

Report to the NTP Board of Scientific Counselors

John R. Bucher, Ph.D., DABT
NTP Associate Director
National Institute of Environmental Health Sciences

June 29, 2017





Outline

- Staff changes
- NIEHS Strategic Plan: 2012-2017
 - Selected accomplishments by the Division of NTP
- NTP website redesign



New DNTP Staff and Trainees



Brandy Beverly, PhD
Office of Health Assessment
and Translation



Suril Mehta, MPH
Office of Report on
Carcinogens



Amy Wang, PhD
Office of Report on
Carcinogens

New Trainees in NTP Laboratory:

- Anthony Luz, PhD, Postdoc
- David Crizer, PhD, Postdoc
- Kevin Mauge-Lewis, Predoc
- Angeliz Concepcion, NIEHS Scholars Connect Program
- Shitij Kumar, NSCP



Said Good-Bye



Kris Thayer, PhD
Office of Health Assessment
and Translation



Abee Boyles, PhD
Office of Health Assessment
and Translation



Yun Xie, PhD
Office of Liaison, Policy, and
Review



Natasha Caitlin, PhD
Toxicology Branch



DNTP Response to NIEHS Strategic Plan 2012-2017

STRATEGIC PLAN

Advancing Science, Improving Health: A Plan for Environmental Health Research





Fundamental (& applied) research

- Toxicology and Carcinogenesis TRs

- 24 2-Yr Bioassay reports- Antimony, TBBPA, BDCAA, Cobalt, Aloe Vera, Acrylamide, Glycidamide, Ginko Extract, Indole-3-carbinol, Vinylidene Cl, Green Tea Extract, RFR partial findings
- Toxicity Reports- Fullerenes, MW Carbon nanotubes, abrasive blasting agents



- Tox21

- ER/AR, ERR, p53, hERG channels, HIF-alpha, HDAC inhibitors, CAR, FXR, TR, Nrf2, aromatase, mitochondrial function, retinol signaling
- diabetes, obesity, cardio-, neuro- & genotoxicity
- S1500+ gene set
- BMD assessments, in vivo & in vitro (IVIVE)
- Zebrafish, *C. elegans*

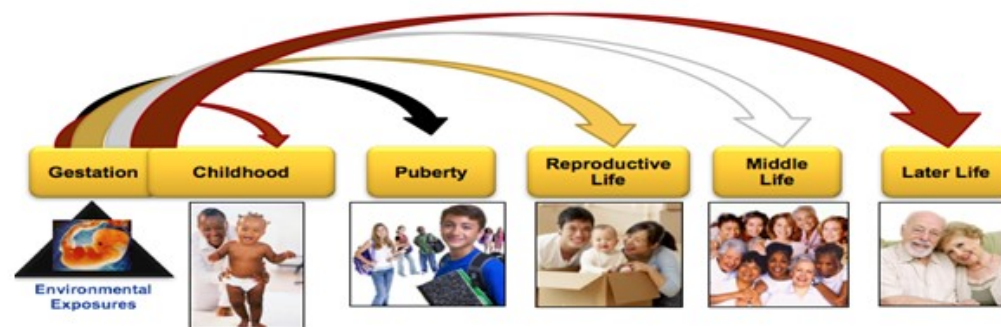




Strategic Goal #2

Individual susceptibility across lifespan

- Clarity BPA U01 research program
- Mouse strain resequencing project (old) →
- Multi strain aging study
- Diversity Outbred studies in vivo & in vitro
- Mouse methylome studies →
- Gonadectomy studies on hepatic methylation
- Transgenerational inheritance Systematic Review →
- Transgenerational study designs

