

# TOXNET and Beyond:

Using the National Library of Medicine  
Environmental Health and Toxicology Portal







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Using the National Library of Medicine  
Environmental Health and Toxicology Portal

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## Disclaimer

Every effort has been made to ensure that the screen graphics and the exercises in this document are up to date and accurate. However, due to the frequency of Web updates, they may have changed.

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The Oak Ridge Institute for Science and Education (ORISE) is a U.S. Department of Energy institute focusing on scientific initiatives to research health risks from occupational hazards, assess environmental cleanup, respond to radiation medical emergencies, support national security and emergency preparedness, and educate the next generation of scientists. ORISE is managed by Oak Ridge Associated Universities.

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This document was prepared for the National Library of Medicine by the ORISE through an interagency agreement with the U.S. Department of Energy (DOE). ORISE is managed by Oak Ridge Associated Universities under DOE contract number DE-AC05-06OR23100.

## Preface

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Our lives are filled with chemical exposures. How do we discover more about these chemicals for ourselves and our organization? The National Library of Medicine Environmental Health and Toxicology Portal provides access to numerous databases that can help you explore environmental chemicals and risks. *TOXNET and Beyond: Using the National Library of Medicine Environmental Health and Toxicology Portal* conveys the fundamentals of searching the NLM TOXNET system of databases in chemistry, toxicology, environmental health, and related fields. In addition to TOXNET, the course will highlight various resources available through the Environmental Health and Toxicology Portal.

The National Library of Medicine Environmental Health and Toxicology Information Program was created in 1967 to serve as the federal government's centralized resource for toxicology and environmental health information. Throughout history, the effects and importance of poisons and exposure to toxic substances has been recognized. A history of congressional legislation and events contributed to the creation of the initial Toxicology and Environmental Health Information Program, TEHIP. Eventually, the program grew into what is now the NLM Environmental Health and Toxicology Program which is offered through an online portal.

### Historical Timeline

- ▶ Poisons recognized throughout time
- ▶ Socrates – hemlock
- ▶ Cleopatra – asp
- ▶ Paracelsus (1493–1541), Father of Toxicology – “The dose makes the poison”
- ▶ Lucretia Borgia – 15<sup>th</sup> & 16<sup>th</sup> Centuries
- ▶ Harvey W. Wiley's Poison Squad (1903)
- ▶ The Jungle (1906) Upton Sinclair – lack of hygiene in the meat-packing industry
- ▶ Food and Drugs Act (1906) – prohibited adulterated or misbranded items
- ▶ Federal Food, Drug and Cosmetic Act (1938) – enhanced safety requirements for drugs
- ▶ Drug Amendments (1962) – effectiveness required for drugs
- ▶ Silent Spring (1962) Rachel Carson – sparked public awareness about hazards of synthetic chemicals
- ▶ President's Science Advisory Committee (1966) – “Report on the Handling of Toxicological Information”
- ▶ TEHIP Created (1967)
- ▶ Situated within NLMs Division of Specialized Information Services (SIS)

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## Table of Contents

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<b>Preface</b> .....	iii
<b>Section 1: Introduction</b>	
Course Overview .....	3
Environmental Health and Toxicology Portal.....	5
<b>Section 2: TOXNET®</b>	
TOXNET Overview .....	9
TOXNET Basic Searching .....	10
<b>Section 3: ChemIDplus®</b>	
ChemIDplus.....	15
ChemIDplus Search Exercises .....	21
<b>Section 4: Hazardous Substances Data Bank (HSDB®)</b>	
HSDB .....	27
HSDB Limits Search Fields.....	31
HSDB Search Exercises .....	35
<b>Section 5: Toxicology Literature Online (TOXLINE®)</b>	
TOXLINE .....	41
TOXLINE Search Exercises.....	45
<b>Section 6: Chemical Carcinogenesis Research Information System (CCRIS)</b>	
CCRIS .....	49
CCRIS Search Exercises.....	53

**Section 7: Developmental and Reproductive Toxicology Database (DART®)**

DART .....	57
DART Search Exercises .....	61

**Section 8: Genetic Toxicology Data Bank (GENE-TOX)**

GENE-TOX.....	65
GENE-TOX Search Exercises .....	69

**Section 9: Integrated Risk Information System (IRIS)**

IRIS .....	73
IRIS Search Exercises.....	77

**Section 10: International Toxicity Estimates for Risk (ITER)**

ITER .....	81
ITER Search Exercises.....	85

**Section 11: LactMed**

LactMed .....	89
LactMed Search Exercises .....	93

**Section 12: Toxics Release Inventory (TRI) and TOXMAP®**

TRI .....	97
TOXMAP .....	99
TRI/TOXMAP Decision Tree.....	103
TRI/TOXMAP Search Exercises .....	105

**Section 13: Haz-Map**

Haz-Map.....	111
Haz-Map Search Exercises .....	113

**Section 14: Household Products Database**

Household Products Database ..... 117

Household Products Database Search Exercises ..... 119

**Section 15: More to Explore**

Drug Information Portal..... 123

Dietary Supplements Labels Database (DSLDB) ..... 125

Tox Town® ..... 126

Radiation Emergency Medical Management (REMM) ..... 127

Wireless Information System for Emergency Responders (WISER®) ..... 129

Enviro-Health Links..... 131

**Section 16: Additional Resources**

Disaster Information Management Research Center (DIMRC)..... 135

Carcinogenic Potency Database (CPDB)..... 137

Comparative Toxicogenomics Database (CTD) ..... 139

LiverTox..... 141

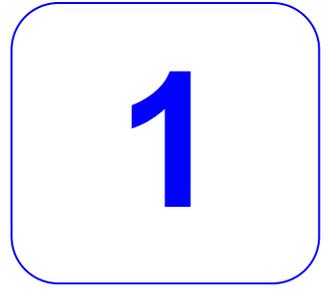
**Section 17: Mobile Tools**

Mobile Tools ..... 145

**Environmental Health & Toxicology Portal Decision Tree**

*(a pull-out reference card)* ..... *final page*

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# Introduction



## Course Overview

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### Purpose

The purpose of this training is to familiarize participants with reliable online environmental health and toxicology information, from the National Library of Medicine and other reliable sources. Skills and knowledge acquired in this training class will enable participants to access, utilize, and refer others to environmental health and toxicology information.

### Objectives

After completing this course, participants will be able to:

- ▶ Identify quality, accurate, and authoritative online resources pertaining to environmental health, toxicology, and related medical information.
- ▶ Demonstrate the ability to perform strategic search techniques to find relevant online information.
- ▶ Apply the skills and knowledge obtained in this class to their organization's health information needs.

### NLM Online Resources Covered in this Class

The following resources will be covered with time for hands-on practice:

- ▶ **ChemIDplus**—access to structure and nomenclature authority databases for the identification of chemical substances cited in NLM databases
- ▶ **Hazardous Substances Data Bank (HSDB)**—comprehensive, peer-reviewed toxicological data for more than 5,000 chemicals
- ▶ **Toxicology Literature Online (TOXLINe)**—a bibliographic toxicology database covering more than 4 million bibliographic citations
- ▶ **Chemical Carcinogenesis Research Information System (CCRIS)**—scientifically evaluated and fully referenced data on more than 9,000 chemicals
- ▶ **Developmental and Reproductive Toxicology Database (DART)**—a bibliographic database containing more than 200,000 references to literature published since 1965
- ▶ **GENE-TOX**—genetic toxicology test data on more than 3,000 chemicals resulting from expert peer review of the open scientific literature
- ▶ **Integrated Risk Information System (IRIS)**—carcinogenic and non-carcinogenic information on more than 500 chemicals
- ▶ **International Toxicity Estimates for Risk (ITER)**—side-by-side comparisons of international risk assessment information on more than 650 chemicals with links to source documentation

- ▶ **LactMed**—a database of more than 900 drugs and other chemicals to which breastfeeding mothers may be exposed
- ▶ **Toxics Release Inventory (TRI)**—information on annual environmental releases of more than 650 toxic chemicals by U.S. facilities from the U.S. Environmental Protection Agency (EPA)
- ▶ **TOXMAP**—a Geographic Information System that uses maps of the United States to help users visually explore TRI data
- ▶ **Haz-Map**—an occupational toxicology database that links job tasks to occupational diseases and their symptoms
- ▶ **Household Products Database**—human health effects information on more than 11,000 brand-name consumer products

Information on the following resources is included in the “More to Explore” section of this manual.

- ▶ **Drug Information Portal**—current drug information for more than 33,000 drugs with links to additional online resources with potential drug information
- ▶ **Dietary Supplements Labels Database**—information from the labels of more than 7,000 brands of dietary supplements in the marketplace
- ▶ **Tox Town**—an interactive guide to commonly encountered toxic substances and environmental health risks
- ▶ **Radiation Emergency Medical Management**—guidance on clinical diagnosis and treatment during mass casualty radiological/nuclear events, primarily for physicians, but usable to those without formal radiation medicine expertise
- ▶ **Wireless Information System for Emergency Responders (WISER)**—provides a wide range of information on hazardous substances, including substance identification support, physical characteristics, human health information, and containment and suppression advice
- ▶ **Enviro-Health Links**—selected links to Internet resources on environmental health and toxicology issues of special interest

These additional resources will be demonstrated:

- ▶ **Disaster Information Management Research Center (DIMRC)**—health information resources and informatics research related to disasters of natural, accidental, or deliberate design
- ▶ **Carcinogenic Potency Database (CPDB)**—analyses of the results of 6,540 chronic, long-term animal cancer tests, conducted in support of cancer risk assessments for humans, on 1547 chemicals
- ▶ **Comparative Toxicogenomics Database (CTD)**—curated scientific data describing relationships between chemicals, genes and human diseases
- ▶ **LiverTox**—Information about drug induced liver injury caused by prescription and nonprescription drugs, herbals and dietary supplements

## Environmental Health & Toxicology Portal

The NLM **Environmental Health and Toxicology Portal** provides a starting point for seeking reliable information on toxicology, hazardous chemicals, environmental health, and toxic releases.

The screenshot shows the Environmental Health & Toxicology Portal website. The header includes the U.S. Department of Health & Human Services logo, the website URL www.hhs.gov, and the National Library of Medicine logo. The main navigation bar contains links for SIS Home, About Us, Site Map & Search, SIS News, and Contact Us. A search bar is located on the right side of the navigation bar.

Key features highlighted with yellow boxes include:

- Find Information by Topic & Intended Audience:** A vertical menu on the left side of the main content area with dropdown options: Find Information About..., Especially For, Search TOXNET® Databases, Other Professional Resources, Resources for the Public, Enviro-Health Links, Guides & Tutorials, and Quick Tours.
- Search TOXNET:** A search box on the right side of the main content area with the text "Search TOXNET" and "Search all TOXNET Databases". Below the search box is a text input field and a search button. The text below the search box reads: "TOXNET - Collection of databases on hazardous chemicals, toxic releases, and environmental health (e.g. mercury, asbestos)".
- Reference Tools & Additional Resources:** A section on the left side of the main content area containing a "Search Our Web Site" box with a search button and a "A to Z Index of Resources" grid.

The main content area features a large banner for "Risk Assessment" with a traffic light image. Below the banner is a section titled "For Information About..." with three resource cards: "Integrated Risk Information System (IRIS)", "International Toxicity Estimates for Risk (ITER)", and "Hazardous Substances Data Bank".

Other sections on the right side of the main content area include "In the Spotlight" (with links to LiverTox Database, Risk Assessment Information from the NLM, Enviro-Health Links: Toxicogenomics, and Which Resource Should I Use?) and "Stay Connected" (with links to Join the Listserv, Subscribe to RSS, Follow us on Twitter, and Bookmark and share).

[sis.nlm.nih.gov/enviro.html](http://sis.nlm.nih.gov/enviro.html)

Browse the easily navigable site by topic or audience. Explore related resources using the **A to Z Index of Resources**. The **Other Professional Resources** include database descriptions, fact sheets, a list of NLM databases and electronic resources. You can also search all TOXNET databases from this page.

### Staying Connected



#### NLM-Tox-Enviro-Health-L Listserv

- Keep informed about new and noteworthy environmental health and toxicology resources, services, and outreach activities from NLM Division of Specialized Information Services [sis.nlm.nih.gov/enviro/envirolistserv.html](http://sis.nlm.nih.gov/enviro/envirolistserv.html)



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- ▶ Follow Twitter to receive the latest information on NLM Environmental Health and Toxicology

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**[sis.nlm.nih.gov/rss/sisnewsfeed.rss](https://sis.nlm.nih.gov/rss/sisnewsfeed.rss)**



News Updates

- ▶ News from NLM Division of Specialized Information Services

**[sis.nlm.nih.gov/news.html](https://sis.nlm.nih.gov/news.html)**

### Additional Resources

For further information, we recommend these additional resources:

- ▶ [Getting the Most from SIS's Environmental Health and Toxicology Resources](https://sis.nlm.nih.gov/getthemostfromsis.html)  
**[sis.nlm.nih.gov/getthemostfromsis.html](https://sis.nlm.nih.gov/getthemostfromsis.html)**
- ▶ [NLM Environmental Health and Toxicology Resources Quick Tour](https://sis.nlm.nih.gov/enviro/captivate/tehipoverview.htm)  
**[sis.nlm.nih.gov/enviro/captivate/tehipoverview.htm](https://sis.nlm.nih.gov/enviro/captivate/tehipoverview.htm)**
- ▶ [Publications and Reference Materials](https://sis.nlm.nih.gov/enviro/enviropubs.html)  
**[sis.nlm.nih.gov/enviro/enviropubs.html](https://sis.nlm.nih.gov/enviro/enviropubs.html)**



**TOXNET**



## TOXNET Overview

NLM **TOXNET** (Toxicology Data Network) is a free, Web-based system of databases on environmental health, toxicology, hazardous chemicals, toxic releases, chemical nomenclatures, and specialty areas such as occupational health and consumer products. Information includes specific chemicals, mixtures, and products; unknown chemicals; and special toxic effects of chemicals in humans and/or animals.

[toxnet.nlm.nih.gov](http://toxnet.nlm.nih.gov)

Types of information in the TOXNET databases include:

- ▶ Specific chemicals, mixtures, and products
- ▶ Unknown chemicals
- ▶ Special toxic effects of chemicals in humans and/or animals

Click the information icon (i) to the right of each database in the Select Database column for a description of the database, a link to the fact sheet, and a sample record.

### The TOXNET Databases

The TOXNET databases covered in this course can be grouped in the following categories:

- ▶ Chemical Nomenclature—ChemIDplus
- ▶ Toxicology Data (one record per chemical)—HSDB, IRIS, CCRIS, GENE-TOX, ITER, and LactMed—can also search any combination of these files with the Multi-Database feature
- ▶ Toxicology Literature (bibliographic references)—TOXLINE and DART
- ▶ Toxic Release—TRI and TOXMAP
- ▶ Specialty Databases—Haz-Map, CPDB, and CTD

## TOXNET Basic Searching

From the TOXNET home page, you can search all TOXNET databases simultaneously. Your results will be displayed as links to the databases in which your search term(s) were found—and the number of records in each—under the headings: References from the Biomedical Literature (TOXLINE and DART) and Chemical, Environmental Health and Toxicological Data (all others).

The screenshot displays the TOXNET search interface. On the left, a 'Select Database' list includes ChemIDplus, HSDB, TOXLINE, CCRIS, DART, GENETOX, IRIS, ITER, LactMed, Multi-Database, TRI, Haz-Map, Household Products, and TOXMAP. A yellow box highlights the 'Search All Databases' button. Below it, a search box contains the term 'ammonia' with a dropdown menu showing suggestions like 'asthma air pollution, ibuprofen fever, vinyl chloride'. A 'Search' button is highlighted. Below the search box are 'TOXNET Search Options' with instructions: 'Search all databases: Enter term(s) in box above', 'Search a specific database: Click database at left', and 'Database description: Click on the [?]'.

The main search area shows the same 'Select Database' list and a 'Search All Databases' section with a search box containing 'ammonia' and 'Search', 'Clear', and 'Help' buttons. Below this, the results are displayed under three headings:

- References from Biomedical Literature**

TOXLINE	Toxicology Literature Online	20242
DART	Developmental Toxicology Literature	250
- Chemical, Toxicological, and Environmental Health Data**

ChemIDplus	Chemical Identification/Dictionary	1
HSDB	Hazardous Substances Data Bank	1018
CCRIS	Chemical Carcinogenesis Information	1

**Entering search term(s)**—You may enter any combination of words, chemical names, and numbers, including Chemical Abstracts Service (CAS) registry numbers. Common “stop words” such as “a,” “an,” “and,” “for,” “the,” and “it” will not be searched. When searching for terms other than chemicals, the system automatically searches for singular and plural forms of the term(s) entered.

**Synonym searching**—By default the system will search for the exact name, synonyms, and CAS number as derived from ChemIDplus. Select “No” to search only for the exact chemical term or CAS Registry Number entered. In LactMed, the CAS number refers to the parent compound (i.e., not the salt form).

The dialog box shows a search box with the example text '(e.g. antifreeze kidney failure, chromium compounds, 7718-54-9)'. Below the search box are 'Search', 'Clear', and 'Help' buttons. A yellow box highlights the section: 'For chemicals, add synonyms and CAS numbers to search:' with radio buttons for 'Yes' (selected) and 'No'. At the bottom are 'Limits' and 'Browse the Index' buttons.

**Truncation**—The asterisk (\*) is the right-handed truncation symbol for any number of characters.

**Phrase searching**—Search phrases with quotation marks.

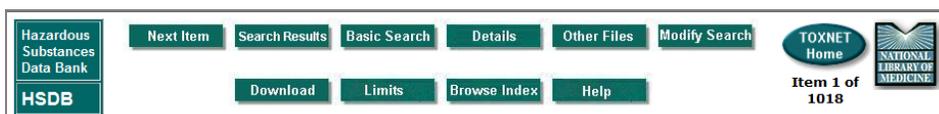
**Boolean searching**—Use the logical operators “AND,” “OR,” and “NOT” to limit a search of two or more terms to specific criteria. In searches with combinations of these operators, “AND” takes precedence, followed by “NOT” and then “OR.” This default precedence may be overridden with the use of parentheses, which may also be nested (i.e., parentheses within parentheses). Examples:  
 Pulmonary AND edema—retrieves all records with the two words appearing together  
 Liver OR kidney—retrieves all records containing either of these words (or both of them)  
 Carcinoma NOT squamous—retrieves records from which one or more terms have been excluded

**Browse the Index**—This feature provides a scannable index of all terms beginning with the search term you entered and the number of records for each term. In the Toxicology Data databases, selectable items indexed are **All Words**, **CAS Registry Number**, and **Chemical Name**. In the Toxicology Literature databases, selectable items indexed are **All Words**, **MeSH Headings/Keywords**, **Authors**, and **CAS Registry Number**.

