



High-Throughput Toxicology Research Area

Only a small fraction of chemicals have been evaluated for their potential to cause adverse effects to humans or the environment. EPA's Chemical Safety for Sustainability National Research Program research is developing and applying new approach methodologies to help rapidly evaluate chemicals for adverse effects.

EPA's Chemical Safety for Sustainability Research Program

The goal of EPA's Chemical Safety for Sustainability (CSS) National Research Program is to provide information and methods to make better-informed, more timely decisions about the safety of chemicals, many of which have not been thoroughly evaluated for potential risks to human health and the environment.

About High-Throughput Toxicology Research

The **High-Throughput Toxicology** research area is focused on hazard profiling of chemicals using rapid toxicity testing approaches. Research is centered on the design, development, and application of new approach methodologies for rapidly testing chemicals, particularly for:

- Chemical classes that are challenging to study using traditional methods
- Chemical groups of high importance to the Agency
- Contaminants and materials of emerging concern.

This research will also focus on generating tests that can be used to study potential ecological impacts and impacts on other (i.e. non-human) species.

Why Is High-Throughput Toxicology Research Important?

Existing chemical inventories and the introduction of new chemicals have driven the need for the development and use of rapid chemical screening technologies. These technologies address the limitations of current chemical testing methods to evaluate large numbers of chemicals for potential adverse human and ecological effects, and can reduce or replace the number of required animal-based toxicity tests.

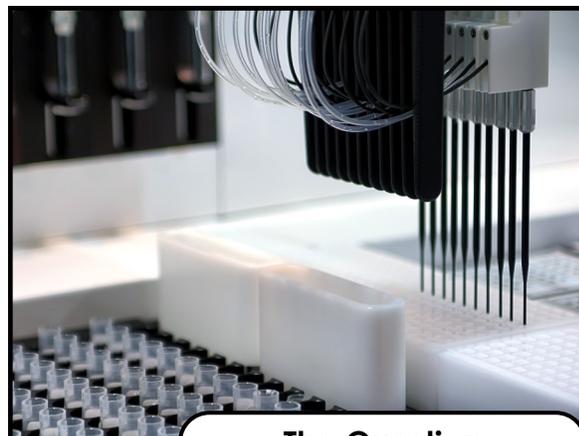
Interested In Learning More?

EPA's Chemical Safety Research Program: epa.gov/chemical-research

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The Question

How can we efficiently produce more information on chemicals?

Our High-Throughput Toxicology Tools



CompTox Chemicals Dashboard: web-based application providing access to chemistry data for thousands of chemicals across EPA's computational research databases including:

- ⇒ **ACToR:** Aggregated Computation Toxicology Online Resource
- ⇒ **TOXCAST Dashboard:** dashboard providing access to high-throughput screening data
- ⇒ **EDSP21 Dashboard:** dashboard of high-throughput screening and exposure estimates for evaluating chemicals for potential endocrine activity

High-Throughput Toxicology Research Area Up Close

Visualizing the CSS Program



Our High-Throughput Toxicology research is categorized under the Chemical Evaluation research topic. This topic is dedicated to developing new and efficient methods to evaluate thousands of chemicals found in consumer products, the air we breathe, and the water we drink.

How High-Throughput Toxicology Fits In

CSS is organized around three research topics that address specific science challenges in assessing the safety of chemicals: Chemical Evaluation, Complex Systems Science, and Knowledge Translation & Delivery.

Included in our *Chemical Evaluation* research topic, our **High-Throughput Toxicology** research is focused on developing rapid and efficient methods to evaluate chemicals for potential toxicity, including chemicals that are challenging to test with traditional methods or chemicals of emerging concern.

Examples of Research and Products

Screening the ToxCast Phase 1 Chemical Library for Inhibition of Deiodinase Type 1 Activity

- ⇒ **Description:** In support of the Endocrine Disruptor Screening Program (EDSP), EPA demonstrates and evaluates the use of new high-throughput screening methodologies, models, and data to more rapidly prioritize and identify chemicals for potential endocrine system activity. The CSS team has made extensive progress on developing assays to evaluate the effects of chemicals on potential thyroid pathway targets, including three deiodinase enzymes.
- ⇒ **Impact:** This work is part of the effort to address gaps in effectively identifying chemicals and their relative potential for thyroid hormone disrupting activity.
- ⇒ **Who Can Use It?:** Researchers and risk assessors interested in the role of chemicals in thyroid disruption
- ⇒ **Learn More:** doi.org/10.1093/toxsci/kfx279

A new cell culture exposure system for studying the toxicity of volatile chemicals at the air-liquid interface

- ⇒ **Description:** A team of EPA scientists developed a cell culture exposure system that allows cells to be exposed at an air-liquid interface in order to assess the potential hazards of volatile organic compounds (VOCs).
- ⇒ **Impact:** Traditional *in vitro* dosing methods are not adequate for screening VOCs. This system addresses the high-priority need for new approach methodologies to assess the potential hazards of VOCs.
- ⇒ **Who Can Use It?:** Everyone, including researchers and risk assessors
- ⇒ **Learn More:** doi.org/10.1080/08958378.2018.1483983

Learn more

EPA's Chemical Safety Research Program: epa.gov/chemical-research