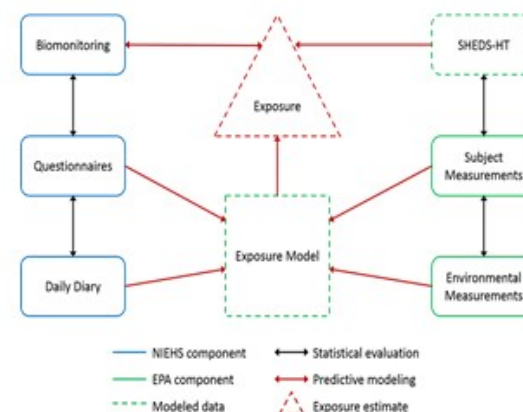




Strategic Goal #3

Exposure science & exposome

- BPA toxicokinetic studies
- Cashier's study
- NIEHS-EPA study of exposure to personal care and consumer product chemicals
 - Collaboration with EPA to improve characterization of PCP, consumer product, and home exposures
 - Provide important information to epidemiological and toxicology mixtures research
 - Validation of Sister Study PCP questionnaire
 - Assess and improve EPA exposure prediction models
- Sister Study research
 - Prospective cohort study of women with a sister who had breast cancer
 - Personal care product questionnaire to assess frequency of use





Combined environmental exposures and disease

- Projects to inform risk assessment of mixtures
 - **Component-based risk assessment:** Estimating the toxicity of mixtures using individual chemical dose-response data and additivity models
 - Assessing the application and limitations of additivity models
 - Identifying interactions among chemicals present in mixtures
 - Informing decisions on which chemicals to include in cumulative risk assessments
 - **Whole mixtures risk assessment:** Using a tested “reference” mixture to estimate the toxicity of an untested mixture
 - Determining sufficient similarity among related, complex mixtures by comparing chemistry and biological effects
 - Developing high throughput tools to evaluate the toxicity of complex mixtures



Component-based

- Assessing models of additivity and identifying interactions
 - Dioxin/PCB toxic equivalence factor studies (old)
 - Polycyclic Aromatic Compound Mixtures Assessment Program (PAC-MAP) <https://ntp.niehs.nih.gov/results/areas/pacs/index.htm>
- Comparing between component-based and whole mixtures approaches
 - PAC-MAP: Testing whole mixtures of cookstove emissions and Superfund mixtures
- Informing decisions on which chemicals to include in a cumulative risk assessment
 - Hypolipidemics and phthalates: Assessing potential additivity of chemicals that disrupt different pathways involved in testosterone production
 - Low Dose Hallmarks of Cancer study: Assessing mixture effects of chemicals that target different pathways leading to cancer





Whole Mixtures

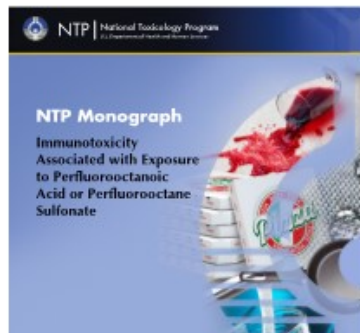
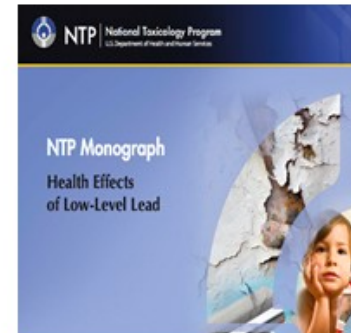
- Understanding the chemistry and health effects of whole mixtures and developing better testing methods
 - 2014 Symposium: Assessing Exposures and Health Effects Related to Indoor Biomass Fuel Burning
 - NIEHS 2015 Workshop: “Statistical Approaches for Assessing Health Effects of Environmental Chemical Mixtures in Epidemiology Studies”
- Determining sufficient similarity of whole mixtures
 - Botanical Dietary Supplement case studies with *Ginkgo biloba* extract, *Echinacea purpurea* extract, and black cohosh extract
 - 2016 Workshop: Addressing Challenges in the Assessment of Botanical Dietary Supplement Safety
<https://ntp.niehs.nih.gov/about/presscenter/events/2016/index.html>