**Search Results Buttons**—Buttons on the left of the search results screen allow you to:

Save Checked Items	▶ Save Checked Items—save items in a set for displaying, sorting, and downloading
Sort	▶ Sort—sort the entire search results or items saved in a set
Details	▶ Download—download the entire search results or items save in a set in brief, full, abstract, or tagged format
History	▶ Modify Search—make changes to the most recent search
Download	▶ Basic Search—conduct a new search in the same database
Modify Search	▶ Browse Index—browse all words, CAS Registry Number, chemical name, and in bibliographic databases MeSH headings/keywords and authors
Basic Search	▶ Go to the Help file for that database
Browse Index	▶ Go to TOXNET Home
Help	
TOXNET Home	

**Navigation Buttons**—Buttons at the top of the record screen allow you to:



- ▶ Go to the Next Item in the search results
- ▶ Go back to the Search Results screen
- ▶ Perform a new Basic Search in the same database
- ▶ View Details of the search
- ▶ Display links to Other Files (NLM databases) containing information on the substance
- ▶ Modify [your] Search
- ▶ Download the record or portions of the record
- ▶ Perform a new search in the same database with Limits applied
- ▶ Browse [the] Index
- ▶ Go to the Help file for that database

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3

**ChemIDplus**



## ChemIDplus

**ChemIDplus** is a free, Web-based search system that provides access to structure and nomenclature authority files used for the identification of chemical substances cited in NLM databases. It also provides structure searching and direct links to many biomedical resources at NLM and on the Internet for chemicals of interest. It contains more than 390,000 chemical records, of which more than 295,000 include chemical structures. Each record in ChemIDplus represents a single chemical or substance. The ChemIDplus database has two different applications: **ChemIDplus Lite** (for basic searching) and **ChemIDplus Advanced** (for more experienced users).

United States National Library of Medicine

**TOXNET**  
Toxicology Data Network

SIS Home | About Us | Site Map & Search | Contact Us

▶ Env. Health & Toxicology ▶ TOXNET ▶ ChemIDplus Lite

**ChemIDplus** - Dictionary of over 370,000 chemicals (names, synonyms, and structures). Includes links to NLM and other databases and resources.

**Select Database**

- ChemIDplus
- HSDB
- TOXLINE
- CCRIS
- DART
- GENETOX
- IRIS
- ITER
- LactMed
- Multi-Database
- TRI
- Haz-Map
- Household Products
- TOXMAP
- TOXNET Home

**Search ChemIDplus**

Search Clear

Enter the name (e.g. formaldehyde) or registry number (e.g. 50-00-0) to search

Advanced ChemIDplus Search

Provides chemical structure, property, and toxicity searching.

**Env. Health & Toxicology**

Portal to environmental health and toxicology resources

VISIT SITE

**Support Pages**

- ▶ Help
- ▶ Fact Sheet
- ▶ Sample Record
- ▶ TOXNET FAQ

**Additional Resources**

- CPDB
- CTD

[toxnet.nlm.nih.gov](http://toxnet.nlm.nih.gov)

## Content

Information in the ChemIDplus database includes:

- ▶ Systematic, generic, and trade names
- ▶ Synonyms
- ▶ CAS registry numbers
- ▶ Molecular formulas
- ▶ Classification codes

► **Chemical structures (ChemIDplus Advanced)**

ChemIDplus also provides links to many biomedical resources at NLM and on the Internet for chemicals of interest.

## Searching ChemIDplus

Search ChemIDplus by name, synonym, Chemical Abstracts Service (CAS) registry number, molecular formula, classification code, locator code, structure, toxicity, and/or physical properties within two distinct applications:

- **ChemIDplus Lite** (ChemIDplus home page) is designed for simple searching on name or registry number to retrieve basic information about a chemical and provide locator links to other resources and does not require special software applets or plug-ins. The Lite version displays structures, but does not allow drawing or searching on structures.
- **ChemIDplus Advanced** (see below) is designed for more advanced searching on any combination of name, registry number, molecular formula, classification code, locator code, toxicity, physical property, structure, or molecular weight. In addition, ChemIDplus Advanced allows users to draw their own structures and perform similarity and substructure searches.

**Enter basic search term** →

**Qualify a toxicity search** {

**Select and qualify a physical property** {

**Qualify a search with specific "locator" resources** {

**Click in box to draw structures** }

**Select type of structure search** }

**Search by molecular weight or range** }

## Search Results

If you searched ChemIDplus Lite, the system displays the record with basic information for the chemical, including links to additional information. If multiple records were retrieved, a list of names would be shown. Following is the ChemIDplus Lite record for diazepam. Use buttons on the left to retrieve categories of detailed information such as Names & Synonyms, Formulas, Classification Codes, Registry Numbers, and Notes. In the center of the page, lists of "locators" provide links to other resources in three categories:

- ▶ **File Locators**—point to a set of NLM associated databases
- ▶ **Internet Locators**—point to a set of resources with biomedical data of interest for the chemical
- ▶ **SuperList Locators**—point to a set of regulatory and scientific lists that contain information about the chemical

### Record for Diazepam (ChemIDplus Lite)

**Diazepam [USAN:INN:BAN:JAN]**  
RN: 439-14-5

For more information about this substance, you may select from the links below.

<p><b>Basic Information</b></p> <p>Full Record</p> <p>Names &amp; Synonyms</p> <p>Formulas</p> <p>Classification Codes</p> <p>Registry Numbers</p> <p>Notes</p> <p>Toxicity</p> <p>Physical Properties</p>	<p><b>File Locator</b></p> <p><a href="#">CCRIS</a></p> <p><a href="#">ClinicalTrials.gov</a></p> <p><a href="#">DART</a></p> <p><a href="#">DailyMed</a></p> <p><a href="#">DrugPortal</a></p> <p><a href="#">EINECS</a></p> <p><a href="#">EMIC</a></p> <p><a href="#">GENETOX</a></p> <p><a href="#">HSDB</a></p> <p><a href="#">LactMed</a></p> <p><a href="#">LiverTox</a></p> <p><a href="#">MeSH</a></p> <p><a href="#">MeSH Heading</a></p> <p><a href="#">MedlinePlusAll</a></p> <p><a href="#">MedlinePlusDrug</a></p> <p><a href="#">Pillbox</a></p> <p><a href="#">PubChem</a></p> <p><a href="#">PubMed</a></p> <p><a href="#">PubMed AIDS</a></p> <p><a href="#">PubMed Cancer</a></p> <p><a href="#">PubMed Toxicology</a></p> <p><a href="#">RTECS</a></p> <p><a href="#">TOXLINE</a></p> <p><b>Internet Locator</b></p> <p><a href="#">CAMEO</a></p> <p><a href="#">CPDB</a></p> <p><a href="#">CTD</a></p> <p><a href="#">CHEBI</a></p> <p><a href="#">DrugDigest</a></p> <p><a href="#">Drugs@FDA</a></p> <p><a href="#">EPA Envirofacts</a></p> <p><a href="#">EPA PPIIS</a></p> <p><a href="#">EPA SBS</a></p> <p><a href="#">NIAID ChemDB</a></p> <p><a href="#">NIST WebBook</a></p> <p><a href="#">NJ-HSFS</a></p> <p><a href="#">NTP DBS</a></p> <p><a href="#">SRC DATALOG</a></p> <p><a href="#">USA.gov</a></p> <p><b>Superlist Locator</b></p> <p><a href="#">CA65</a></p> <p><a href="#">DEA</a></p> <p><a href="#">DSL</a></p> <p><a href="#">IARC</a></p> <p><a href="#">MA</a></p> <p><a href="#">TSCAInv</a></p>	<p><b>Search Navigation</b></p> <p>Main Query Page</p> <p>Advanced ChemIDplus Search</p> <p><input type="checkbox"/> NCI Chem Carcino Res Info Sys</p> <p><input type="checkbox"/> NIH ClinicalTrials.gov</p> <p><input type="checkbox"/> Developmental and Reprod.Tox.</p> <p><input type="checkbox"/> NLM/FDA Drug Labelling</p> <p><input type="checkbox"/> NLM Drug Information Portal</p> <p><input type="checkbox"/> EU Inv of Exist. Comm. Chem Sub</p> <p><input type="checkbox"/> Env. Mutagen Info. Center</p> <p><input type="checkbox"/> EPA GENetic Toxicology</p> <p><input type="checkbox"/> Hazardous Substances Data Bank</p> <p><input type="checkbox"/> Drugs and Lactation Database</p> <p><input type="checkbox"/> Information on Drug-Induced Liver Injury</p> <p><input type="checkbox"/> Medical Subject Headings File</p> <p><input type="checkbox"/> Medical Subject Headings</p> <p><input type="checkbox"/> Search Consumer Health Info</p> <p><input type="checkbox"/> Consumer Drug Information</p> <p><input type="checkbox"/> Drug Identification and Image Display</p> <p><input type="checkbox"/> PubChem</p> <p><input type="checkbox"/> Biomedical Citations From PubMed</p> <p><input type="checkbox"/> AIDS Citations from PubMed</p> <p><input type="checkbox"/> Cancer Citations from PubMed</p> <p><input type="checkbox"/> Toxicology Citations From PubMed</p> <p><input type="checkbox"/> Reg. of Toxic Eff. of Chem. Sub.</p> <p><input type="checkbox"/> NLM TOXLINE on TOXNET</p> <p><input type="checkbox"/> NOAA CAMEO Chemicals</p> <p><input type="checkbox"/> Carcinogenic Potency Database</p> <p><input type="checkbox"/> Comparative Toxicogenomics Database</p> <p><input type="checkbox"/> Chem Entities of Biological Interest</p> <p><input type="checkbox"/> Drug Digest</p> <p><input type="checkbox"/> FDA Drug Database</p> <p><input type="checkbox"/> EPA Master Chemical Integrator</p> <p><input type="checkbox"/> EPA Pest. Prod. Info. System</p> <p><input type="checkbox"/> EPA Substance Registry System</p> <p><input type="checkbox"/> NIAID Chemical Database</p> <p><input type="checkbox"/> NIST Chemistry WebBook</p> <p><input type="checkbox"/> New Jersey Haz. Sub. Fact Sheets</p> <p><input type="checkbox"/> NTP Database Search</p> <p><input type="checkbox"/> Syracuse Res. Corp. DATALOG</p> <p><input type="checkbox"/> USA.gov Search Engine</p> <p><input type="checkbox"/> California Proposition 65 List</p> <p><input type="checkbox"/> DEA Controlled Substances</p> <p><input type="checkbox"/> Domestic Sub. List of Canada</p> <p><input type="checkbox"/> Int. Agency for Res. on Cancer</p> <p><input type="checkbox"/> Massachusetts Right-to-know Sub.</p> <p><input type="checkbox"/> EPA Chem. Sub. Inventory</p>
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**Other names used for chemical** →

**Links to PubMed articles** →

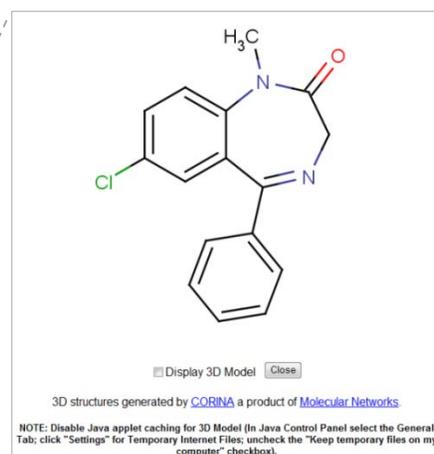
**Internet Locator(s)** →

**Superlist Locator(s)** →

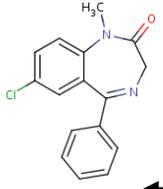
**File Locator(s)** →

The advanced record shows the same locator lists and basic information as the ChemIDplus Lite record with the addition of structures including structure navigation buttons.

**Record for Diazepam (ChemIDplus Advanced)**



**NAME: Diazepam [USAN:INN:BAN:JAN]**  
**RN: 439-14-5**



MW: 284.7447  
[Enlarge Structure](#)

**Click to enlarge and manipulate structure**

**Click to display structure** →

For more information about this substance, you may select from the links below.

<p><b>File Locator</b></p> <p><a href="#">CCRIS</a></p> <p><a href="#">ClinicalTrials.gov</a></p> <p><a href="#">DART</a></p> <p><a href="#">DailyMed</a></p> <p><a href="#">DrugPortal</a></p> <p><a href="#">EINECS</a></p> <p><a href="#">EMIC</a></p> <p><a href="#">GENETOX</a></p> <p><a href="#">HSDB</a></p> <p><a href="#">LactMed</a></p> <p><a href="#">LiverTox</a></p> <p><a href="#">MeSH</a></p> <p><a href="#">MeSH Heading</a></p> <p><a href="#">MedlinePlusAll</a></p> <p><a href="#">MedlinePlusDrug</a></p> <p><a href="#">Pillbox</a></p> <p><a href="#">PubChem</a></p> <p><a href="#">PubMed</a></p> <p><a href="#">PubMed AIDS</a></p> <p><a href="#">PubMed Cancer</a></p> <p><a href="#">PubMed Toxicology</a></p> <p><a href="#">RTECS</a></p> <p><a href="#">TOXLINE</a></p> <p><b>Internet Locator</b></p> <p><a href="#">CAMEO</a></p> <p><a href="#">CPDB</a></p> <p><a href="#">CTD</a></p> <p><a href="#">ChEBI</a></p> <p><a href="#">DrugDigest</a></p> <p><a href="#">Drugs@FDA</a></p> <p><a href="#">EPA Envirofacts</a></p> <p><a href="#">EPA PPIIS</a></p> <p><a href="#">EPA SRS</a></p> <p><a href="#">NIAID ChemDB</a></p> <p><a href="#">NIST WebBook</a></p> <p><a href="#">NJ-HSFS</a></p> <p><a href="#">NTP DBS</a></p> <p><a href="#">SRC DATALOG</a></p>	<ul style="list-style-type: none"> <li><a href="#">NCI Chem Carcino Res Info Sys</a></li> <li><a href="#">NIH ClinicalTrials.gov</a></li> <li><a href="#">Developmental and Reprod.Tox.</a></li> <li><a href="#">NLM/FDA Drug Labelling</a></li> <li><a href="#">NLM Drug Information Portal</a></li> <li><a href="#">EU Inv of Exist. Comm. Chem Sub</a></li> <li><a href="#">Env. Mutagen Info. Center</a></li> <li><a href="#">EPA GENETIC TOXICology</a></li> <li><a href="#">Hazardous Substances Data Bank</a></li> <li><a href="#">Drugs and Lactation Database</a></li> <li><a href="#">Information on Drug-Induced Liver Injury</a></li> <li><a href="#">Medical Subject Headings File</a></li> <li><a href="#">Medical Subject Headings</a></li> <li><a href="#">Search Consumer Health Info</a></li> <li><a href="#">Consumer Drug Information</a></li> <li><a href="#">Drug Identification and Image Display</a></li> <li><a href="#">PubChem</a></li> <li><a href="#">Biomedical Citations From PubMed</a></li> <li><a href="#">AIDS Citations from PubMed</a></li> <li><a href="#">Cancer Citations from PubMed</a></li> <li><a href="#">Toxicology Citations From PubMed</a></li> <li><a href="#">Reg. of Toxic Eff. of Chem. Sub.</a></li> <li><a href="#">NLM TOXLINE on TOXNET</a></li> </ul>
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**Structure navigation buttons**

**View data tables** {

<p><b>Basic Information</b></p> <p><b>Full Record</b></p> <p><b>Structure</b></p> <p><b>Names &amp; Synonyms</b></p> <p><b>Formulas</b></p> <p><b>Classification Codes</b></p> <p><b>Registry Numbers</b></p> <p><b>Notes</b></p> <p><b>Toxicity</b></p> <p><b>Physical Properties</b></p>	<p><b>Search Navigation</b></p> <p><b>Start New Query</b></p> <p><b>Modify Query</b></p> <p><b>Show Query</b></p> <p><b>Search History</b></p> <p><b>Structure Similarity Search</b></p> <p><b>Structure Salt/Parent Search</b></p> <p><b>Transfer Structure</b></p> <p><b>Basic ChemDplus Search</b></p>
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## Additional Resources

For further information, we recommend these additional resources:

- ▶ [ChemIDplus Fact Sheet](http://nlm.nih.gov/pubs/factsheets/chemidplusfs.html)  
**nlm.nih.gov/pubs/factsheets/chemidplusfs.html**
- ▶ [TOXNET Workbook](http://sis.nlm.nih.gov/enviro/manuals.html)  
**sis.nlm.nih.gov/enviro/manuals.html**
- ▶ [ChemIDplus Help](http://chem.sis.nlm.nih.gov/chemidplus/html/help.jsp)  
**chem.sis.nlm.nih.gov/chemidplus/html/help.jsp**

## ChemIDplus Search Exercises

### Scenario 1 – Chemical Identification

Linda works for a government agency that monitors ingredients in cigarettes. Linda and her team receive ingredient submissions from cigarette manufacturers. The team is tasked with verifying chemical ingredient names and registry numbers. Linda receives an ingredient submission which lists acetoin with CAS registry number 513-86-0. The previous submission listed acetyl methyl carbinol with the same registry number.

**Search ChemIDplus Lite to verify the information: Locate the record for acetoin. Since 513-86-0 is the registry number for the acetoin record, verify whether, or not, acetyl methyl carbinol is a synonym for acetoin. Is there a regulatory source for this synonym?**

Suggested Solution:

- Type **acetoin** in the Search box
- Click **Search**
- Click **Names & Synonyms** on the left
- Scroll down to **Superlist Name**
-  Remember that the Superlist heading indicates government regulatory information (U.S. and International).
- Click **Information** icon (  ) next to “Acetyl methyl carbinol” to view the source
- Close the **Data Source Information** window
- Close **Names & Synonyms** window

### Scenario 2 – Research Data

Dr. Stein is conducting research and has a need to examine the toxic effects of chemicals produced in high volumes in mice. Dr. Stein would like to focus on extremely toxic chemicals, but exclude pesticides from his initial short list for his team.

