NICEATM Computational Tools and Resources Supporting Alternative Test Method Development and Evaluation

S. Bell[1], K. Mansouri[1], J. Phillips[2], X. Chang[1], J. Abedini[1], A.L. Karmaus[1], I. Lea[1], R. Rai[1], D. Allen[1], W. Casey[3], N. Kleinstreuer[3]

[1]ILS, RTP, NC, United States; [2]Sciome RTP, NC, United States, [3]NIH/NIEHS/DNTP/NICEATM, RTP, NC, United States

The NTP Interagency Center for the Evaluation of Alternative Toxicological Methods (NICEATM) develops and evaluates alternatives to animal use for chemical safety testing. To support these activities, NICEATM has developed a set of computational tools and resources in partnership with federal agencies, industry, and academia. This presentation highlights two resources that make data and computational tools more accessible to our stakeholders: the Open Structure-activity/property Relationship App (OPERA) and the Integrated Chemical Environment (ICE). OPERA is a suite of QSAR models to predict physicochemical and pharmacokinetic properties often needed in modeling. OPERA also includes a set of models built using global collaborative crowdsourcing approaches to construct consensus models for various toxicity endpoints. CERAPP and CoMPARA are consensus models that predict estrogen and androgen receptor pathway activity, respectively. The newest model, CATMoS, is a consensus model providing predictions for acute oral systemic toxicity (LD50) and hazard categories. OPERA is available as a stand-alone downloadable program with graphical user interface and command line options. ICE is an online database that provides users access to in vivo, in vitro, and in silico data for a range of toxicity endpoints, including curated Tox21 high-throughput screening data for >9,000 chemicals and OPERA predictions for >700,000 chemicals. ICE also includes a growing suite of tools such as a web-based in vitro to in vivo extrapolation tool allowing users to compare predicted exposures from in vitro bioactivity concentrations to doses from in vivo animal studies. For test method developers and evaluators, curated lists of reference chemicals with known effects are available along with their supporting data. Features of both tools and example use cases in the context of chemical evaluation will be presented. This project was funded in whole or in part with federal funds from the NIEHS, NIH under Contract No. HHSN273201500010C.

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