Strategic Goal #5

Emerging (or re-emerging) environmental threats

- Gulf Oil Spill
- Perfluorinated chemicals class studies
- Elk River spill
- Tire crumb rubber fields
- Lead

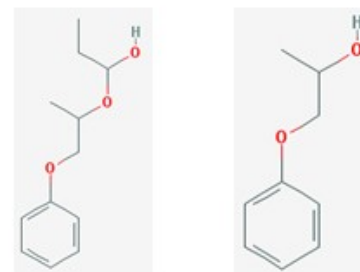




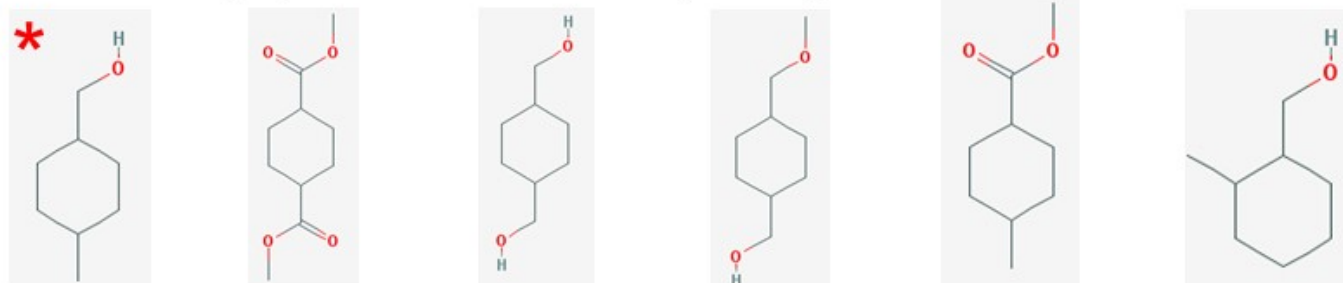
Elk River, West Virginia - January 9, 2014



Phenyl Ethers (PPH)



Crude Methylcyclohexanemethanol (MCHM)



A liquid used to wash coal was spilled from a leaking tank into the Elk River approximately 1.5 miles upstream of the water intake facility serving 300,000 people.
Do not use water order issued.



NTP Studies on Elk River Chemicals

Test Article [Abbreviation, CAS Number]	Studies							
	Rat Prenatal Toxicity	Mouse Dermal Irritation and Hypersensitivity	5-Day Rat Toxicogenic	Bacterial Mutagenicity	Zebrafish Developmental	Nematode Toxicity	High Throughput Screening	Structure Activity Relationship (SAR) Analysis
4-Methylcyclohexanemethanol [MCHM, 34885-03-5]	X	X	X	X	X	X	X	X
Dipropylene glycol phenyl ether [DiPPH, 51730-94-0]			X	X	X	X		X
Propylene glycol phenyl ether [PPH, 770-35-4]			X	X	X	X	X	X
1,4-Cyclohexanedimethanol (CHDM; 105-08-8)				X	X	X	X	X
2-Methylcyclohexanemethanol [2MCHM, 2105-40-0]				X	X	X		X
4-(Methoxymethyl)cyclohexanemethanol [MMCHM, 98955-27-2]				X	X	X		X
Dimethyl 1,4-cyclohexanedicarboxylate [DMCHDC, 94-60-0]				X	X	X	X	X
Methyl 4-methylcyclohexanecarboxylate [MMCHC, 51181-40-9]				X	X	X		X
Technical product ["crude MCHM"]		X	X	X	X	X		

Proposed study plan underwent
cross-agency review

Guideline studies
Non-guideline studies



Knowledge management

- Office of Data Science
 - Develop and implement data science training opportunities
 - Enhance researcher's ability to find, access, interoperate, and reuse data
 - Develop and support policies and standards for data integration and harmonization
 - Facilitate transformation of data and information into user-friendly knowledge-based platforms
 - Represent NIEHS in trans-NIH and interagency data science and knowledge management activities