**Search ChemIDplus Advanced to form a list of chemicals and view some of the effects listed in literature: Enter toxicity criteria for extremely toxic chemicals. Qualify the type of chemical by using Locator Codes. View the effects in the toxicity table. Return to the Search Results page to continue with Scenario 3.**

Suggested Solution:

- Click **Advanced ChemIDplus Search**
- Select **LD50** from the Test drop-down menu under the **Toxicity** input area. Next, qualify the value as **less than** in the drop-down menu to the right
- Type a value of **50** (mg/kg or ppm) in the Search box under **Test**
- Select **mouse** from the Species: drop-down menu

- Select **oral** from the Route: drop-down menu
- Select **EPA HPVIS** from the first drop-down menu under the Locator Codes search box
-  The EPA HPVIS locator is the resource for High Production Volume Chemical Information System from the Environmental Protection Agency (EPA).
- Select **AND NOT** from the second drop-down menu under Locator Codes
-  The AND NOT qualifier excludes pesticides from the search results. The shaded rows indicate an exact match on the search query. The red text indicates a partial match. Notice links to PubMed in the Source column.
- Select **EPA PPIS** from the last drop-down menu under Locator Codes
-  The EPA PPIS is the EPA's Pesticide Product Information System. The system identifies registered pesticides for use in the United States (current and former).
- Click **Search**
- Click the first record in the search results
- Click **Toxicity** on the left side of the page
- View the **Effect** column and close the Toxicity pop-up window
- Click **Search Results Page** on right side of the page to continue with Scenario 3

### Scenario 3 – Structure Similarity

**Dr. Stein takes a look at his search results. He notices butanenitrile in the results list. Dr. Stein would like to identify chemicals structurally similar to this compound.**

**Use the ChemIDplus Advanced search results from Scenario 2 to identify similar structures: From the previous search results, locate the butanenitrile record and transfer the structure to the main query page. On the main query page, choose a level of similarity in the structure search box. The Similarity Search should be pre-selected as the default.**

Suggested Solution:

- Click **Transfer** icon (  ) button on the right side of the butanenitrile structure
- Select **70%** from the drop-down menu under structure search options on the right side of the page
- Click **Search**
-  Notice the similar halogenated structures.
- Return to ChemIDplus Lite to prepare for the next search

## Additional Exercises

 Go to **toxnet.nlm.nih.gov**.

 Click  in the **Select Database** column.

### Exercise 1: Locate the record for trifluralin. Is trifluralin on the U.S. EPA Clean Air List (CAA1)?

Suggested solution:

- Type **trifluralin** in the Search box
- Click **Search**
- Click **CAA1** under SuperList Locator
- Review the information in the pop-up window and close the window
- Click the **Main Query Page** button at the right to prepare for a new search

### Exercise 2: Check the File Locator field in the selenium record to see what other NLM databases contain information on selenium. View the listing of selenium synonyms.

Suggested solution:

- Type **selenium** in the Search box
- Click **Search**
- Review the other NLM databases (under **File Locator**), that contain information on the chemical
- Click the **Names & Synonyms** button on the left side of the page
- Review the list in the pop-up window and close the window
- Click the **Main Query Page** button at the right to prepare for a new search

### Exercise 3: Find the lowest toxic dose tested (TDLo) for phenobarbital in infants.

Suggested solution:

- Type **phenobarbital** in the Search box
- Click **Search**
- Click **Phenobarbital [USAN:INN:JAN]**
- Click the **Toxicity** button on the left side of the page
- Review the chart and close the window
- Click the **Main Query Page** button at the right to prepare for a new search

**Exercise 4: Locate the record for formaldehyde and link to the Internet Locator ATSDR Tox Portal. Then link to the NIOSH Pocket Guide. Use the Classification Code button to find the Overall Carcinogenic Evaluation classification and the source for the rating.**

Suggested solution:

- Type **formaldehyde** in the Search box
- Click **Search**
- Click **ATSDR Tox Portal** under Internet Locator
- Review the **Tox Portal for Formaldehyde** in the ATSDR window and close the window
- Click **NIOSH Pocket Guide** under Internet Locator
- Review the information and close the CDC window
- Click **Classification Codes** on the left side of the page
- Review the **Superlist Classification Code** list to find Overall Carcinogenic Evaluation: Group 1
- Click the **information icon ( i )** next to Overall Carcinogenic Evaluation: Group 1 to find the data source – **IARC (International Agency for Research on Cancer)**
- Close the **Data Source Information** window, then the Classification Codes window and return to the **Formaldehyde [USAN]** record
- Click **Main Query Page** at the top right to prepare for a new search

**Exercise 5: Find the xylene record in ChemIDplus and use its structure to do substructure and 70% similarity searches, respectively. How many structures are in each category?**

Suggested solution:

- Click **Advanced ChemIDplus Search**
- Type **xylene** in the Substance Identification search box
- Click **Search** and review the information retrieved
- Click **Transfer Structure** at the right
- Click **Similarity Search** in the Structure Search Options box and change the percentage to **70** in the pull-down menu
- Click **Search** and review the information retrieved



# **Hazardous Substances Data Bank (HSDB)**



## HSDB

**HSDB** (Hazardous Substances Data Bank) is a comprehensive toxicology data file on NLM TOXNET system. It contains data on more than 5,000 chemicals, organized into individual records. The average record is approximately 25 printed pages. Content is peer-reviewed by the Scientific Review Panel, a committee of experts in the major subject areas within the data bank's scope. HSDB is enhanced with information on human exposure, industrial hygiene, emergency handling procedures, environmental fate, regulatory requirements, and related areas.

The screenshot shows the TOXNET website interface. At the top left is the NLM logo and text: "United States National Library of Medicine". To the right is the "TOXNET Toxicology Data Network" header with a background image of a person in a red cap working in a field. Below the header is a navigation bar with links: "TOXNET Mobile Access", "SIS Home", "About Us", "Site Map & Search", and "Contact Us". A breadcrumb trail shows "Env. Health & Toxicology > TOXNET > HSDB".

The main content area is titled "Hazardous Substances Data Bank (HSDB) - Comprehensive, peer-reviewed toxicology data for about 5,000 chemicals." Below this are three main sections:

- Select Database:** A list of databases with "HSDB" selected. Other options include ChemIDplus, TOXLINE, CCRIS, DART, GENETOX, IRIS, ITER, LactMed, Multi-Database, TRI, Haz-Map, Household Products, TOXMAP, and TOXNET Home.
- Search HSDB:** A search box with a placeholder "(e.g. antifreeze kidney failure, chromium compounds, 7718-54-9)". Below the search box are "Search", "Clear", and "Help" buttons. A checkbox section asks "For chemicals, add synonyms and CAS numbers to search:" with "Yes" selected and "No" as an option. At the bottom are "Limits" and "Browse the Index" buttons.
- Env. Health & Toxicology:** A section with a "VISIT SITE" button and a "Portal to environmental health and toxicology resources" link.

At the bottom left, there is an "Additional Resources" section with links to "CPDB" and "CTD". At the bottom right, there is a "Support Pages" section with links to "Help", "Fact Sheet", "Sample Record", "HSDB Scientific Review Panel", "List of Chemicals in HSDB", and "TOXNET FAQ".

toxnet.nlm.nih.gov

### Searching HSDB

Search HSDB by chemical or other name, chemical name fragment, Chemical Abstracts Service (CAS) Registry Number, and/or subject terms (basic searching). By default, the system searches for synonyms and CAS numbers of chemicals.

Use truncation (\*), Boolean operators (AND, OR, NOT), phrase searching, nested parentheses, limits, and index browsing to refine your search results.

Click the **Limits** button on the home page to search:

- ▶ Exact words, singular & plural forms, or word variants
- ▶ All the words, any of the words, or as a phrase
- ▶ In specific fields or categories of fields (see “HSDB Limits Search Fields” in this section)

Click the **Browse the Index** button on the home page to search a list of index terms related to the search term entered and the number of records containing that term. Select the record(s) you want to view by clicking the appropriate box in the “Check to Select” column and clicking the **Select** button. Scan the index above or below the original display by clicking the **Up** or **Down** button.

HSDB Browse Results

benzene Search Clear Return to Basic Search

All Words  CAS Registry Number  Chemical Name

Check one or more text words. Then click on SELECT.

Start of Text Word Browse: benzene

Up Down Select

Check to Select	Number of Records	Index Term
<input type="checkbox"/>	1963	benzene
<input type="checkbox"/>	6	benzeneacetamide
<input type="checkbox"/>	7	benzeneacetate
<input type="checkbox"/>	27	benzeneacetic
<input type="checkbox"/>	1	benzeneacetanitr
<input type="checkbox"/>	4	benzeneacetanitrile
<input type="checkbox"/>	6	benzeneamine
<input type="checkbox"/>	4	benzenearsonic
<input type="checkbox"/>	3	benzeneazo
<input type="checkbox"/>	1	benzeneazoamide
<input type="checkbox"/>	2	benzeneazoaniline
<input type="checkbox"/>	1	benzeneazobenzene

## Search Results

Your initial retrieval is displayed as a list of substance names in blue and their CAS Registry Numbers. Substances are listed in **relevancy ranked order**. Relevancy ranking is based on the number of individual search terms occurring in a document, the number of times each search term occurs in a document, the rarity of the search terms within the database, and the nearness of search terms to each other. Records containing combinations of search terms tend to be ranked higher than records with isolated occurrences of search terms.

When searching for a chemical, the initial matching chemical record (the “primary record”) may be followed by additional chemical records that contain the chemical name or search term you entered.

If you click the primary record, the system displays the **Human Health Effects**. If you click a different chemical record, or if your search was for a term other than a chemical, the system will display the sections of the record best matching your query terms (**Best Sections**), those where the chemical search term(s) appears with greatest frequency.

Click on a substance name on the search results screen to retrieve the record for that substance. The **Record** screen is organized into three sections:

1. Navigation buttons at the top of the screen allow you to link to **Other Files** (NLM databases), modify your search (**Modify Search**), **Download**, return to the **Basic Search** screen, and more.
2. A **Table of Contents** in the left frame allows you to choose categories and fields for display.
3. Chemical data is shown in the right frame. Your search term(s) appear in red.

## Primary Record

Search terms  
are in red

## Additional Chemical Record

**Hazardous Substances Data Bank**  
HSDB

Next Item Search Results Basic Search Details Other Files Modify Search

Previous Item Download Limits Browse Index Help

TOXNET Home  
Item 2 of 1963

Contract all categories  
Expand all categories

**Table of Contents** Select Clear

- FULL RECORD
- BEST SECTIONS
- Human Health Effects
  - Toxicity Summary
  - Evidence for Carcinogenicity
  - Human Toxicity Excerpts
  - Skin, Eye and Respiratory Irritations
  - Drug Warnings
  - Medical Surveillance
  - Probable Routes of Human Exposure
  - Body Burden
  - Reported Fatal Dose
- Emergency Medical Treatment
  - Emergency Medical Treatment
  - Antidote and Emergency Treatment
- Animal Toxicity Studies
  - Toxicity Summary
  - Evidence for Carcinogenicity
  - Non-Human Toxicity Excerpts
  - National Toxicology Program Studies
  - Non-Human Toxicity Values
  - Ecotoxicity Values
  - Ongoing Test Status

**HYDROQUINONE**  
CASRN: 123-31-9

Oc1ccc(O)cc1

For other data, click on the Table of Contents

**Best Sections**

**Human Toxicity Excerpts :**  
/OTHER TOXICITY INFORMATION/ ...The accumulated evidence demonstrates that benzene-induced bone marrow damage results from the production of toxins that are products of benzene metabolism. The metabolism of benzene is described with respect to the formation of benzene metabolites with emphasis on hydroquinone, which are the major metabolites, the significance of the formation of glutathione conjugates, the activity of NAD(P)H:quinone oxidoreductase (NQO1), and the ring opening products. Results are shown suggesting that oxidative stress induced by benzene metabolites is likely to be a significant factor in damaging DNA in bone marrow cells. Although a variety of effects on bone marrow can be demonstrated it is not yet clear which metabolites are most important in either benzene-induced aplastic anemia or leukemia. Benzene metabolism alone is insufficient to fully describe benzene toxicity...  
[Snyder R; Hu Exptl Toxicol 26 (9): 687-96 (2007)] \*\*\*PEER REVIEWED\*\*\* PubMed Abstract

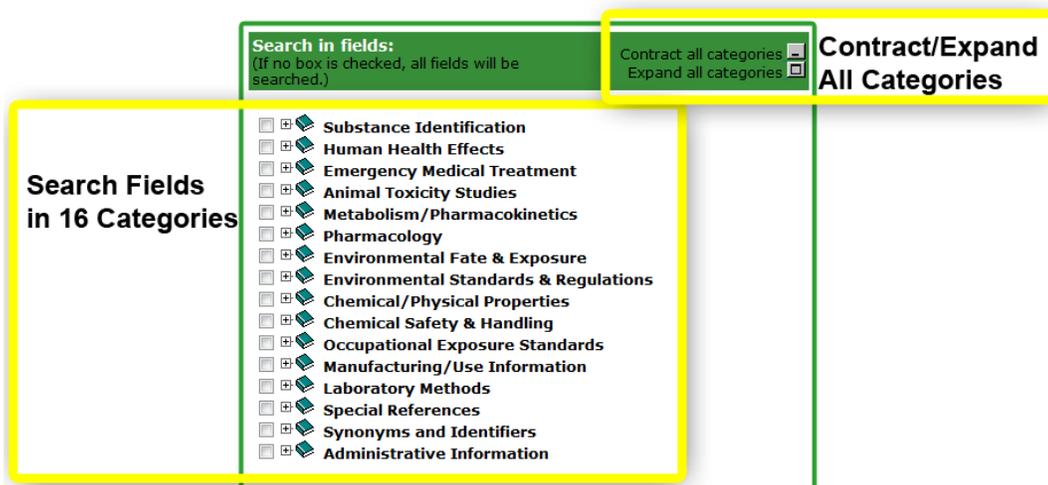
## Additional Resources

For further information, we recommend these additional resources:

- ▶ [HSDB Skill Kit](http://nlm.nih.gov/pubs/techbull/ma07/ma07_hsd_b_skill_kit.html)  
[nlm.nih.gov/pubs/techbull/ma07/ma07\\_hsd\\_b\\_skill\\_kit.html](http://nlm.nih.gov/pubs/techbull/ma07/ma07_hsd_b_skill_kit.html)
- ▶ [HSDB Animated Tutorial](http://sis.nlm.nih.gov/enviro/captivate/basicsearchinghsdb_skin.swf)  
[sis.nlm.nih.gov/enviro/captivate/basicsearchinghsdb\\_skin.swf](http://sis.nlm.nih.gov/enviro/captivate/basicsearchinghsdb_skin.swf)
- ▶ [TOXNET Help Text – HSDB](http://toxnet.nlm.nih.gov/help/HSDBhelp.htm)  
[toxnet.nlm.nih.gov/help/HSDBhelp.htm](http://toxnet.nlm.nih.gov/help/HSDBhelp.htm)

## HSDB Limits Search Fields

The Limits feature allows you to specify a particular field or category of fields to search. By default, the system will search all fields in all categories. To see all fields within a specific category, click the “+” beside that category.



### Expanded Categories (All Fields)

#### Substance Identification

-  Chemical Names
-  CAS Registry Number

#### Human Health Effects

-  Toxicity Summary
-  Evidence for Carcinogenicity
-  Human Toxicity Excerpts
-  Human Toxicity Values
-  Skin, Eye and Respiratory Irritations
-  Drug Warnings
-  Medical Surveillance
-  Populations at Special Risk
-  Probable Routes of Human Exposure
-  Body Burden
-  Average Daily Intake
-  Reported Fatal Dose

#### Emergency Medical Treatment

-  Emergency Medical Treatment
-  Antidote and Emergency Treatment

#### Animal Toxicity Studies

-  Toxicity Summary
-  Evidence for Carcinogenicity
-  Non-Human Toxicity Excerpts
-  Ecotoxicity Excerpts
-  National Toxicology Program Studies
-  Non-Human Toxicity Values
-  Ecotoxicity Values
-  Ongoing Test Status
-  TSCA Test Submissions

#### Metabolism/Pharmacokinetics

-  Metabolism/Metabolites
-  Absorption, Distribution & Excretion
-  Biological Half-Life
-  Mechanism of Action
-  Interactions

#### Pharmacology

-  Therapeutic Uses
-  Drug Warnings

-  Interactions
-  Drug Idiosyncrasies
-  Drug Tolerance
-  Minimum Fatal Dose Level
-  Maximum Drug Dose
-  Bionecessity

### **Environmental Fate & Exposure**

-  Environmental Fate/Exposure Summary
-  Probable Routes of Human Exposure
-  Body Burden
-  Average Daily Intake
-  Natural Pollution Sources
-  Artificial Pollution Sources
-  Environmental Fate
-  Environmental Biodegradation
-  Environmental Abiotic Degradation
-  Environmental Bioconcentration
-  Soil Adsorption/Mobility
-  Volatilization from Water/Soil
-  Environmental Water Concentrations
-  Effluent Concentrations
-  Sediment/Soil Concentrations
-  Atmospheric Concentrations
-  Food Survey Values
-  Plant Concentrations
-  Fish/Seafood Concentrations
-  Animal Concentrations
-  Milk Concentrations
-  Other Environmental Concentrations

### **Environmental Standards & Regulations**

-  FIFRA Requirements
-  Acceptable Daily Intakes
-  TSCA Requirements
-  CERCLA Reportable Quantities
-  RCRA Requirements
-  Atmospheric Standards
-  Clean Water Act Requirements
-  Federal Drinking Water Standards
-  Federal Drinking Water Guidelines
-  State Drinking Water Standards
-  State Drinking Water Guidelines
-  Soil Standards
-  FDA Requirements
-  Allowable Tolerances

### **Chemical/Physical Properties**

-  Molecular Formula

-  Molecular Weight
-  Color/Form
-  Odor
-  Taste
-  Boiling Point
-  Melting Point
-  Corrosivity
-  Critical Temperature & Pressure
-  Density/Specific Gravity
-  Dissociation Constants
-  Heat of Combustion
-  Heat of Vaporization
-  Octanol/Water Partition Coefficient
-  pH
-  Solubilities
-  Spectral Properties
-  Surface Tension
-  Vapor Density
-  Vapor Pressure
-  Relative Evaporation Rate
-  Viscosity
-  Other Chemical/Physical Properties

### **Chemical Safety & Handling**

-  Hazards Summary
-  DOT Emergency Guidelines
-  Odor Threshold
-  Skin, Eye and Respiratory Irritations
-  Fire Potential
-  NFPA Hazard Classification
-  Flammable Limits
-  Flash Point
-  Autoignition Temperature
-  Fire Fighting Procedures
-  Toxic Combustion Products
-  Firefighting Hazards
-  Explosive Limits & Potential
-  Hazardous Reactivities & Incompatibilities
-  Hazardous Decomposition
-  Hazardous Polymerization
-  Other Hazardous Reaction
-  Prior History of Accidents
-  Immediately Dangerous to Life or Health
-  Protective Equipment & Clothing
-  Preventive Measures
-  Stability/Shelf Life

-  Shipment Methods and Regulations
-  Storage Conditions
-  Cleanup Methods
-  Disposal Methods
-  Radiation Limits & Potential

### **Occupational Exposure Standards**

-  OSHA Standards
-  Threshold Limit Values
-  NIOSH Recommendations
-  Immediately Dangerous to Life or Health
-  Other Standards Regulations and Guidelines

### **Manufacturing/Use Information**

-  Major Uses
-  Manufacturers
-  Methods of Manufacturing
-  General Manufacturing Information
-  Formulations/Preparations
-  Impurities
-  Consumption Patterns
-  U. S. Production
-  U. S. Import
-  U. S. Exports

### **Laboratory Methods**

-  Clinical Laboratory Methods
-  Analytic Laboratory Methods
-  Sampling Procedures

### **Special References**

-  Special Reports

### **Synonyms and Identifiers**

-  Related HSDB Records
-  Synonyms
-  Associated Chemicals
-  Formulations/Preparations
-  Shipping Name/Number  
DOT/UN/NA/IMO
-  Standard Transportation Number
-  EPA Hazardous Waste Number
-  Wiswesser Line Notation
-  RTECS Number

### **Administrative Information**

-  Hazardous Substances Databank  
Number
-  Last Revision Date
-  Last Review Date
-  Update History

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## HSDB Search Exercises

### Scenario 1 – Regulatory Information

Sonya, the parent of an elementary school student, receives a letter from the school stating that over the summer water from all sinks and drinking fountains in the building was tested for lead compounds. The letter states that the water contains safe levels of lead for consumption. None of the detected lead levels exceeded 2.0 micrograms per liter. Sonya would like to confirm that this level is safe for drinking water.

