* to *in vivo* extrapolation (IVIVE) to real world situations. The U.S. EPA has created a public tool (R package "httk" for high throughput toxicokinetics) for TK and physiologically-based TK (PBTK). We are now able to rapidly parameterize generic PBPK models using *in vitro* data to allow IVIVE for 543 chemicals. We evaluate using four R's: We have (1) Reused existing TK data by compiling a library of TK time course data in, this data has (2) Refined the design of in vivo TK studies, allowing us to perform new, informative experiments for high value chemicals using a (3) Reduced (n=6) study design. Careful evaluation of the existing and new data allows comparison of the results of *in vitro* HTS bioactivity assays with previously collected *in vivo* toxicity studies. In some cases, we may be able to (4) Replace *in vivo* animal studies with HTS and HTTK. *This abstract does not necessarily reflect U.S. EPA policy.*