Strategic Goal #9

Building the EHS research workforce 2012-2017

- Applied toxicology and carcinogenesis
 - 8 fellows
- Biomolecular screening and computational toxicology
 - 2 fellows
- Health assessment and translation
 - 1 fellow
- Lab animal medicine
 - 1 fellow
- Systems and mechanistic toxicology
 - 8 fellows
- Toxicologic pathology
 - 9 fellows





Strategic Goal #10

Improve impact by addressing public health issues

- NTP monographs on noncancer hazards
 - Low level lead, folate supplementation, fluoride neurobehavioral assessment in animals, PFOS/PFOA immunotoxicity, cancer chemotherapy in pregnancy
- Report on Carcinogens
 - 11 listings: 5 viruses (HIV Type 1, Epstein-Bar virus, Kaposi sarcoma-associated herpesvirus, HTLV Type 1, Merkel cell polyomavirus), 1-bromopropane, cobalt and cobalt compounds that release cobalt in vivo, cumene, pentachlorophenol and by-products of its synthesis, trichloroethylene, o-toluidine
 - NAS agrees with formaldehyde and styrene listings
 - In process: haloacetic acids found in water as disinfection by-products; *Helicobacter pylori* (chronic infection); antimony trioxide; shiftwork, light at night, and circadian disruption

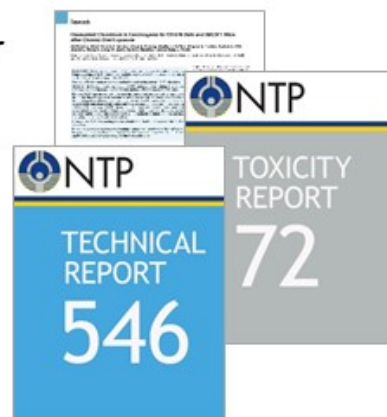




Strategic Goal #10

Assess impact of NTP's work

- Developed an approach for a comprehensive and objective assessment of NTP's effectiveness in multiple sectors
 - Xie Y, Holmgren S, Andrews DMK, Wolfe MS. 2017. Evaluating the impact of the U.S. National Toxicology Program: a case study on hexavalent chromium. *Environ Health Perspect* 125:181-188
- Applied to case study on hexavalent chromium: NTP's work strengthened the science base and informed public health decision-making
 - NTP's research was key to the nation's first-ever drinking water standard for CrVI adopted by California in 2014
- Working on methods to automate processes for assessing impact

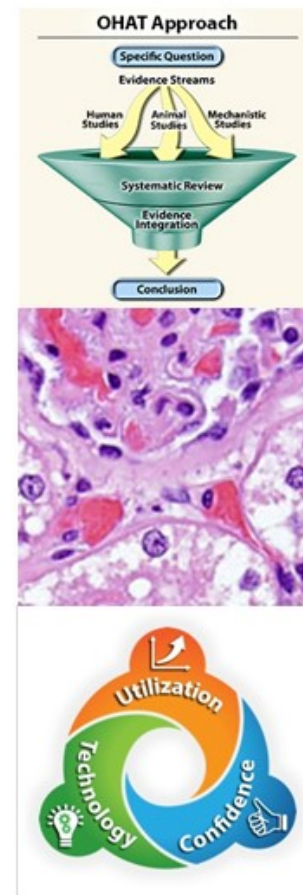




Strategic Goal #11

Improve communication; new approaches & tools

- Systematic review methods
 - Applying to environmental health to increase transparency of literature analysis and hazard decisions
- Nonneoplastic pathology atlas
 - Standardizing terminology in toxicologic pathology for rodents
- ICCVAM strategic roadmap
 - Fostering new approaches for evaluating the safety of chemicals and medical products