**Search HSDB to determine the safe level: Locate the lead compounds record in HSDB. Open the lead compounds record. Locate the Federal Drinking Water Standards.**

Suggested Solution:

Type	<b>lead</b> in the <u>Search</u> box
Click	<b>Search</b>
Click	<b>LEAD COMPOUNDS</b> in the <u>search results</u> list
Scroll	down to the <b>Environmental Standards &amp; Regulations</b> section in the <u>Table of Contents</u>
Click	<b>Federal Drinking Water Standards</b>
	States whose standards and guidelines differ from the federal values are listed when the data is available. States not listed follow the federal standards and guidelines.
View	the federal action level for safe drinking water: 15 ug/l

### Scenario 2 – Chemical Toxicity / Testing

A researcher reads an FDA consumer update on Bisphenol A (BPA), a compound used in plastic food and beverage packaging, including baby bottles. The article states that “current evidence indicates that exposure levels to BPA from food contact materials...are below those that may cause health effects.” The researcher decides to take a look at completed and/or ongoing studies that may be included in the “current evidence.”

**Search HSDB to examine studies: Locate the Bisphenol A record. Open the Bisphenol A record. Navigate the table of contents to locate information on scientific testing and toxicity.**

Suggested Solution:

Type	<b>bisphenol a</b> in the <u>Search</u> box
Click	<b>Search</b>
Click	the primary record for <b>Bisphenol A</b>
Scroll	through <b>Human Health Effects</b> to examine case reports, surveillance, biomonitoring, and in vitro tests

Click **National Toxicology Program Studies** and **Ongoing Test Status** in the [Table of Contents](#) to view NTP study results

### Scenario 3 – Environmental Fate & Exposure

An environmental scientist is interested in examining current information on how ethylene glycol behaves in the environment based on the chemical's physical properties.

**Search HSDB to find the information: Locate the ethylene glycol record in HSDB. Open the ethylene glycol record. Navigate the table of contents to locate the Environmental Fate & Exposure section.**

Suggested Solution:

- Type **ethylene glycol** in the [Search](#) box
- Click **Search**
- Click the primary record for ethylene glycol
- Scroll down to the **Environmental Fate & Exposure** section in the [Table of Contents](#)
-  The Environmental Fate & Exposure Summary provides information on how a chemical behaves in air, soil, and water; routes of human occupational exposure; and more.
- Scroll through the **Summary** and other subsections
-  Notice the physical properties provided to support statements within the summary (vapor pressure, octanol-water partition coefficient (Koc), and Henry's Law constant). Ethylene glycol is used in antifreeze and various other automotive and consumer products.

### Scenario 4 – Limiting a search

A Department of Homeland Security employee is interested in finding out what chemical warfare agents have a record in HSDB.

**Search HSDB using limits: Pull up the limits search options. Limit your search to major uses under Manufacturing/Use Information. Enter your specified use query.**

Suggested Solution:

- Click **Limits** at the bottom of the [Search](#) box
- Click the icon (⊕) to expand the [Manufacturing/Use Information](#) field
- Click the box next to **major uses**
- Type **chemical warfare** in the [Search](#) box. Select “exact words” and “the phrase” below the search box. Click search
-  Examine the use field text. Results may contain chemicals used against chemical warfare agent exposure.

## Additional Exercises



Go to [toxnet.nlm.nih.gov](http://toxnet.nlm.nih.gov).



Click  in the **Select Database** column.

### Exercise 1: What are the concerns of bisphenol A residue in baby bottles?

Suggested Solution:

- Type **bisphenol a baby bottles** in the Search box
- Click **Search**
- Click **BISPHENOL A**
- Review the **Best Sections** information in the right frame
- Click **Basic Search** at the top of the page to prepare for the next search

### Exercise 2: What is the military usage of arsine? View the ChemIDplus record for arsine.

Suggested Solution:

- Type **arsine military** in the Search box
- Click **Search**
- Click **ARSINE**
- Review the **Best Sections** information in the right frame
- Click **Other Files** at the top of the page
- Click **ChemIDplus Chemical Structure** in the pop-up window
- Click **CDC EP&R** (CDC Emerg. Prep. & Response) under Internet Locator
- Review the information retrieved and close the CDC window
- Close the ChemIDplus window and return to HSDB
- Click **Basic Search** at the top of the page to prepare for the next search

### Exercise 3: What is the average daily intake of mercury?

Suggested Solution:

- Type **mercury** in the Search box
- Click **Search**
- Click **MERCURY COMPOUNDS**
- Click **Average Daily Intake** under Human Health Effects in the Table of Contents
- Review the information retrieved
- Click **Basic Search** at the top of the page to prepare for the next search

**Exercise 4: Using the CAS Registry Number 298-00-0, find information on the occurrence or effects of this chemical in soil.**

Suggested Solution:

Type **298-00-0** in the Search box

Click **Search**

Click **METHYL PARATHION**

Review the **Best Sections** information in the right frame

**5**

## **Toxicology Literature Online (TOXLINE)**



## TOXLINE

**TOXLINE** is NLM bibliographic database for toxicology, providing information covering the biochemical, pharmacological, physiological, and toxicological effects of drugs and other chemicals. It contains more than 4 million bibliographic citations from 1965 to the present, most with abstracts and/or indexing terms and Chemical Abstracts Service (CAS) Registry Numbers.

The screenshot shows the TOXNET website interface. At the top, there is a header for the United States National Library of Medicine (NLM) and the TOXNET Toxicology Data Network. Below the header, there is a navigation bar with links for TOXNET Mobile Access, SIS Home, About Us, Site Map & Search, and Contact Us. The main content area is titled "Toxicology Literature Online (TOXLINE) - References from toxicology literature." It features a "Select Database" section with a list of databases including ChemIDplus, HSDB, TOXLINE (highlighted), CCRIS, DART, GENETOX, IRIS, ITER, LactMed, Multi-Database, TRI, Haz-Map, Household Products, TOXMAP, and TOXNET Home. There is also an "Additional Resources" section with links to CPDB and CTD. The "Search TOXLINE" section includes a search input field with a placeholder example "(e.g. asphalt fumes roofers, calcium aging, Neville DM autoimmune)", a search button, a clear button, and a help button. Below the search field, there are options to "For chemicals, add synonyms and CAS numbers to search:" with radio buttons for Yes and No, and "Include PubMed records:" with radio buttons for Yes and No. There are also "Limits" and "Browse the Index" buttons. On the right side, there is a "Env. Health & Toxicology" section with a "Portal to environmental health and toxicology resources" and a "Support Pages" section with links to Help, Fact Sheet, Sample Record, TOXNET FAQ, and Importing Citations into Reference Manager.

toxnet.nlm.nih.gov

### TOXLINE Components

TOXLINE references come from various sources organized into components. These components are searched together but may be used to limit searches.

- ▶ **Standard biomedical/toxicology journal literature**
  - PubMed/MEDLINE
- ▶ **Special journal and other research literature**
  - Developmental and Reproductive Toxicology (DART)
  - International Labour Office (CIS)
- ▶ **Technical reports and research projects**
  - Federal Research in Progress (FEDRIP)
  - Toxic Substances Control Act of Test Submissions (TSCATS)
  - Toxicology Document and Data Depository (NTIS)
  - Toxicology Research Projects (CRISP)

- ▶ **Meeting Abstracts**
- ▶ **Archival Collection (no longer being updated)**
  - Aneuploidy (ANEUPL)
  - Environmental Mutagen Information Center File (EMIC)
  - Environmental Teratology Information Center File (ETIC)
  - Epidemiology Information System (EPIDEM)
  - Hazardous Materials Technical Center (HMTC)
  - Health Aspects of Pesticides Abstract Bulletin (HAPAB)
  - International Pharmaceutical Abstracts (IPA)
  - NIOSHTIC (NIOSH)
  - Pesticides Abstracts (PESTAB)
  - Poisonous Plants Bibliography (PPBIB)
  - Swedish National Chemicals Inspectorate (RISKLINE)
  - Toxicological Aspects of Environmental Health (BIOSIS)

## Searching TOXLINE

Any terms you enter in the query box will automatically be searched against both the keyword and MeSH fields, in addition to other fields such as title, abstract, and author. Chemical names are mapped to names, synonyms, and CAS Registry Numbers derived from ChemIDplus. Words such as “a,” “an,” “and,” “for,” “the,” and “it” will not be searched.

Limits may be applied to narrow your search to:

- ▶ Titles or authors
- ▶ Exact words or word variants
- ▶ Year of publication
- ▶ Documents added within a specified number of months
- ▶ TOXLINE components (more than one component can be selected)
- ▶ Language

You may also specify the maximum number of records you would like retrieved.

The screenshot shows the 'Search TOXLINE' interface. At the top, there is a search box with 'Search', 'Clear', and 'Help' buttons. Below the search box are several filter options:

- 'Add chemical synonyms and CAS numbers to search:' with radio buttons for 'Yes' (selected) and 'No'.
- 'Include PubMed records:' with radio buttons for 'Yes' (selected) and 'No'.
- 'Search fields:' with radio buttons for 'All fields' (selected), 'Titles', and 'Authors (e.g., Smith H)'.
- 'Search:' with radio buttons for 'exact words', 'singular & plural forms' (selected), and 'word variants'.
- 'Search records with:' with radio buttons for 'the phrase', 'all words' (selected), and 'any words'.
- 'Maximum records returned:' set to 25000.
- 'Year of Publication:' from 1900 through 2008.
- 'Only search documents added in the last:' followed by a blank box for months.
- 'TOXLINE Components:' a dropdown menu with options: All, ANEUPL, BIOSIS, CIS, CRISP, DART (non-PubMed).
- 'Language:' a dropdown menu with options: All, English, Afrikaans, Arabic, Armenian, Azerbaijani.

At the bottom, there is a note: 'To select more than one component, click while holding the CTRL (PC) or CMD (Mac) key.' and two buttons: 'Search' and 'Browse the Index'.

## Search Results

Address: http://toxnet.nlm.nih.gov/cgi-bin/sis/search

**TOXNET**  
Toxicology Data Network

SIS Home | About Us | Site Map & Search | Contact Us

Env. Health & Toxicology | TOXNET | TOXLINE

**TOXLINE Search Results**

toluidine bladder cancer Search Clear Limits Print this page

For chemicals, add synonyms and CAS numbers to search: Yes No Search tips

Include PubMed records: Yes No Find full text

Items 1 through 20 of 102 records are sorted in relevancy ranked order and not by date. Click on Sort to change the order of the retrieved records.

Pages: 1 2 3 4 5 6

Select	Record
1 <input type="checkbox"/>	<p><a href="#">Excess number of bladder cancers in workers exposed to ortho-toluidine and aniline.</a></p> <p>Ward E, Carpenter A, Markowitz S, Roberts D, Halpern W J Natl Cancer Inst. 1991, Apr 3; 83(7):501-6. [Journal of the National Cancer Institute] [PubMed]</p> <p><a href="#">PubMed Citation</a></p>
2 <input type="checkbox"/>	<p><a href="#">Monitoring of aromatic amine exposures in workers at a chemical plant with a known bladder cancer excess.</a></p> <p>Ward EM, Sabbioni G, DeBord DG, Teass AW, Brown KK, Talaska GG, Roberts DR, Ruder AM, Reinherz RP</p>

Your initial retrieval is displayed as a list—in relevancy ranked order—of bibliographic references with the titles in blue. Each reference is followed by the acronym [in brackets] of the component from which the article was retrieved. References coming from PubMed/MEDLINE will be marked PubMed citation with a green and blue M-encircled icon (M) and linked to the same reference in PubMed. Clicking on this link takes you to PubMed where you can use functions such as LinkOut, Related Links, and document ordering.

## Selected Record Screen

**TOXNET**  
Toxicology Data Network

SIS Home | About Us | Site Map & Search | Contact Us

Env. Health & Toxicology | TOXNET | TOXLINE

toluidine bladder cancer Search Clear Limits Print this page

For chemicals, add synonyms and CAS numbers to search: Yes No Search tips

Include PubMed records: Yes No Find full text

Item 1 of 102 PubMed Citation (M)

**Excess number of bladder cancers in workers exposed to ortho-toluidine and aniline.**

Authors:

[Ward E](#)  
[Carpenter A](#)  
[Markowitz S](#)  
[Roberts D](#)  
[Halpern W](#)

Author Address: Industrywide Studies Branch, National Institute for Occupational Safety and Health, Cincinnati, Ohio 45226.

Source: J Natl Cancer Inst. 1991, Apr 3; 83(7):501-6. [Journal of the National Cancer Institute]

Comments:

Comment in: J Natl Cancer Inst. 1994 Jan 5; 86(1):59-62(medline /8271286)  
Comment in: J Natl Cancer Inst. 1991 Nov 20; 83(22):1686-7(medline /1749022)  
Comment in: J Natl Cancer Inst. 1991 Oct 16; 83(20):1507-8(medline /1920498)

Abstract:

A retrospective cohort study of the incidence of bladder cancer was conducted in response to a union request for an evaluation of a possible excess number of cases of bladder cancer at a chemical plant in western New York State. Workers at the plant were exposed to two potential bladder carcinogens—ortho-toluidine (o-toluidine) and aniline. Incidence rates of bladder cancer among workers at the plant were compared with those of the population of New York State (excluding New York City). Among all 1749 workers at the plant, 13 cases of bladder cancer were observed versus 3.04 expected (standardized incidence ratio [SIR] = 3.60; 95%

Search terms are in red

Linked titles are in blue

The record screen displays the complete record for the item you selected on the results screen. Your search terms are in red. Individual author names, MeSH headings, keywords, and CAS Registry Numbers are in blue and linked to similar records in the database. Click an author link to find other articles by that author; Click a keyword to find other articles indexed with that keyword.

Other information appearing includes the article language, the month it was entered into the system, the year of publication, and a secondary source ID—a unique identifying number for the record and tagged to its component.

### Additional Resources

For further information, we recommend these additional resources:

- ▶ [PubMed](http://pubmed.ncbi.nlm.nih.gov)  
**pubmed.gov**
- ▶ [TOXLINE Help](http://sis.nlm.nih.gov/toxnethelp/toxlinehelp.html)  
**sis.nlm.nih.gov/toxnethelp/toxlinehelp.html**
- ▶ [TOXLINE Fact Sheet](http://nlm.nih.gov/pubs/factsheets/toxlinfs.html)  
**nlm.nih.gov/pubs/factsheets/toxlinfs.html**
- ▶ [Importing Citations into Reference Manager](http://sis.nlm.nih.gov/enviro/captivate/toxlinespecialimports.htm)  
**sis.nlm.nih.gov/enviro/captivate/toxlinespecialimports.htm**
- ▶ [Free Full Text Health Science/Medical Journals](http://sis.nlm.nih.gov/enviro/findingfreefulltext.html)  
**sis.nlm.nih.gov/enviro/findingfreefulltext.html**

## TOXLINE Search Exercises

### Scenario 1 – General Search

Michelle, a graduate student, is aware that many studies on pesticides have been conducted. She is also aware that pesticides are regulated in the United States. Michelle would like to get an idea of how much literature exists on cancer among agricultural workers since they may experience higher exposure to pesticides than the general public.

Suggested Solution:

- |        |   |
|--------|---|
| Type   | <b>cancer agricultural workers</b> in the <u>Search</u> box |
| Click  | <b>Search</b>   |
| Review | the citation(s)   |
| Click  | <b>Basic Search</b> to prepare for the next search          |

### Scenario 2 – Limiting Search Results

Thomas, a principal investigator, is designing a new breast cancer study for women. He would like to perform a literature search for recent articles focused on the effects of diet on breast cancer. Thomas would like articles published since 2010.

Suggested Solution:

- |        |  |
|--------|--|
| Type   | <b>diet breast cancer</b> in the <u>Search</u> box                         |
| Click  | <b>Limits</b>  |
| Select | <b>Titles</b> under <u>Search fields:</u>                                  |
| Type   | <b>2010</b> in the first <u>Year of Publication</u> box (replacing “1900”) |
| Click  | <b>Search</b>  |
| Review | record(s) of your choice   |
| Click  | <b>Basic Search</b> to prepare for the next search                         |

### Scenario 3 – Sorting Search Results

Jean, an industrial hygienist, would like to examine articles on worker exposure to caprolactam. She is interested in how studies have changed over time, beginning with older articles and ending with the most recent. Jean would also like to retrieve only English citations.

Suggested Solution:

- |        |   |
|--------|---|
| Type   | <b>occupational exposure caprolactam</b> in the <u>Search</u> box |
| Click  | <b>Limits</b>   |
| Select | <b>English</b> in the <u>Language</u> box                         |

- Click **Search**
- Click **Sort** in the left margin
- Select **Ascending order**
- Click **Sort**
- Review the citation(s)
- Click **Basic Search** at the left of the page to prepare for the next search

### Additional Exercises

 Go to **toxnet.nlm.nih.gov**.

 Click  in the **Select Database** column.