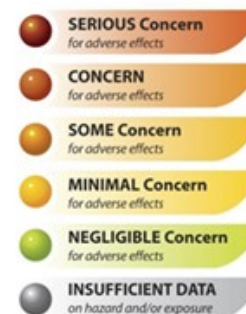


Strategic Goal #11

Improve communication through new approaches & tools

- “Level of Concern” research study
 - Updating framework for communicating NTP’s opinion whether an environmental substance is of concern for causing adverse effects on human health given its toxicity and human exposure
- NTP website redesign
- New “report” types or forums

Current framework



NTP Website Redesign

Beth Bowden, MS
Program Operations Branch
National Institute of Environmental Health Science





NTP Website Redesign

- Improve communications by improving all aspects of the NTP website
 - Look and feel
 - Organization
 - Content
- Process includes:
 - Consultant's audit of website
 - Focus groups, interviews of external and internal users
 - Foresee survey
 - ITRAC's mapping of information architecture
 - Identification of personas
 - Prototyping

NIEHS National Institute of Environmental Health Sciences **FORESEE**

Customer Satisfaction Survey

Thank you for visiting our site. You've been randomly chosen to take part in a brief survey to let us know what we're doing well and where we can improve.

Please take a few minutes to share your opinions, which are essential in helping us provide the best online experience possible.

*Required questions are denoted by an **

1: *Please rate the options available for navigating this site.

1=Poor Excellent=10 Don't Know

1 2 3 4 5 6 7 8 9 10

2: *Please rate how well the site layout helps you find what you need.

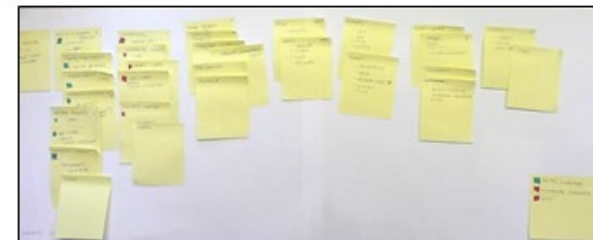
1=Poor Excellent=10 Don't Know

1 2 3 4 5 6 7 8 9 10

3: *Please rate the consistency of speed from page to page on this site.

1=Poor Excellent=10 Don't Know

1 2 3 4 5 6 7 8 9 10





NTP Website Redesign

Incremental approach

- New “search” tool is live
- Landing pages are being reworked and go live as complete
- Updates to look and feel will go live this summer
- Content will go live as updated

Refine **CLEAR ALL FILTERS**

Categories ▲

CLEAR

☐ Pathology (6668) ⓘ

☐ Testing Program (6107) ⓘ

☐ General NTP (2081) ⓘ

☐ Alternative Methods (1525) ⓘ

☐ Committees & Panels (918) ⓘ

+ MORE

Content Type ▲

CLEAR

☐ Tables & Curves (5294) ⓘ

☐ Testing Status (2901) ⓘ

☐ Nominations & Background (1963) ⓘ

☐ Nonneoplastic Lesion Atlas (1955) ⓘ

☐ Event & Materials (1294) ⓘ

+ MORE

Reports and Publications ▼

Years ▼

Formats ▼



NTP Website Redesign

Old: “Areas of Research” landing page



National Toxicology Program
U.S. Department of Health and Human Services

Search the NTP Website

[Home](#) [Testing Information](#) [Study Results & Research Projects](#) [Public Health](#) [About NTP](#)

Home » Study Results & Research Projects » Areas of Research

Cell Phones

Hexavalent Chromium

Polycyclic Aromatic Compounds

Sulfonane

Synthetic Turf/Crumb Rubber

West Virginia Chemical Spill

Areas of Research


▼ On This Page

[Endocrine Disruptors](#)

[Occupational Mixtures and Exposures](#)

[Phototoxicology](#)

[Safe Drinking Water](#)

<https://ntptestigo/current>

NTP has a broad mandate to provide toxicological characterizations for chemicals and agents of public health concern and strives to balance the selection of chemicals for study. This has resulted in a diverse research program, but with emphasis on synthetic industrial chemicals, pesticides, various pharmaceuticals, metals, and food additives. NTP continues to explore new areas of research. In general, these initiatives are broad-based and include various health-related endpoints.

Endocrine Disruptors

Endocrine disruptors are naturally occurring or man-made substances that may mimic or interfere with natural hormones in the body. Endocrine disruptors may turn on, shut off, or modify signals that hormones carry, therefore affecting the normal functions of tissues and organs. NTP is involved in several efforts to strengthen the science base within this field.

For contact information, visit the [Toxicology Branch](#).

[Back to Top](#)


Occupational Mixtures and Exposures

NTP is coordinating an effort between NIEHS/NIH and NIOSH/CDC to better characterize worker exposures, educate workers, and identify occupational health research gaps. Current efforts are addressing worker exposure to asphalt fumes and 1-bromopropane and future initiatives are proposed for occupational mixtures such as welding fumes, abrasive blasting compounds, and metal working fluids. An industry consortium has petitioned the EPA to list 1-bromopropane as an



NTP Website Redesign


New: “Areas of Research” landing page – **Now live**

**National Toxicology Program**
U.S. Department of Health and Human Services

Search the NTP Website

[Home](#) [Testing Information](#) [Study Results & Research Projects](#) [Public Health](#) [About NTP](#)

Home » Study Results & Research Projects » Areas of Research



<https://ntp.niehs.nih.gov/govtocurrent>

Areas of Research

Featured:


Vinpocetine

In advance of releasing the draft NTP technical report, NTP is providing information about the genetic toxicity and prenatal developmental toxicity studies.




NTP has a broad mandate to provide toxicological characterizations for chemicals and agents of public health concern and strives to balance the selection of substances for study. This has resulted in a diverse research program with emphasis on synthetic industrial chemicals, pesticides, drugs, metals, and food additives. NTP continues to explore new areas of research. In general, these initiatives are broad-based and include various health-related endpoints.

Current Areas




Botanical Dietary Supplements

NTP is studying select botanical dietary supplements to identify potential harm from short-term and long-term exposure. [Go »](#)




Cell Phones

NTP has been conducting experiments in rats and mice on potential health hazards from cell phone radiofrequency radiation. [Go »](#)



Glyphosate and Glyphosate Formulations

NTP is conducting a series of in vitro and in vivo screening assays to evaluate glyphosate and glyphosate formulations. [Go »](#)



Hexavalent Chromium

NTP studied the short-term toxicity and long-term carcinogenicity of sodium dichromate dihydrate administered to rodents in drinking water. [Go »](#)


Related Links

- [FAQs and Fact Sheets](#)
- [Health Effects of Low-level Lead Evaluation](#)
- [Systematic Review on Fluoride](#)



NTP Website Redesign

Old: “Database, Searches, & Other Resources” landing page

**National Toxicology Program**
U.S. Department of Health and Human Services

Search the NTP Website

[Home](#) [Testing Information](#) [Study Results & Research Projects](#) [Public Health](#) [About NTP](#)

Home » Study Results & Research Projects » Databases, Searches, & Other Resources

[Search All Available NTP Data \(CEBS\)](#)
[Search by Test Article \("Chemical"\)](#)
[Search Pathology Data](#)
[Search by Organ Sites Associated with Neoplasia](#)
[Historical Controls](#)
[Pathology Code Tables](#)
[Download NTP Study Data](#)

Databases, Searches, & Other Resources

▼ On This Page






Atlases

- [Atlas of Mouse Liver Lesions](#)
- [Nonneoplastic Lesion Atlas](#)

Archives


Databases and Searches

- [CEBS Database](#)
- [DrugMatrix and ToxFx Databases](#)
- [Historical Control Database](#)
- [NICEATM LLNA Database](#)


    
<https://ntp.niehs.nih.gov/goldatasearch>


Atlases

Atlas of Mouse Liver Lesions

The Atlas  provides digitized images of mouse liver lesions. Pathologists and others can view the images to familiarize themselves with the spontaneous and chemically induced lesions seen in the livers of B6C3F1 mice.