**Exercise 1: Search for the chemical of concern in baby bottles, bisphenol A (BPA). Explore navigating through your retrieval, examining individual records, and going to linked records.**

Suggested Solution:

- Type **bisphenol a baby bottles** in the Search box
- Click **Search**
- Review record(s) of your choice
- Click **Basic Search** to prepare for the next search

**Exercise 2: Find citations on the salmonella contamination in eggs. Limit your results to citations since 2010.**

Suggested Solution:

- Type **salmonella eggs** in the Search box
- Click **Limits**
- Type **2010** in the first Year of Publication box
- Click **Search**
- Review the citation(s)

6

**Chemical Carcinogenesis  
Research Information System  
(CCRIS)**



## CCRIS

**CCRIS** (Chemical Carcinogenesis Research Information System) is a toxicology data file of the NLM TOXNET. It is a scientifically evaluated and fully referenced data bank, developed and maintained by the National Cancer Institute (NCI). It contains more than 8,000 chemical records with carcinogenicity, mutagenicity, tumor promotion, and tumor inhibition test results. Data are derived from studies cited in primary journals, current awareness tools, NCI reports, and other special sources. Test results have been reviewed by experts in carcinogenesis and mutagenesis.

The screenshot displays the TOXNET website interface. At the top left is the NLM logo and the text "United States National Library of Medicine". To the right is the "TOXNET Toxicology Data Network" header. Below this is a navigation bar with links for "TOXNET Mobile Access", "SIS Home", "About Us", "Site Map & Search", and "Contact Us". A breadcrumb trail shows "Env. Health & Toxicology > TOXNET > CCRIS".

The main content area features a heading: "Chemical Carcinogenesis Research Information System (CCRIS) - Carcinogenicity and mutagenicity test results for over 8,000 chemicals." Below this heading are three main sections:

- Select Database:** A list of databases with checkboxes, including ChemIDplus, HSDB, TOXLINE, CCRIS (selected), DART, GENETOX, IRIS, ITER, LactMed, Multi-Database, TRI, Haz-Map, Household Products, TOXMAP, and TOXNET Home.
- Search CCRIS:** A search box with a placeholder "(e.g. Ames salmonella positive, nickel, 59978-65-3)". Below the search box are buttons for "Search", "Clear", and "Help". A note states "For chemicals, add synonyms and CAS numbers to search:" with radio buttons for "Yes" (selected) and "No". At the bottom of this section are buttons for "Limits" and "Browse the Index".
- Env. Health & Toxicology:** A section with a "VISIT SITE" button and a link to a "Portal to environmental health and toxicology resources".

At the bottom left, there is an "Additional Resources" section with links to "CPDB" and "CTD". At the bottom right, there is a "Support Pages" section with links to "Help", "Fact Sheet", "Sample Record", and "TOXNET FAQ".

toxnet.nlm.nih.gov

### Searching CCRIS

Search CCRIS by any combination of words, chemical names, and numbers, including Chemical Abstracts Service (CAS) Registry Numbers (RN). By default, the system adds synonyms and CAS numbers to chemical searches.

Use truncation (\*), Boolean operators (AND, OR, NOT), nested parentheses, limits, and index browsing to refine your search results.

Click the **Limits** button on the home page to search:

- ▶ Exact words, singular & plural forms, or word variants
- ▶ Records with the phrase, all words, or any words
- ▶ In specific fields or categories of fields—Click the plus sign (+) to the left of a category to show all fields in that category. Use the (−) and (+) buttons to contract or expand all categories

With the **Browse the Index** feature, the system returns a list of index terms related to the search term entered and the number of records containing that term. Select one or more index terms in the **Check to Select** column and click the **Select** button for the search results. Scan the index above or below the original display by clicking the **Up** or **Down** button.

Check to Select	Number of Records	Index Term
<input type="checkbox"/>	9	chloroform
<input type="checkbox"/>	2	chloroformate
<input type="checkbox"/>	1	chlorogenic
<input type="checkbox"/>	1	chlorohydrin
<input type="checkbox"/>	1	chloroisopropyl
<input type="checkbox"/>	2	chloromethoxy
<input type="checkbox"/>	26	chloromethyl
<input type="checkbox"/>	1	chloromethylanthracene
<input type="checkbox"/>	7	chloromethylbenzo
<input type="checkbox"/>	1	chloromethylidimethylvinyl
<input type="checkbox"/>	5	chloromethylfluoranthene
<input type="checkbox"/>	2	chloromethylfurfural

## Search Results

Your initial retrieval is displayed as a list of substance names in blue and their CAS Registry Numbers. Substances are listed in **relevancy ranked order**—based on the number of individual search terms occurring in a document, the number of times each search term occurs in a document, the rarity of the search terms within the database, and the nearness of search terms to each other. Records containing combinations of search terms tend to be ranked higher than records with isolated occurrences of search terms. Click the substance name to retrieve the record for that substance.

When searching for a chemical, your retrieval may include other chemical records in addition to the initial matching chemical record (the “primary” record). These additional records appear if they contain the chemical name or search term.

CCRIS Search Results

chloroform Search Clear Limits

For chemicals, add synonyms and CAS numbers to search:  Yes  No

Items 1 through 9 of 9  
Substance Names are sorted in [relevancy ranked](#) order.

Select Record	Substance Name
<input type="checkbox"/> 1	<b>CHLOROFORM</b> 67-66-3
<input type="checkbox"/> 2	PARAMID 24938-64-5
<input type="checkbox"/> 3	4-NITRO-O-PHENYLENEDIAMINE 99-89-9
<input type="checkbox"/> 4	BENZOLAPYRENE 50-32-8
<input type="checkbox"/> 5	HYDROGEN PEROXIDE 7722-84-1
<input type="checkbox"/> 6	SCORBIL AZIDE 26629-22-8
<input type="checkbox"/> 7	MITOMYCIN C 50-07-7
<input type="checkbox"/> 8	ROTENONE 83-79-4

Click any of these non-primary chemicals on the **Search Results** screen to display the sections of the record best matching your query terms (**Best Sections**), those where the chemical search term(s) appears with greatest frequency. The term(s) searched appear in red.

The **Record** screen is organized into three sections:

1. Navigation buttons at the top of the screen allow you to link to **Other Files** (NLM databases), **Modify Search**, **Download**, return to the **Basic Search** screen, and more.
2. A **Table of Contents** in the left frame allows you to choose categories and fields for display.
3. Chemical Data is shown in the right frame.

## Primary Record

Chemical Carcinogenesis Research Information System

CCRIS

Next Item Search Results Basic Search Details Other Files Modify Search

Download Limits Browse Index Help

Item 1 of 9

Table of Contents

Contract all categories Expand all categories

Substance Identification

Substance Name

CAS Registry Number

Major Use

Data Type

Studies Data

Carcinogenicity Studies

Mutagenicity Studies

Tumor Inhibition Studies

Administrative Information

CCRIS Record Number

Last Revision Date

Update History

U.S. National Library of Medicine  
8600 Rockville Pike, Bethesda, MD 20894  
National Institutes of Health  
Department of Health & Human Services  
Copyright and Privacy Policy  
Freedom of Information Act, Accessibility  
Customer Service: [info@nih.nlm.nih.gov](mailto:info@nih.nlm.nih.gov)  
Download free Adobe® Reader

**CHLOROFORM**  
CASRN: 67-66-3

For other data, click on the Table of Contents

**Substance Identification:**

Substance Name: **CHLOROFORM**

CAS Registry Number: 67-66-3

**Major Use:**

INTERMEDIATES; SOLVENTS

**Data Type:**

Carcinogenicity  
Mutagenicity  
Tumor Inhibition

**Studies Data:**

Carcinogenicity Studies:

Search terms are in red

## Additional Chemical Record

Chemical Carcinogenesis Research Information System

Next Item Search Results Basic Search Details Other Files Modify Search

Previous Item

Download

Limits

Browse Index

Help

Item 2 of 9

Table of Contents

Contract all categories  
 Expand all categories

FULL RECORD  
 BEST SECTIONS  
 Substance Identification  
 Substance Name  
 CAS Registry Number  
 Data Type  
 Studies Data  
 Mutagenicity Studies  
 Administrative Information  
 CCRIS Record Number  
 Last Revision Date  
 Update History

U.S. National Library of Medicine  
 8600 Rockville Pike, Bethesda, MD 20894,  
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 Department of Health & Human Services  
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 Customer Service: [info@tox.nlm.nih.gov](mailto:info@tox.nlm.nih.gov)  
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**P-ARAMID**  
CASRN: 24938-64-5

For other data, click on the Table of Contents

### Best Sections

**Mutagenicity Studies :**

**Test System:** AMES SALMONELLA TYPHIMURIMUM

**Strain Indicator:** TA100

**Metabolic Activation:** NONE

**Method:** PREINCUBATION

**Dose:** CHLOROFORM EXTRACT OF 1 G

**Results:** NEGATIVE

**Reference:**

[WENING,JV, MARQUARDT,H, KATZER,A, JUNGBLUTH,XH AND MARQUARDT,H; CYTOTOXICITY AND MUTAGENICITY OF KEVLAR: AN IN VITRO EVALUATION; BIOMATERIALS 16(4):337-340, 1995]

## Additional Resources

For further information, we recommend these additional resources:

- ▶ [CCRIS Fact Sheet:](http://nlm.nih.gov/pubs/factsheets/ccrisfs.html)  
[nlm.nih.gov/pubs/factsheets/ccrisfs.html](http://nlm.nih.gov/pubs/factsheets/ccrisfs.html)
- ▶ [TOXNET Help-CCRIS](http://toxnet.nlm.nih.gov/help/CCRIShelp.htm)  
[toxnet.nlm.nih.gov/help/CCRIShelp.htm](http://toxnet.nlm.nih.gov/help/CCRIShelp.htm)

## CCRIS Search Exercises

---

 Go to **toxnet.nlm.nih.gov**.

 Click  in the Select Database column.

### Exercise 1: Does the record for naphthalene contain any positive carcinogenicity studies? Does it contain any positive mutagenicity studies?

Suggested Solution:

- Type **naphthalene** in the Search box
- Click **Search**
- Click **NAPHTHALENE**
- Click **Carcinogenicity Studies** under Studies Data
- Review the information retrieved in the right frame
- Click **Mutagenicity Studies** under Studies Data
- Review the information retrieved in the right frame
- Click **Basic Search** at the top of the page to prepare for the next search

### Exercise 2: Locate the mirex record and review the tumor promotion studies.

Suggested Solution:

- Type **mirex** in the Search box
- Click **Search**
- Click **MIREX**
- Click **Tumor Promotion Studies** under Studies Data
- Review the information in the right frame
- Click **Basic Search** at the top of the page to prepare for a new search

**Exercise 3: Review the citral record for carcinogenicity data and any associated human health effects.**

Suggested Solution:

- Type **citral** in the Search box
- Click **Search**
- Click **CITRAL**
- Click **Carcinogenicity Studies** under Studies Data
- Review the information in the right frame
- Click **Other Files** on the top of the page
- Click **HSDB Record** in the pop-up window
- Review the information in the right frame
- Click **Return to CCRIS** at the top of the page
- Click **Basic Search** the top of the page to prepare for a new search

**Exercise 4: How many substances are identified in CCRIS as positive for lung cancer?**

Suggested Solution:

- Type **positive lung cancer** in the Search box
- Click **Search**
- Click chemical record(s) of your choice
- Review the information in the right frame



## **Developmental and Reproductive Toxicology Database (DART)**



## DART

**DART** (Developmental and Reproductive Toxicology Database) is a bibliographic database that covers teratology and other aspects of developmental and reproductive toxicology. It contains more than 200,000 references to literature published since 1965.

The screenshot displays the TOXNET website interface. At the top left is the NLM logo and the text "United States National Library of Medicine". The main header features the "TOXNET Toxicology Data Network" logo. A navigation bar includes links for "TOXNET Mobile Access", "SIS Home", "About Us", "Site Map & Search", and "Contact Us". Below this, there are breadcrumb links: "Env. Health & Toxicology" > "TOXNET" > "DART".

The main content area is titled "Developmental and Reproductive Toxicology Database (DART) - References to developmental and reproductive toxicology literature." It is divided into three main sections:

- Select Database:** A list of databases with "DART" selected. The list includes ChemIDplus, HSDB, TOXLINE, CCRIS, DART, GENETOX, IRIS, ITER, LactMed, Multi-Database, TRI, Haz-Map, Household Products, TOXMAP, and TOXNET Home.
- Search DART:** A search interface with a text input field containing "(e.g. neural tube defects, aromatic hydrocarbons embryo)". Below the input are "Search", "Clear", and "Help" buttons. It includes options for "For chemicals, add synonyms and CAS numbers to search:" (Yes/No) and "Include PubMed records:" (Yes/No). At the bottom are "Limits" and "Browse the Index" buttons.
- Env. Health & Toxicology:** A section with a "Portal to environmental health and toxicology resources" and a "VISIT SITE" button.
- Support Pages:** A list of links including Help, Fact Sheet, Sample Record, TOXNET FAQ, and Importing Citations into Reference Manager.
- Additional Resources:** A small section with links to CPDB and CTD.

[toxnet.nlm.nih.gov](http://toxnet.nlm.nih.gov)

DART has some of the same features as PubMed, including the following: MeSH searching; applying limits by field, publication type, age, gender, language, human or animal, etc.; MyNCBI to store and update search strategies; Related Records; LinkOut and Links to Books; and Interlibrary Loan (Loansome Doc).

## Searching DART

Any term(s) you enter in the query box will automatically be searched against both the keyword and MeSH fields, in addition to other fields such as title, abstract, and author. Chemical names are mapped to names, synonyms, and CAS Registry Numbers derived from ChemIDplus. Words such as “a,” “an,” “and,” “for,” “the,” and “it” will not be searched.

Limits may be applied to narrow your search to:

- ▶ Titles
- ▶ Authors
- ▶ Exact words or word variants
- ▶ Year of publication
- ▶ Documents added within a specified number of months
- ▶ Language

You may also specify the maximum number of records you would like retrieved.

The screenshot shows the 'Search DART' interface. It includes a search box with 'Search', 'Clear', and 'Help' buttons. Below the search box are options to 'Add chemical synonyms and CAS numbers to search' (Yes/No) and 'Include PubMed records' (Yes/No). The 'Search fields' section has radio buttons for 'All fields' (selected), 'Titles', and 'Authors (e.g., Smith H)'. The 'Search' section has radio buttons for 'exact words', 'singular & plural forms' (selected), and 'word variants'. The 'Search records with' section has radio buttons for 'the phrase', 'all words' (selected), and 'any words'. There are input fields for 'Maximum records returned' (set to 25000) and 'Year of Publication' (from 1900 to 2008). A dropdown menu for 'Language' is open, showing options: All, English, Afrikaans, Arabic, Armenian, and Azerbaijani. At the bottom, there are 'Search' and 'Browse the Index' buttons.

## Search Results

The screenshot shows the 'DART Search Results' page. The search term 'caffeine' is entered in the search box. The results are displayed as a list of bibliographic references. The first reference is: 'Teratogen update: evaluation of the reproductive and developmental risks of caffeine. Christian MS, Brent RL. Teratology. 2001, Jul; 64(1):51-78. [Teratology] PubMed Citation'. The second reference is: 'Caffeine intake and fecundability: a follow-up study among 430 Danish couples planning their first pregnancy. Jensen TK, Henniksen TB, Hjollund NH, Scheike T, Kolstad H, Ciwercman A, Ernst E, Blomde JP, Skakkebaek NE, Olsen J. Reprod Toxicol. 1990 May-Jun; 12(3):209-95. [Reproductive toxicology (Elmsford, N.Y.)] [PubMed] PubMed Citation'. A yellow callout box points to the 'PubMed Citation' link in the first reference, containing a blue 'M' icon and the text 'Link to PubMed Citation'.

Your initial retrieval is displayed as a list—in relevancy ranked order—of bibliographic references with the titles in blue. Each reference is followed by the mnemonic [in brackets] of the subfile from which the article was retrieved. References that come from PubMed/MEDLINE have TOXLINE [PubMed] following the bibliographic citation. They also have PubMed Citation in blue and a green and blue M-encircled icon. This icon is linked to the same citation as it appears in PubMed. Click this icon to go to PubMed where you can use any of the PubMed functions such as LinkOut and document ordering.

## Selected Record Screen

**TOXNET**  
Toxicology Data Network

SIS Home | About Us | Site Map & Search | Contact Us

**DART** | Env. Health & Toxicology | TOXNET | DART

caffeine Search Clear Limits Print this page  
Search tips Find full text

For chemicals, add synonyms and CAS numbers to search:  Yes  No  
Include PubMed records:  Yes  No

Item 1 of 1539 PubMed Citation

**Teratogen update: evaluation of the reproductive and developmental risks of caffeine.**

Authors:  
[Christian MS](#)  
[Brent RL](#)

Author Address: Argus International and Argus Research Laboratories, Horsham, Pennsylvania 19044, USA. mildred.christian@primedica.com

Source: Teratology. 2001, Jul; 64(1):51-78. [Teratology]

Abstract:

**Caffeine** is a methylated xanthine that acts as a mild central nervous system stimulant. It is present in many beverages, including coffee, tea, and colas, as well as chocolate. **Caffeine** constitutes 1-2% of roasted coffee beans, 3.5% of fresh tea leaves, and approximately 2% of mate leaves (Spiller, '84; Graham, '84a,b). Many over-the-counter medications, such as cold and allergy tablets, headache medicines, diuretics, and stimulants also contain **caffeine**, although they lead to relatively minimal intake (FDA, '90); in epidemiological studies, it is assumed that one cup of coffee contains < or =100 mg of **caffeine**, and soft drinks, such as sodas, contain 10-50 mg of **caffeine** per 12-ounce serving. The average consumption of **caffeine** from all sources is estimated to be about 3-7 mg/kg per day, or approximately 200 mg/day (Barone and Roberts, '96). Consumption of caffeinated beverages during pregnancy is quite common (Hill et al., '77) and is estimated to be approximately 144 mg/day, or 2.4 mg/kg for a 60-kg human.

Linked terms  
are in blue

Search terms  
are in red

This screen displays the complete record for the item you selected on the Results Screen. Your search terms are in red. Individual author names, MeSH headings, keywords, and CAS Registry Numbers are in blue and linked to related records in the database. Click an author link to find other articles by that author; Click a keyword to find other articles indexed with that keyword. Other information on the page includes the article language, the month it was entered into the system, the year of publication, and a secondary source ID—a unique identifying number for the record and tagged to its subfile. References from PubMed have the PubMed citation designation and the green-and-blue PubMed symbol (M).

## Additional Resources

For further information, we recommend these additional resources:

- ▶ [DART Fact Sheet](http://nlm.nih.gov/pubs/factsheets/dartfs.html)  
[nlm.nih.gov/pubs/factsheets/dartfs.html](http://nlm.nih.gov/pubs/factsheets/dartfs.html)
- ▶ [PubMed](http://pubmed.gov)  
[pubmed.gov](http://pubmed.gov)
- ▶ [Importing citations into Reference Manager](http://sis.nlm.nih.gov/enviro/captivate/toxlinespecialimports.htm)  
[sis.nlm.nih.gov/enviro/captivate/toxlinespecialimports.htm](http://sis.nlm.nih.gov/enviro/captivate/toxlinespecialimports.htm)
- ▶ [TOXNET Help-DART](http://toxnet.nlm.nih.gov/help/DARThelp.htm)  
[toxnet.nlm.nih.gov/help/DARThelp.htm](http://toxnet.nlm.nih.gov/help/DARThelp.htm)

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## DART Search Exercises

---

 Go to **toxnet.nlm.nih.gov**.

 Click  in the Select Database column.

**Exercise 1: Find the latest citations pertaining to food allergies and prevention. Sort the citations by author in descending order.**

Suggested Solution:

Type	<b>food allergies prevention</b> in the <u>Search</u> box
Click	<b>Search</b>
Review	the citation(s)
Click	<b>Sort</b> on the left of the page
Select	<b>Author</b> and <u>Descending</u> order
Click	<b>Sort</b> to the right
Review	the citation(s) as they now appear
Click	<b>Basic Search</b> to prepare for the next search

**Exercise 2: Locate articles on psychomotor stimulants.**

Suggested Solution:

Type	<b>psychomotor stimulants</b> in the <u>Search</u> box
Click	<b>Search</b>
Review	the citation(s)
	The results will be in relevancy ranked order.
Click	<b>Basic Search</b> to prepare for a new search

**Exercise 3: Find information on the effects of alcohol on the fetus.**

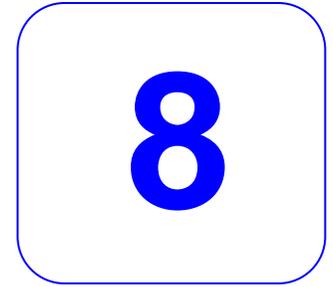
Suggested Solution:

Type	<b>alcohol fetus</b> in the <u>Search</u> box
Click	<b>Search</b>
Click	the record of your choice to view the abstract
Click	<b>Basic Search</b> to prepare for a new search

**Exercise 4: Find articles on the adverse effect of citalopram. Download the first three records to full format.**

## Suggested Solution:

- |        |   |
|--------|---|
| Type   | <b>adverse effect citalopram</b> in the <u>Search</u> box                   |
| Click  | <b>Search</b>   |
| Review | the citation(s)   |
| Click  | the box to the left of the first three records                              |
| Click  | <b>Download</b> to the left of the page                                     |
| Change | the number in the <b>Download</b> box to <b>3</b> (for the first 3 records) |
| Select | <b>Full</b> for the format  |
| Click  | <b>Download</b> to the right  |
| Close  | the pop-up window   |
| Review | the full format records   |
| Click  | your browser's <b>Back</b> button to return to the DART Search Results page |



# **Genetic Toxicology Data Bank (GENE-TOX)**



## GENE-TOX

**GENE-TOX** is a toxicology data file of the National Library of Medicine Toxicology Data Network (TOXNET). It is created by the U.S. Environmental Protection Agency and contains genetic toxicology (mutagenicity) test data, resulting from expert peer review of the open scientific literature, on more than 3,000 chemicals. The GENE-TOX program was established to select assay systems for evaluation, review data in the scientific literature, and recommend proper testing protocols and evaluation procedures for these systems.

The screenshot displays the TOXNET website interface. At the top left is the United States National Library of Medicine (NLM) logo. The main header features the TOXNET logo and the text 'Toxicology Data Network'. Below the header is a navigation bar with links for 'TOXNET Mobile Access', 'SIS Home', 'About Us', 'Site Map & Search', and 'Contact Us'. A breadcrumb trail shows 'Env. Health & Toxicology > TOXNET > GENETOX'. The main content area is titled 'Genetic Toxicology Data Bank (GENE-TOX) - Peer-reviewed genetic toxicology test data for over 3,000 chemicals.' Below this, there are three main sections: 'Select Database', 'Search GENETOX', and 'Env. Health & Toxicology'. The 'Select Database' section lists various databases, with 'GENETOX' highlighted. The 'Search GENETOX' section includes a search input field, a search button, and options to add synonyms and CAS numbers. The 'Env. Health & Toxicology' section features a 'Portal to environmental health and toxicology resources' and 'Support Pages' including Help, Fact Sheet, Sample Record, and TOXNET FAQ.

toxnet.nlm.nih.gov

### Searching GENE-TOX

Search GENE-TOX by chemical or other name, chemical name fragment, Chemical Abstracts Service (CAS) Registry Number, and/or subject terms. By default, the system adds synonyms and CAS numbers to chemical searches.

Use truncation (\*), Boolean operators (AND, OR, NOT), nested parentheses, limits, and index browsing to refine your search results.

Click the **Limits** button on the home page to search:

- ▶ Exact words, singular & plural forms, or word variants
- ▶ Records with the phrase, all words, or any words
- ▶ In specific fields or categories of fields—  
Click the plus sign (+) to the left of a category to show all fields in that category. Use the (−) and (□) buttons above and to the right of the list of categories to contract or expand all categories

**Search GENETOX**

Search [input] Search Clear Help

Add chemical synonyms and CAS numbers to search:  Yes  No

Search:  exact words  singular & plural forms  word variants  
 Search records with:  the phrase  all words  any words

**Search in fields:** (If no box is checked, all fields will be searched.) Contract all categories [−] Expand all categories [□]

Substance Identification  
  Mutagenicity Studies  
  Administrative Information

Search Browse the Index

With the **Browse the Index** feature, the system returns a list of index terms related to the search term entered and the number of records containing that term. Select one or more index terms and click the **Select** button for the search results. Scan the index above or below the original display by clicking the **Up** or **Down** button.

**Search GENETOX**

benzene  
(e.g. micronucleus positive styrene, calcium chloride, 139-06-0)

Search Clear Help

For chemicals, add synonyms and CAS numbers to search:  
 Yes  No

Limits Browse the Index

**GENETOX Browse Results**

benzene Search Clear Return to Basic Search

All Words  CAS Registry Number  Chemical Name

Check one or more text words. Then click on SELECT.

Start of Text Word Browse: benzene

Up Down Select

Check to Select	Number of Records	Index Term
<input type="checkbox"/>	352	benzene
<input type="checkbox"/>	3	benzeneacetic
<input type="checkbox"/>	1	benzenediamine
<input type="checkbox"/>	1	benzeneethanamine
<input type="checkbox"/>	6	benzenemethanamine
<input type="checkbox"/>	3	benzenetriamine
<input type="checkbox"/>	2	benzidine
<input type="checkbox"/>	2	benzimidazole
<input type="checkbox"/>	1	benzimidazolecarbamate
<input type="checkbox"/>	54	benzimidazoles
<input type="checkbox"/>	1	benzimidazole
<input type="checkbox"/>	45	benzo
<input type="checkbox"/>	3	benzoate

## Search Results

Your initial retrieval is displayed as a list of substance names in blue and their CAS Registry Numbers. Substances are listed in relevancy ranked order. Relevancy ranking is based on the number of individual search terms occurring in a document, the number of times each search term occurs in a document, the rarity of the search terms within the database, and the nearness of search terms to each other. Records containing combinations of search terms tend to be ranked higher than records with isolated occurrences of search terms.

When searching for a chemical, your retrieval may include other chemical records in addition to the initial matching chemical record (the “primary” record).

**GENE-TOX Search Results**

benzene

For chemicals, add synonyms and CAS numbers to search:  Yes  No

Items 1 through 20 of 352 Page 1 of 18

Substance Names are sorted in [relevancy ranked order](#).

Select Record	Substance Name
1 <input type="checkbox"/>	<b>BENZENE</b> 71-43-2
2 <input type="checkbox"/>	BE-SERPINE 50-85-5
3 <input type="checkbox"/>	HALAMID 51-12-7
4 <input type="checkbox"/>	2,4-DINITROPHENOL 51-28-5
5 <input type="checkbox"/>	SCOPOLAMINE 51-24-3
6 <input type="checkbox"/>	AMINOPTERIN 54-62-6
7 <input type="checkbox"/>	ATROPINE 51-85-8
8 <input type="checkbox"/>	DOPAMINE 51-61-6
9 <input type="checkbox"/>	HALOPERIDOL 52-86-8
10 <input type="checkbox"/>	PUROMYCIN 57-10-9

These additional records appear if they contain the chemical name or search term. Click any of these non-primary chemicals on the **Search Results** screen to display the sections of the record best matching your query term(s) (**Best Sections**), those where the chemical search term(s) appear with greatest frequency. Search term(s) appear in red:

The **Record** screen is organized into three sections:

1. Navigation buttons at the top of the screen allow you to link to **Other Files** (NLM databases), **Modify Search**, **Download**, return to the **Basic Search** screen, and more.
2. A **Table of Contents** in the left frame allows you to choose categories and fields for display.
3. Chemical Data is shown in the right frame.

## Primary Record

**GENE-TOX**

Next Item Search Results Basic Search Details Other Files

Download Home Index Help Item 1 of 352

**Table of Contents**

- FULL RECORD
- Substance Identification
- Substance Name
- CAS Registry Number
- Chemical Classification Category
- Taxonomic Name & Assay
- Subpopulativity Studies
- GENE\_TOX Evaluation II (post-1980)
- GENE\_TOX Evaluation A (pre-1980)
- Administrative Information
- Update History

**BENZENE**  
CASRN: 71-43-2

For other data, click on the Table of Contents

**Substance Identification:**

Substance Name: **BENZENE**

CAS Registry Number: 71-43-2

**Chemical Classification Category:**  
Benzene ring

**Taxonomic Name & Assay:**  
Plants - gene mutation  
In vitro mammalian - chromosome effects  
In vivo mammalian somatic cells - chromosome effects  
In vitro mammalian, SCE - other genotoxic effects  
In vivo mammalian, sperm morphology - other genotoxic effects  
In vitro mammalian - cell transformation, viral enhancement

**Mutagenicity Studies:**

## Additional Chemical Record

Genetic Toxicology  
**GENE-TOX**

Next Item Search Results Basic Search Details Other Files Modify Search

TOXNET Home  
Item 2 of 352

Previous Item Download Limits Browse Index Help

**Table of Contents** Contract all categories Expand all categories Select Clear

- FULL RECORD
- BEST SECTIONS
- Substance Identification
  - Substance Name
  - CAS Registry Number
  - Chemical Classification Category
  - Taxonomic Name & Assay
- Mutagenicity Studies
  - GENE-TOX Evaluation A (pre-1980)
- Administrative Information
  - GENETOX Record Number
  - Last Revision Date
  - Update History

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Department of Health & Human Services  
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Freedom of Information Act, Accessibility  
Customer Service: [info@nlm.nih.gov](mailto:info@nlm.nih.gov)  
Download free [Adobe® Reader](#)

**RESERPINE**  
CASRN: 50-55-5

C1=CC=C2C(=C1)C(=O)N3C(=O)C4=CC=CC=C4C(=O)N3C2

For other data, click on the Table of Contents

**Best Sections**

Chemical Classification Category :  
**Benzene ring**

## Additional Resources

For further information, we recommend these additional resources:

- ▶ [GENE-TOX Fact Sheet:](http://nlm.nih.gov/pubs/factsheets/genetxfs.html)  
[nlm.nih.gov/pubs/factsheets/genetxfs.html](http://nlm.nih.gov/pubs/factsheets/genetxfs.html)
- ▶ [TOXNET Help- GENE-TOX](http://toxnet.nlm.nih.gov/help/GENETOXhelp.htm)  
[toxnet.nlm.nih.gov/help/GENETOXhelp.htm](http://toxnet.nlm.nih.gov/help/GENETOXhelp.htm)

## GENE-TOX Search Exercises

 Go to **toxnet.nlm.nih.gov**.

 Click  in the Select Database column.

**Exercise 1: Using the CAS registry number 108-95-2, identify the chemical it represents. Review the mutagenicity studies panel report.**

Suggested Solution:

- |        |   |
|--------|---|
| Type   | <b>108-95-2</b> in the <u>Search</u> box                                      |
| Click  | <b>Search</b>   |
| Click  | <b>PHENOL</b>   |
| Click  | <b>Mutagenicity Studies</b> in the <u>Table of Contents</u> frame on the left |
| Review | the information retrieved in the right frame                                  |
| Click  | the link for the Panel Report of your choice to view the abstract             |
| Review | the abstract  |
| Click  | your browser's <b>Back</b> button to return to the GENE-TOX results page      |
| Click  | <b>Basic Search</b> at the top of the page to prepare for the next search     |

**Exercise 2: Has cyclophosphamide been studied for effects on human male fertility and sterility?**

Suggested Solution:

- |        |   |
|--------|---|
| Type   | <b>cyclophosphamide human male fertility</b> in the <u>Search</u> box     |
| Click  | <b>Search</b>   |
| Click  | <b>CYCLOPHOSPHAMIDE</b>   |
| Review | the <b>Best Sections</b> information in the right frame                   |
| Click  | <b>Basic Search</b> at the top of the page to prepare for the next search |

**Exercise 3: Search GENE-TOX for Mutagenicity study results for caffeine. How do study results compare with results in CCRIS?**

Suggested Solution:

- Type **caffeine** in the Search box
- Click **Search**
- Click **Mutagenicity Studies** in the Table of Contents frame on the left
- Review the information retrieved in the right frame
- Click **Other Files** on the top of the page
- Click **CCRIS Record** in the pop-up window
- Click **Mutagenicity Studies** in the Table of Contents frame on the left
- Review the information in the right frame
- Click **Return to GENE-TOX** at the top of the page

9

# **Integrated Risk Information System (IRIS)**



## IRIS

The **Integrated Risk Information System (IRIS)** contains data for more than 500 chemicals, compiled by the Environmental Protection Agency (EPA), in support of human health risk assessment. Overall, IRIS focuses on the human health effects that may result from exposure to various substances found in the environment with data on hazard identification and dose-response assessments.

The screenshot displays the TOXNET website interface. At the top left is the logo for the United States National Library of Medicine (NLM). The main header features the text "TOXNET Toxicology Data Network" in a green banner. Below the header is a navigation bar with links for "TOXNET Mobile Access", "SIS Home", "About Us", "Site Map & Search", and "Contact Us". A breadcrumb trail indicates the current location: "Env. Health & Toxicology > TOXNET > IRIS".

The main content area is titled "Integrated Risk Information System (IRIS) - Hazard identification and dose-response assessments for over 500 chemicals." It is divided into three columns:

- Select Database:** A list of databases with "IRIS" highlighted. Other databases include ChemIDplus, HSDB, TOXLINE, CCRIS, DART, GENETOX, ITER, LactMed, Multi-Database, TRI, Haz-Map, Household Products, TOXMAP, and TOXNET Home.
- Search IRIS:** A search box with a placeholder "(e.g. arsenic blackfoot disease, lead, 78-00-2)". Below the search box are buttons for "Search", "Clear", and "Help". A note states "For chemicals, add synonyms and CAS numbers to search:" with radio buttons for "Yes" (selected) and "No". At the bottom are buttons for "Limits" and "Browse the Index".
- Env. Health & Toxicology:** A section with a "VISIT SITE" button and a link to "Portal to environmental health and toxicology resources". Below this is a "Support Pages" section with links for "Help", "Fact Sheet", "Sample Record", "EPA Disclaimer", and "TOXNET FAQ".

At the bottom left of the main content area is an "Additional Resources" section with links for "CPDB" and "CTD".

[toxnet.nlm.nih.gov](http://toxnet.nlm.nih.gov)

### Searching IRIS

Search IRIS by chemical or other name, chemical name fragment, Chemical Abstracts Service (CAS) Registry Number (RN), and/or subject terms. Search results, displayed in relevancy ranked order, can easily be viewed, printed, or downloaded.

Use truncation (\*), Boolean operators (AND, OR, NOT), phrase searching, nested parentheses, limits, and index browsing to refine your search results.

Click the **Limits** button on the home page to search:

- ▶ Exact words, singular & plural forms, or word variants
- ▶ Records with the phrase, all words, or any words
- ▶ In specific fields or categories of fields—Click the plus sign (+) to the left of a category to show all fields in that category. Use the (−) and (□) buttons to contract or expand all categories

With the **Browse the Index** feature, the system returns a list of index terms related to the search term entered. Select one or more index terms and click the **Select** button for the search results.

Check to Select	Number of Records	Index Term
<input type="checkbox"/>	25	benzene
<input type="checkbox"/>	8	benzenes
<input type="checkbox"/>	4	benzidine
<input type="checkbox"/>	1	benzidines
<input type="checkbox"/>	18	benzo
<input type="checkbox"/>	2	benzoata
<input type="checkbox"/>	1	benzodiazepine
<input type="checkbox"/>	1	benzoflavone
<input type="checkbox"/>	2	benzoic
<input type="checkbox"/>	1	benzophenone
<input type="checkbox"/>	1	benzopyrene
<input type="checkbox"/>	1	benzoquinone

## Search Results

Search results are relevancy ranked. Relevancy ranking is based on the number of individual search terms occurring in a document, the number of times each search term occurs in a document, the rarity of the search terms within the database, and the nearness of search terms to each other. Records containing combinations of search terms tend to be ranked higher than records with isolated occurrences of search terms.

When searching for a chemical, your retrieval may include other chemical records in addition to the initial matching chemical record (the “primary” record).

The screenshot shows the IRIS Search Results page for the query 'benzene'. The search bar contains 'benzene' and the results are sorted by relevance. The primary record is 'Benzene' (CAS 71-43-2). Below it, 24 additional records are listed, including 2-Methylphenol, Benzotrichloride, 4-Methylphenol, 2-Methylphenol, Glyoxaldehyde, Coke oven emissions, 1,3-Butadiene, and Naphthalene.

These additional records appear if they contain the chemical name or search term. Click any of these non-primary chemicals on the **Search Results** screen to display the **Best Sections**, those where the chemical search term(s) appear with greatest frequency. The term(s) searched appear in red.

The **Record** screen is organized into three sections:

1. Navigation buttons at the top of the screen allow you to link to **Other Files** (NLM databases), **Modify Search**, **Download**, return to the **Basic Search** screen, and more.
2. A **Table of Contents** in the left frame allows you to choose categories and fields for display.
3. Chemical Data is shown in the right frame.