Nonneoplastic Lesion Atlas

The Nonneoplastic Lesion Atlas  is a database for non-neoplastic lesions that are organized by organ system and employs a set of guidelines developed for consistent terminology.

Back to Top 



New: “Data & Resources” landing page – Now live


**National Toxicology Program**
U.S. Department of Health and Human Services

Search the NTP Website

[Home](#) [Testing Information](#) [Study Results & Research Projects](#) [Public Health](#) [About NTP](#)

Home » Study Results & Research Projects » Data & Resources

Data & Resources

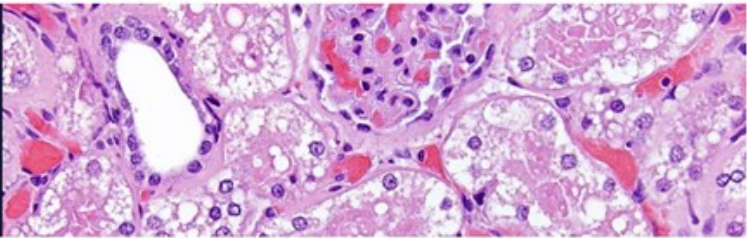

<https://ntp.niehs.nih.gov/go/datasearch>

Featured:


Nonneoplastic Lesion Atlas


Search the atlas for high-quality images and descriptions of rodent nonneoplastic lesions.


[Go »](#)




DATA

**Chemical Effects in Biological Systems ¹²**
View individual data and summaries from NTP studies. Use guided searches to find organ sites with neoplasia, publications, and more. [Go »](#)

**DrugMatrix ¹²**
Access a comprehensive database of toxicogenomic studies for hundreds of compounds including drugs and environmental chemicals. [Go »](#)

**Data Tables for Peer Review**
Review the growth, survival, pathology and other toxicology data tables that underlie NTP's draft reports. [Go »](#)

**Historical Controls**
View the growth, survival, and cancer incidence data for untreated or control groups from NTP chronic rodent studies. [Go »](#)

Related Links


- [Digital Atlas of Mouse Liver Lesions ¹²](#)
- [HAWC — Health Assessment Workplace Collaborative ¹²](#)
- [ToxFX Application ¹²](#)


Search Study Data

CEBS includes all individual animal data

SEARCH


RESOURCES

**NTP Archives**
Request access to an extensive collection of research specimens and supporting data from over 2000 NTP studies. [Go »](#)

**Alternative Toxicological Methods**
Gain access to reference chemical lists [chemicals, assessment information, and results](#)



NTP Website Redesign: Draft Home Page



National Toxicology Program
U.S. Department of Health and Human Services

Calendar & Events | News & Media | Get Involved | Support

[SEARCH](#)

Testing Information ▾ | Study Results & Research Projects ▾ | Public Health ▾ | About NTP ▾


Latest News


- Board of Scientific Counselors Meeting
December 14-15, 2016
- Request for Data and Information on
Zebrafish Embryo Chemical Screening


[SEE MORE NEWS](#)


14th
Report on Carcinogens (2016)
PAUSE

14th RoC
released
A science-based public health report
identifying cancer hazards.
[ROC REPORT](#)

[Report on Carcinogens ▸](#)


[Reports & Publications ▸](#)

[NICEATM ▸](#)

[CEBS ▸](#)

Quick Links

- Nominate & Provide Input to NTP
- Federal Register Notices
- Health Assessment and Translation