## Primary Record

The screenshot shows the IRIS Record page for Benzene (CAS 71-43-2). The page is organized into three sections: 1. Navigation buttons at the top (Next Item, Search Results, Basic Search, Details, Other Files, Download, Browse Index, Help). 2. A Table of Contents on the left side, listing various sections like I.A. Reference Dose for Chronic Oral Exposure (RfD), I.B. Reference Concentration for Chronic Inhalation Exposure (RfC), and I.C. Evidence for Human Carcinogenicity. 3. Chemical data on the right side, including the substance name 'Benzene', its CAS number, and a table of categories and sections with their status and last revised dates.

Search terms are in red

## Additional Chemical Record

Integrated Risk Information System  
IRIS

Next Item Search Results Basic Search Details Other Files Modify Search

Previous Item

Download Limits Browse Index Help

Item 2 of 25

**Table of Contents**

Contract all categories  Expand all categories  Select Clear

- FULL RECORD
- BEST SECTIONS
- Status
- Substance Identification
  - Substance Name
  - CAS Registry Number
- I. Chronic Health Hazard Assessment for Noncarcinogens
  - I.A. Reference Doses for Chronic Oral Exposure (RfD)
    - I.A.1. Oral RfD Summary
    - I.A.2. Principal and Supporting Studies (Oral RfD)
    - I.A.3. Uncertainty and Modifying Factors (Oral RfD)
    - I.A.4. Additional Studies/Comments (Oral RfD)
    - I.A.5. Confidence in the Oral RfD
    - I.A.6. EPA Documentation and Review of the Oral RfD
    - I.A.7. EPA Contacts (Oral RfD)
  - I.B. Reference Concentration for Chronic Inhalation Exposure (RfC)
- II. Carcinogenicity Assessment for Lifetime Exposure
  - II.A. Evidence for Human Carcinogenicity
    - II.A.1. Weight of Evidence Characterization
    - II.A.2. Human Carcinogenicity Data
    - II.A.3. Animal Carcinogenicity Data
    - II.A.4. Supporting Data for Carcinogenicity
  - II.B. Quantitative Estimate of Carcinogenic Risk from Oral Exposure
  - II.C. Quantitative Estimate of Carcinogenic Risk from Inhalation Exposure
  - II.D. EPA Documentation, Review, and Contacts (Carcinogenicity)
  - II.D.1. EPA Documentation



**3-Methylphenol**  
CASRN: 108-39-4

For other data, click on the Table of Contents

**Best Sections**

**II.A.3. Animal Carcinogenicity Data :**

Limited. Four skin application studies which had positive results are reported; however, the final two studies are of limited value due to the application of a mixture of chemicals. In a study by Boutwell and Bosch (1959), female Sutter mice (27-29/group; 2-3 months of age) received a single dermal application of 25  $\mu$ l of 0.3% dimethylbenzanthracene (DMBA) in acetone as the initiator, followed 1 week later by 25  $\mu$ l of 20% (v/v) o-, m- or p- cresol in benzene twice weekly for 12 weeks. Skin papillomas were evaluated at 12 weeks. Mice in the benzene control group developed no papillomas. In another experiment, groups of 20 mice received a single dose (25  $\mu$ l) of 0.3% DMBA in acetone, followed by twice weekly applications of 5.7% o-cresol in benzene or 5.7% p-cresol in benzene for 20 weeks. No skin papillomas were observed in the 18 surviving benzene control mice; 4/17 m-cresol- and 4/14 p-cresol-treated mice developed skin papillomas (Boutwell and Bosch, 1959). These two experiments indicate that cresols can serve as tumor promoters of a polycyclic aromatic hydrocarbon.

## Additional Resources

For further information, we recommend these additional resources:

- ▶ [IRIS Fact Sheet:  
pubs.nlm.nih.gov/pubs/factsheets/irisfs.html](https://pubs.nlm.nih.gov/pubs/factsheets/irisfs.html)
- ▶ [EPA IRIS Web Site:  
epa.gov/NCEA/iris](https://epa.gov/NCEA/iris)
- ▶ [TOXNET Help Text - IRIS  
toxnet.nlm.nih.gov/help/IRIShelp.htm](https://toxnet.nlm.nih.gov/help/IRIShelp.htm)

## IRIS Search Exercises

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 Go to **toxnet.nlm.nih.gov**.

 Click  in the Select Database column.

**Exercise 1: What is the NOAEL (No Observed Adverse Effect Level) for significant proteinuria from cadmium?**

Suggested Solution:

- Type **cadmium proteinuria** in the Search box
- Click **Search**
- Click **Cadmium**
- Review the **Best Sections** information in the right frame
- Click **Basic Search** to prepare for the next search

**Exercise 2: What is the Inhalation Reference Concentration (RfC) of ammonia? (Note: The RFC is a non-carcinogenic risk assessment parameter). Also, view the Download options available.**

Suggested Solution:

- Type **ammonia** in the Search box
- Click **Search**
- Click **Ammonia**
- Click **I.B. Reference Concentration for Chronic Inhalation Exposure (RfC)**
- Click **Download** at the top of the page
- Review the Custom Formats
- Close Custom Formats window
- Click **Basic Search** to prepare for the next search

**Exercise 3: How does the U.S. Environmental Protection Agency characterize the carcinogenicity of methylmercury?**

Suggested Solution:

- Type **methylmercury** in the Search box
- Click **Search**
- Click **Methylmercury (MeHg)**
- Click **II.A. Evidence for Human Carcinogenicity**
- Review the information retrieved
- Click **Basic Search** to prepare for the next search

**Exercise 4: What is the Inhalation BMC (Benchmark Concentration) for n-hexane?**

Suggested Solution:

- Type **n-hexane** in the Search box
- Click **Search**
- Click **n-Hexane**
- Click **I.B.1. Inhalation RfC Summary**
- Review the information retrieved
- Click **TOXNET Home** to prepare for the next search

**Exercise 5: Review the carcinogenicity assessment documentation listed for boron.**

Suggested Solution:

- Type **boron** in the Search box
- Click **Search**
- Click **II. Carcinogenicity Assessment for Lifetime Exposure**
- Review the information retrieved

**10**

## **International Toxicity Estimates for Risk (ITER)**



## ITER

**ITER** (International Toxicity Estimates for Risk) is a toxicology data file on the National Library of Medicine (NLM) Toxicology Data Network (TOXNET) and contains data in support of human health risk assessments. Compiled by Toxicology Excellence for Risk Assessment, ITER is a small database with data on more than 600 chemical records. It is structured to provide a comparison of international risk assessment information in a side-by-side format and explains differences in risk values derived by different organizations.

The screenshot displays the TOXNET website interface. At the top, there is a header for the United States National Library of Medicine (NLM) and the TOXNET Toxicology Data Network. Below the header, there are navigation links for TOXNET Mobile Access, SIS Home, About Us, Site Map & Search, and Contact Us. The main content area features a search bar with a placeholder text "(e.g. vinyl chloride, liver cancer risk, 78-00-2)" and buttons for Search, Clear, and Help. To the left of the search bar is a "Select Database" menu with a list of databases including ChemIDplus, HSDB, TOXLINE, CCRIS, DART, GENETOX, IRIS, ITER (highlighted), LactMed, Multi-Database, TRI, Haz-Map, Household Products, TOXMAP, and TOXNET Home. To the right of the search bar is a "Support Pages" section with links to ITER Glossary, What's New, Risk Methods, More about ITER, Risk Assessment Links, Help, Fact Sheet, Sample Record, and TOXNET FAQ. The URL [toxnet.nlm.nih.gov](http://toxnet.nlm.nih.gov) is displayed below the screenshot.

[toxnet.nlm.nih.gov](http://toxnet.nlm.nih.gov)

ITER provides both risk data and cancer classifications. Information is derived from:

- ▶ Agency for Toxic Substances & Disease Registry (ATSDR)
- ▶ Health Canada
- ▶ U.S. Environmental Protection Agency (EPA)
- ▶ International Agency for Research on Cancer (IARC)
- ▶ NSF International (National Sanitation Foundation)
- ▶ National Institute of Public Health & the Environmental (RIVM), The Netherlands

## Searching ITER

Search ITER by chemical or other name, chemical name fragment, Chemical Abstracts Service (CAS) Registry Number, and/or subject terms. By default, the system adds synonyms and CAS numbers to chemical searches.

Use truncation (\*), Boolean operators (AND, OR, NOT), nested parentheses, limits, and index browsing to refine your search results.

Click the **Limits** button on the home page to search:

- ▶ Exact words, singular & plural forms, or word variants
- ▶ Records with the phrase, all words, or any words
- ▶ In specific fields or categories of fields—Click the plus sign (+) to the left of a category to show all fields in that category. Use the (−) and (□) buttons to contract or expand all categories

With the **Browse the Index** feature, the system returns a list of index terms related to the search term entered and the number of records containing that term. Select one or more index terms and click the **Select** button for the search results. Scan the index above or below the original display by clicking the **Up** or **Down** button.

Check to Select	Number of Records	Index Term
<input type="checkbox"/>	10	benzene
<input type="checkbox"/>	4	benzenediamine
<input type="checkbox"/>	1	benzenediamines
<input type="checkbox"/>	4	benzenes
<input type="checkbox"/>	1	benzidine
<input type="checkbox"/>	1	benzkatechin
<input type="checkbox"/>	19	benzo
<input type="checkbox"/>	1	benzofuran
<input type="checkbox"/>	1	benzoic
<input type="checkbox"/>	1	benzotrifluoride
<input type="checkbox"/>	1	benzoyl
<input type="checkbox"/>	3	benzyl
<input type="checkbox"/>	1	ber

## Search Results

Your initial retrieval is displayed as a list of substance names highlighted in blue and their CAS Registry Numbers. Substances are listed in relevancy ranked order. Relevancy ranking is based on the number of individual search terms occurring in a document, the number of times each search term occurs in a document, the rarity of the search terms within the database, and the nearness of search terms to each other. Records containing combinations of search terms tend to be ranked higher than records with isolated occurrences of search terms.

When searching for a chemical, your retrieval may include other chemical records in addition to the initial matching chemical record (the “primary” record).

**Primary Record**

1  [BENZENE](#)  
71-43-2

**Additional Chemical Records**

2  [DICHLOROBENZENE, 1,2-](#)  
95-50-1

3  [ALPHA,HEXACHLOROCYCLOHEXANE](#)  
219-84-6

4  [ETHYLBENZENE](#)  
100-41-4

5  [BUTADIENE, 1,3-](#)  
106-99-0

6  [PENTACHLOROBENZENE](#)  
608-93-6

7  [TOLUENE](#)  
108-88-3

8  [TRICHLOROETHYLENE \(TCE\)](#)  
79-01-6

9  [CHLOROBENZENE](#)  
.....

These additional records appear if they contain the chemical name or search term. Click any of these non-primary chemicals on the **Search Results** screen to display the sections of the record best matching your query terms (**Best Sections**), those where the chemical search term(s) appear with greatest frequency. Search term(s) appear in red.

The **Record** screen is organized into three sections:

1. Navigation buttons at the top of the screen allow you to link to **Other Files** (NLM databases), **Modify Search**, **Download**, return to the **Basic Search** screen, and more.
2. A **Table of Contents** in the left frame allows you to choose categories and fields for display.
3. Chemical Data is shown in the right frame.

## Primary Record

**Table of Contents**

- FULL RECORD
- Substance Identification/Summary Table
  - Substance Name
  - CAS Registry Number
  - Risk Values - Summary Table
- Data - Noncancer Oral
  - Noncancer Oral Risk Values Table
  - Noncancer Oral Synopses
  - Noncancer Oral Specifics
- Data - Cancer Oral
  - Cancer Oral Risk Values Table
  - Cancer Oral Synopses
  - Cancer Oral Specifics
- Data - Noncancer Inhalation
  - Noncancer Inhalation Risk Values Table
  - Noncancer Inhalation Synopses
  - Noncancer Inhalation Specifics
- Data - Cancer Inhalation
  - Cancer Inhalation Risk Values Table
  - Cancer Inhalation Synopses
  - Cancer Inhalation Specifics

**BENZENE**  
CASRN: 71-43-2

**Substance Identification/Summary Table:**

Substance Name: **BENZENE**

CAS Registry Number: 71-43-2

**Risk Values - Summary Table:**

Risk Value Type \ Organization	ATSDR <sup>1</sup>	Health Canada <sup>2</sup>	IARC <sup>3</sup>	IRPV <sup>4</sup>	ITER DB <sup>5</sup>	NSF Int <sup>6</sup>	RVM <sup>7</sup>	U.S.EPA <sup>8</sup>
Noncancer Oral	✓	✓	**	**	**	**	✓	✓
Cancer Oral	✓	✓	**	**	**	**	✓	✓
Noncancer Inhalation	✓	✓	**	**	**	**	✓	✓
Cancer Inhalation	✓	✓	**	**	**	**	✓	✓

✓ = Chemical evaluated and ITER data online.

## Additional Chemical Record

International Toxicity Estimates for Risk  
ITER

Next Item Search Results Basic Search Details Other Files Modify Search TOXNET Home  
Previous Item Download Limits Browse Index Help Item 2 of 10 NATIONAL LIBRARY OF MEDICINE

Table of Contents  
Contract all categories  
Expand all categories  
Select Clear

- FULL RECORD
- BEST SECTIONS
- Substance Identification/Summary
  - Substance Name
  - CAS Registry Number
  - Risk Values - Summary Table
- Data - Noncancer Oral
  - Noncancer Oral Risk Values Table
  - Noncancer Oral Synopsis
  - Noncancer Oral Specifics
- Data - Cancer Oral
  - Cancer Oral Risk Values Table
  - Cancer Oral Synopsis
  - Cancer Oral Specifics
- Data - Noncancer Inhalation
  - Noncancer Inhalation Risk Values Table
  - Noncancer Inhalation Synopsis
  - Noncancer Inhalation Specifics
- Data - Cancer Inhalation
  - Cancer Inhalation Risk Values Table
  - Cancer Inhalation Synopsis
  - Cancer Inhalation Specifics

**DICHLOROBENZENE, 1,2-**  
CASRN: 95-50-1

ClC1=CC=C(Cl)C=C1

For other data, click on the Table of Contents

**BEST SECTIONS** displays excerpts in the record that contain your search words. To view organizational risk data with risk tables and synopses, click on **FULL RECORD** in "Contents" table at left.

**Best Sections**

**Cancer Inhalation Specifics :**  
**Organization:** Health Canada

**Potential for Human Carcinogenicity:** No clinical investigations were identified on the effects in human volunteers of exposure to 1,2-dichlorobenzene. Case reports of adverse effects associated with exposure to 1,2-dichlorobenzene, of mixtures containing 1,2-dichlorobenzene, were confined to haematological disorders including anaemia and leukaemia (Girard et al., 1969; Tolot et al., 1969). In the only identified (early and inadequately documented) cross-sectional epidemiological study of workers exposed to 1,2-dichlorobenzene, there was no evidence of "organic injury or untoward haematological effects" in an unspecified number of workers exposed to mean concentrations of 15 ppm (90 mg/cu.

## Additional Resources

For further information, we recommend these additional resources:

- ▶ [ITER Fact Sheet](http://nlm.nih.gov/pubs/factsheets/toxnetfs.html)  
[nlm.nih.gov/pubs/factsheets/toxnetfs.html](http://nlm.nih.gov/pubs/factsheets/toxnetfs.html)
- ▶ [TOXNET Help Text – ITER](http://toxnet.nlm.nih.gov/help/ITERhelp.htm)  
[toxnet.nlm.nih.gov/help/ITERhelp.htm](http://toxnet.nlm.nih.gov/help/ITERhelp.htm)
- ▶ [What's New](http://tera.org/iter)  
[tera.org/iter](http://tera.org/iter)

## ITER Search Exercises

 Go to **toxnet.nlm.nih.gov**.

 Click  in the **Select Database** column.

### Exercise 1: Do ATSDR and U.S. EPA currently have any noncancer oral risk data for the chemical acetone?

Suggested Solution:

- Type **acetone** in the Search box
- Click **Search**
- Click **ACETONE**
- Click **Noncancer Oral Risk Values Table** under Data-Noncancer Oral in the Table of Contents frame on the left
- Review the information in the right frame
- Click **Cancer Oral Risk Values Table** under Data-Cancer Oral in the Table of Contents frame on the left
- Review the information in the right frame
- Click **Basic Search** to prepare for the next search

### Exercise 2: How many international agencies have classified dichloroacetic acid as carcinogenic to humans?

Suggested Solution:

- Type **dichloroacetic acid** in the Search box
- Click **Search**
- Click **DICHLOROACETIC ACID**
- Click **FULL RECORD** in the Table of contents frame on the left and review the information
- Click **Basic Search** to prepare for the next search

**Exercise 3: How do the Dutch RIVM, Health Canada, and ATSDR compare in their non-cancer inhalation risk values for nickel oxide?**

Suggested Solution:

- Type **nickel oxide** in the Search box
- Click **Search**
- Click **NICKEL OXIDE**
- Click **Noncancer Inhalation Risk Values Tables** under Data-Noncancer Inhalation in the Table of Contents to the left
- Review the **Noncancer Inhalation Table**



**LactMed**



## LactMed

**LactMed** is a database that contains information on more than 900 drugs and other chemicals to which breastfeeding mothers may be exposed. It includes information on the levels of such substances in breast milk and infant blood, and the possible adverse effects in the nursing infant. All data are derived from the scientific literature and fully referenced. Data are organized into substance-specific records, which provide a summary of the pertinent reported information and include links to other NLM databases.

The screenshot displays the LactMed website interface. At the top left is the NLM logo and the text "United States National Library of Medicine". To the right is the "TOXNET Toxicology Data Network" header. Below this is a navigation bar with links for "TOXNET Mobile Access", "SIS Home", "About Us", "Site Map & Search", and "Contact Us". A breadcrumb trail shows "Env. Health & Toxicology > TOXNET > LactMed".

The main content area features a description of the "Drugs and Lactation Database (LactMed)" as a peer-reviewed and fully referenced database. Below this are three main sections:

- Select Database:** A list of databases including ChemIDplus, HSDB, TOXLINE, CCRIS, DART, GENETOX, IRIS, ITER, LactMed (highlighted), Multi-Database, TRI, Haz-Map, Household Products, TOXMAP, and TOXNET Home.
- Search LactMed:** A search box with a placeholder "(e.g. Advil, oral contraceptives, Prozac)", "Search" and "Clear" buttons, and a section for adding synonyms and CAS numbers with "Yes" (selected) and "No" radio buttons, and "Limits" and "Browse the Index" buttons.
- Env. Health & Toxicology:** A section with a "Portal to environmental health and toxicology resources" and a "VISIT SITE" button.
- Support Pages:** A list of links including "LactMed App **NEW!**", "LactMed Record Format", "Database Creation & Peer Review Process", "Help", "Fact Sheet", "Sample Record", "TOXNET FAQ", "Glossary", "About Dietary Supplements", "Breastfeeding Links", and "Get LactMed Widget **NEW!**".