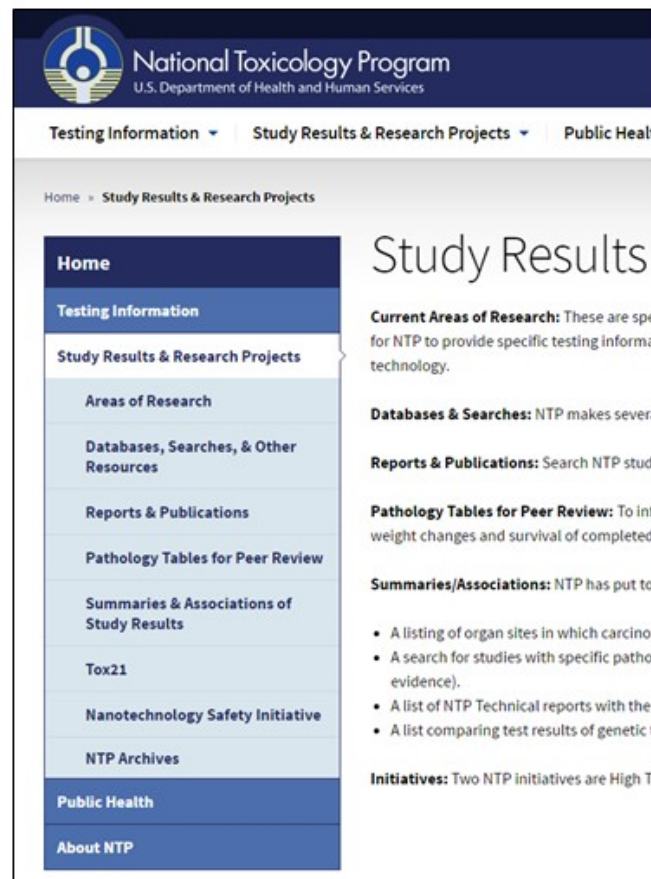
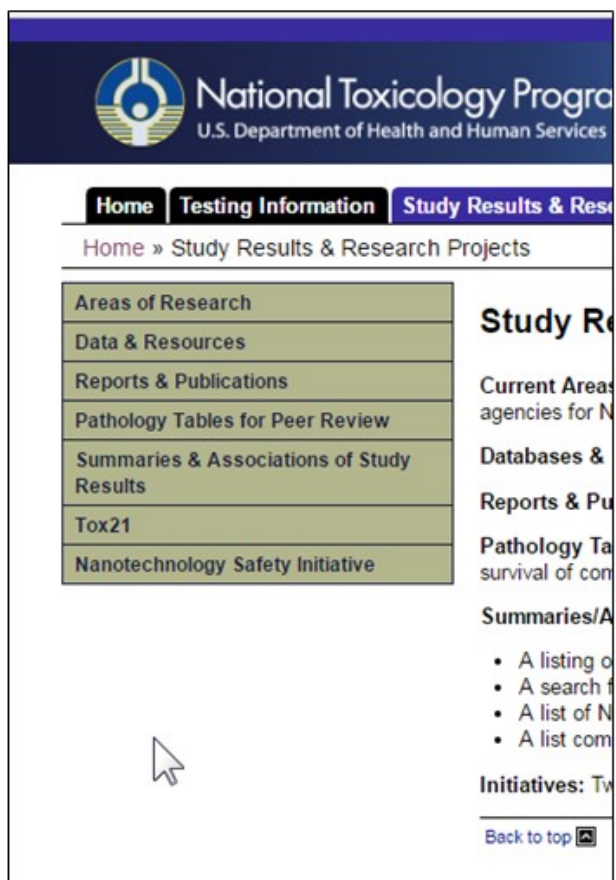
Substance Search

Search all substances studied by NTP:



NTP Website Redesign: Organization

Draft: Navigation





Thank you!

<https://niehs.nih.gov>
<https://ntp.niehs.nih.gov>



National Institute of
Environmental Health Sciences



National Toxicology Program
U.S. Department of Health and Human Services