At the bottom left, there is an "Additional Resources" section with links to "CPDB" and "CTD".

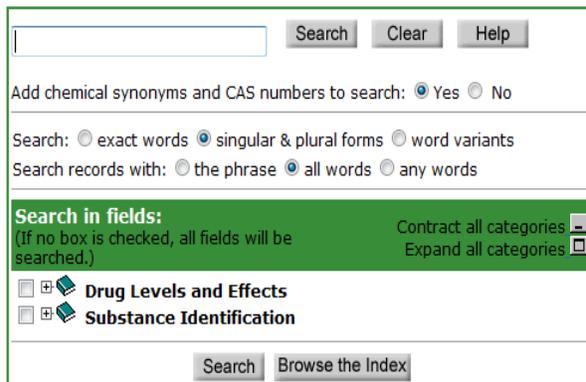
[lactmed.nlm.nih.gov](http://lactmed.nlm.nih.gov)

### Searching LactMed

Search LactMed by chemical, brand name, Chemical Abstracts Service (CAS) Registry Number, pharmacologic category, and/or subject terms. By default, the system adds synonyms and CAS numbers to chemical searches. Search results, displayed in relevancy ranked order, can easily be viewed, printed, or downloaded.

Click the **Limits** button on the home page to search:

- ▶ Exact words, singular & plural forms, or words variants
- ▶ Records with the phrase, all words, or any words
- ▶ In specific fields or categories of fields: LactMed contains ten search fields organized under two broad categories. Click the plus sign (+) to the left of a category to show all fields in that category. Use the (  ) and (  ) buttons above and to the right of the list of categories to contract or expand all categories.



Search [ ] [ Search ] [ Clear ] [ Help ]

Add chemical synonyms and CAS numbers to search:  Yes  No

Search:  exact words  singular & plural forms  word variants

Search records with:  the phrase  all words  any words

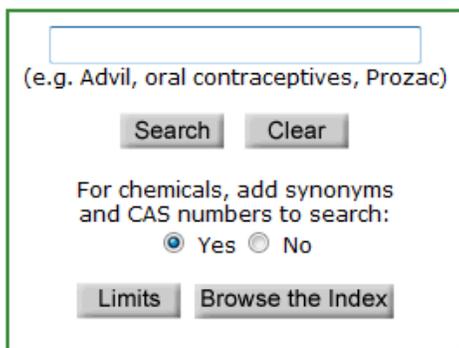
**Search in fields:** (If no box is checked, all fields will be searched.) Contract all categories  Expand all categories 

 Drug Levels and Effects

 Substance Identification

[ Search ] [ Browse the Index ]

Click the **Browse the Index** button on the home page to search a list of index terms related to the search term entered and the number of records containing that term. Select the record(s) you want to view by clicking the appropriate box in the “Check to Select” column and clicking the **Select** button. Scan the index above or below the original display by clicking the **Up** or **Down** button.



[ Search Box ]  
(e.g. Advil, oral contraceptives, Prozac)

[ Search ] [ Clear ]

For chemicals, add synonyms and CAS numbers to search:  
 Yes  No

[ Limits ] [ Browse the Index ]

LactMed Browse Results

paroxetine [ Search ] [ Clear ] [ Return to Basic Search ]

All Words  CAS Registry Number  Chemical Name

Check one or more text words. Then click on SELECT.

Start of Text Word Browse: paroxetine

[ Up ] [ Down ] [ Select ]

Check to Select	Number of Records	Index Term
<input type="checkbox"/>	34	paroxetine
<input type="checkbox"/>	1	paroxysmal
<input type="checkbox"/>	2	parsley
<input type="checkbox"/>	40	part
<input type="checkbox"/>	1	partenelle
<input type="checkbox"/>	1	partheni
<input type="checkbox"/>	1	parthenium
<input type="checkbox"/>	1	parthenolide
<input type="checkbox"/>	13	partial
<input type="checkbox"/>	37	partially
<input type="checkbox"/>	10	participants
<input type="checkbox"/>	10	participating
<input type="checkbox"/>	49	particularly

## Search Results

Your initial retrieval is displayed as a list of chemical names, highlighted in blue and underlined, and their CAS Registry Numbers. If your search was for a chemical or drug (e.g., codeine) and there is a match for it in the database, the record for this chemical—referred to as the primary chemical record—will display first, followed by a list of other chemical records which also contain some mention of the chemical you entered. This latter list of chemicals is displayed according to a Relevancy Ranking algorithm. Clicking directly on any of the items will provide a display of the Selected Record Screen, containing all the data for that item. If your query consists of words that are not chemical or drug terms, this same Relevancy Ranking algorithm determines the order of display of all your search results.

When searching for a chemical, your retrieval may include other chemical records in addition to the initial matching chemical record (the “primary” record).

**LactMed Search Results**

paroxetine Search Clear Limits

For chemicals, add synonyms and CAS numbers to search:  Yes  No

Items 1 through 20 of 34  
Substance Names are sorted in [relevance ranked order](#). Pages: 1, 2

Select Record	Substance Name
1	Paroxetine 61869-08-7
2	Fluvoxamine 54739-18-3
3	Fluoxetine 64919-09-3
4	Citalopram 59729-33-8
5	Escitalopram 128196-01-0
6	Sertraline 39617-96-2
7	Quetiapine 111974-69-7
8	Duloxetine 116216-43-1

These additional records appear if they contain the chemical name or search term. Click any of these non-primary chemicals on the **Search Results** screen to display the sections of the record best matching your query terms (**Best Sections**), those where the chemical search term(s) appear with greatest frequency. Search term(s) appear in red.

The **Record** screen is organized into three sections:

1. Navigation buttons at the top of the screen allow you to link to **Other Files** (NLM databases), **Modify Search**, **Download**, return to the **Basic Search** screen, and more.
2. A **Table of Contents** in the left frame allows you to choose categories and fields for display.
3. Chemical Data is shown in the right frame.

## Primary Record

**Paroxetine**  
CASRN: 61869-08-7

**Drug Levels and Effects:**

**Summary of Use during Lactation:**  
Because of the low levels of **paroxetine** in breastmilk, amounts ingested by the infant are small and **paroxetine** has not been detected in the serum of most infants tested. Occasional mild side effects have been reported, especially in the infants of mothers who took **paroxetine** during the third trimester of pregnancy, but the contribution of the drug in breastmilk is not clear. Most authoritative reviewers consider **paroxetine** one of the preferred antidepressants during breastfeeding.[1][2][3][4] Mothers taking an SSRI during pregnancy and postpartum may have more difficulty breastfeeding and may need additional breastfeeding support.

**Drug Levels:**  
Maternal Levels In a pooled analysis of serum levels from published studies and 3

Search terms are in red

## Additional Chemical Record

The screenshot displays the LactMed database interface for Fluvoxamine. At the top, there are navigation buttons: 'Next Item', 'Search Results', 'Basic Search', 'Details', 'Other Files', and 'Modify Search'. Below these are 'Previous Item', 'Download', 'Limits', 'Browse Index', and 'Help'. The 'Table of Contents' on the left lists sections such as 'FULL RECORD', 'Drug Levels and Effects', 'Substance Identification', and 'Administrative Information'. The main content area features the chemical structure of Fluvoxamine (CASRN: 54739-18-3) and text sections including 'Drug Levels and Effects' and 'Summary of Use during Lactation'. The 'Summary of Use during Lactation' section states: 'Limited information indicates that maternal fluvoxamine doses of up to 300 mg daily produce low levels in breastmilk and would not be expected to cause any adverse effects in breastfed infants, especially if the infant is older than 2 months. One infant was reported to have an elevated serum level of fluvoxamine, but most who have been tested have undetectable serum levels. No adverse effects on breastfed infants have been reported, including a limited amount of long-term follow-up on growth and development. Mothers taking an SSRI during pregnancy and postpartum may have more difficulty breastfeeding and may need additional breastfeeding support.'

## Additional Resources

For further information, we recommend these additional resources:

- ▶ [Drugs and Lactation Database \(LactMed\) Fact Sheet](http://nlm.nih.gov/pubs/factsheets/lactmedfs.html)
- ▶ [LactMed App](http://toxnet.nlm.nih.gov/help/lactmedapp.htm)
- ▶ [LactMed Basics Brochure](http://nlm.gov/mcr/resources/consumer/LactMed.pdf)
- ▶ [Pregnancy Riskline \(University of Arizona College of Pharmacy\)](http://www.pharmacy.arizona.edu/centers/pregnancy-riskline)
- ▶ [Organization of Teratology Information Specialists](http://otispregnancy.org)

## LactMed Search Exercises

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### Scenario 1 – Summary Information

**Carolyn, a nursing mother, has been prescribed methotrexate due to an early onset of rheumatoid arthritis. Her doctor has told her that she may continue to nurse her baby since he has prescribed a low dose of the medication. Carolyn would like to do some research herself to confirm her doctor’s statements.**

**Search LactMed to gather information: Locate the methotrexate record in LactMed. Open the methotrexate record. Browse the record for information.**

Suggested Solution:

- Type **methotrexate** in the Search box
- Click **Search**
- Click **Methotrexate** record in the Search Results list
- Scroll through the record or use the **Table of Contents**
-  The Summary of Use during Lactation supports the doctor’s statements.

### Scenario 2 – Alternative Drug Field

**While browsing the methotrexate record, Carolyn (Scenario 1) notices auranofin listed as an alternate drug to consider. Have any effects in infants been reported after use of auranofin by a nursing mother?**

**Use links within the methotrexate record to find information: Locate the alternate drugs within the methotrexate record. Open the auranofin record. Locate the infant effects section of the record.**

Suggested Solution:

- Click **Alternate Drugs to Consider** in the Table of Contents
- Click the link to the **auranofin** record
- Click **Auranofin**
- Click **Effects in Breastfed Infants** in the Table of Contents

## Additional Exercises

 Go to [toxnet.nlm.nih.gov](http://toxnet.nlm.nih.gov).

 Click  in the **Select Database** column.

### Exercise 1: To which class of drugs does clomipramine belong?

Suggested Solution:

Type **clomipramine** in the Search box

Click **Search**

Click **Clomipramine**

Click **Drug Class** under Substance Identification in the **Contents** frame to the left

Click **Basic Search** to prepare for the next search

### Exercise 2: Is there a substitute for the use of hydrocodone during lactation?

Suggested Solution:

Type **hydrocodone** in the Search box

Click **Search**

Click **Hydrocodone**

Click **Alternate Drugs to Consider** under Drug Levels and Effects in the **Contents** frame to the left

**12**

# **Toxics Release Inventory (TRI) and TOXMAP**



## Toxics Release Inventory (TRI)

The **Toxics Release Inventory (TRI)** is a publicly available resource of the U.S. Environmental Protection Agency (EPA) containing detailed information on more than 600 chemicals and chemical categories, which more than 23,000 U.S. industrial and federal facilities manage through disposal or other releases, recycling, energy recovery, or treatment. This inventory was established under the Emergency Planning and Community Right to Know Act of 1986 (EPCRA) and was expanded by the Pollution Prevention Act of 1990. TRI's data, beginning with the 1987 reporting year, cover air, water, land, and underground injection releases as well as transfers to waste sites.

The screenshot shows the TOXNET website interface. At the top, there is a header for the United States National Library of Medicine (NLM) and TOXNET Toxicology Data Network. Below the header, there are navigation links for TOXNET Mobile Access, SIS Home, About Us, Site Map & Search, and Contact Us. The main content area is titled "Toxics Release Inventory (TRI) - Annual environmental releases of over 600 toxic chemicals by U.S. facilities. About the Environmental Protection Agency (EPA) Toxics Release Inventory (TRI) Program." The interface is divided into several sections: "Select Database" with a list of databases including ChemIDplus, HSDB, TOXLINE, CCRIS, DART, GENETOX, IRIS, ITER, LactMed, Multi-Database, TRI (selected), Haz-Map, Household Products, TOXMAP, and TOXNET Home; "Search TRI" with a search box for "TRI Chemical Name or CAS Registry Number", search buttons (Search, Clear, Help), and options to "Add synonyms and CAS numbers to search" (Yes/No); "TRI Files" with a "Select All" button and a list of years from 1987 to 2010; "Additional Resources" with links to CPDB and CTD; "Env. Health & Toxicology" with a "Portal to environmental health and toxicology resources" link; and "Support Pages" with links to Help, Fact Sheet, Sample Record, and TOXNET FAQ.

toxnet.nlm.nih.gov

### Searching TRI

Search TRI by chemical or other name, chemical name fragment, Chemical Abstracts Service (CAS) Registry Number, and/or subject terms. By default, the system adds synonyms and CAS numbers to chemical searches. Use truncation (\*), Boolean operators (AND, OR, NOT), nested parentheses, and limits to refine your search results.

TRI currently contains data from 1987 through 2010. By default the system will search the most current year. You can also limit your search with the following criteria:

- ▶ Facility Name
- ▶ Facility Location
  - Select State, City/State, County/State, or Zip
- ▶ TRI Reporting Form Type
  - Ability to search for either Form R or Form A or both

The screenshot shows a detailed search criteria form for TRI. It includes sections for: "TRI Facility Names (Separate multiple entries with commas)", "TRI Facility Location (Separate multiple entries for state, city/state, or zip with commas. For example: NJ, DE, or Trenton/NJ, Houston/TX, or 21113, 21224)" with radio buttons for State, City/State, County/State, and Zip; "TRI Reporting Form Type" with radio buttons for Both Form R and Form A, Form R (long form) only, and Form A (short form) only; "Standard Industrial Classification Code or North American Industry Classification System Code (Separate multiple entries with commas)"; and "Greater Than 0 lbs for" with a dropdown menu and a "None Selected" option. At the bottom, there are "Search" and "Browse the Index" buttons.

- ▶ Standard Industrial Classification Code or North American Industry Classification System Code
  - Separate multiple entries with commas
- ▶ Weight in pounds (Great Than)
- ▶ Type of release (air, water, land, underground injection, disposal, or total environmental release)

With the **Browse the Index** feature, the system returns a list of index terms related to the search term entered and the number of records containing that term. Select one or more index terms and click the **Select** button for the search results. Scan the index above or below the original display by clicking the **Up** or **Down** button.

## Search Results

Your initial retrieval is displayed in relevancy ranked order as a list of abbreviated records with facility name in blue and hot-linked, chemical name, and city and state where the facility is located. Relevancy ranking is based on the number of individual search terms occurring in a document, the number of times each search term occurs in a document, the rarity of the search terms within the database, and the nearness of search terms to each other. Records containing combinations of search terms tend to be ranked higher than records with isolated occurrences of search terms.

The Record screen is organized into three sections:

1. Navigation buttons at the top of the screen allow you to link to **Other Files** (NLM databases), **Modify Search**, **Download**, return to the **Basic Search** screen, and more.
2. A **Table of Contents** in the left frame allows you to choose categories and fields for display.
3. Data is shown in the right frame—Click the **Map it with TOXMAP** button on the right to visually explore on-site releases in TOXMAP

The screenshot displays the TOXNET record screen for TRI2010. At the top, there are navigation buttons: 'Next Item', 'Search Results', 'New Search', 'Details', 'Other Files', 'Modify Search', 'Download', 'Browse Index', and 'Help'. A 'Map it with TOXMAP' button is highlighted in the top right. The main content area is divided into three sections:

- Section 1 (Navigation):** Buttons for 'Next Item', 'Search Results', 'New Search', 'Details', 'Other Files', 'Modify Search', 'Download', 'Browse Index', and 'Help'.
- Section 2 (Table of Contents):** A list of categories and fields for display, including 'FULL RECORD', 'Facility Identification', 'Facility Name/Address', 'EPA Facility Number', 'EPA Region', 'Federal Facility Status', 'Covered Facility', 'EPC State/County Code', 'Public Contact', 'Public Contact Telephone Number', 'Standard Industrial Classification Code', 'North American Industry Classification Code', 'Latitude', 'Longitude', 'Centroid Latitude', 'Centroid Longitude', 'Facility Down & Broadstreet Number', 'EPA Identification Number', 'NDEIS Permit Number', 'LIC ID Number', 'Parent Company Name', and 'Parent Company Chn & Broadstreet'. A 'Map it with TOXMAP' button is also present.
- Section 3 (Facility Details):** Information for 'BENZENE' at 'SPRAGUE SEARSPORT TERMINAL SEARSPORT, ME'. It includes 'Facility Identification', 'Facility Name/Address' (SPRAGUE SEARSPORT TERMINAL, MACK'S POINT TRUNDRY RD, SEARSPORT, (WALDO County) ME 04974), 'EPA Facility Number' (04974SPRGSMAKCS), 'EPA Region' (1), 'Federal Facility Status' (Commercial), and 'Covered Facility' (0 - entire).

## Additional Resources

For further information, we recommend these additional resources:

- ▶ [TRI Fact Sheet:](http://nlm.nih.gov/pubs/factsheets/trifs.html)  
[nlm.nih.gov/pubs/factsheets/trifs.html](http://nlm.nih.gov/pubs/factsheets/trifs.html)
- ▶ [TRI/EPA:](http://epa.gov/tri)  
[epa.gov/tri](http://epa.gov/tri)

## TOXMAP

**TOXMAP** is a Geographic Information System (GIS) that uses maps of the United States to help users visually explore data from the Environmental Protection Agency's (EPA) Toxics Release Inventory (TRI) and Superfund programs. TOXMAP helps users create nationwide, regional, or local area maps showing where TRI chemicals are released on-site into the air, water, and ground. Maps can also show locations of Superfund sites on the National Priorities List (NPL). The NPL guides the federal government in determining which sites should be investigated. It is updated on a regular basis.

[toxmap.nlm.nih.gov](http://toxmap.nlm.nih.gov)

### Map Features

TOXMAP offers several ways to create maps: using the tabs and sub-tabs along the top of the page, the **Quick Search** box on the home page, and the **Map Controls** below each created map.

TOXMAP can create several types of maps:

- ▶ TRI Facilities
- ▶ TRI Chemical Releases
- ▶ TRI Chemical Trends
- ▶ Superfund Maps
- ▶ Combination (Combo) Maps
- ▶ Search (Advanced)

TOXMAP also overlays map data such as:

- ▶ U.S. Census Data—1990 and 2000 demographics (population, ethnicity, age, gender ratio)
- ▶ Income Data—per capita personal income
- ▶ Health Data—mortality data for cancer and various causes
- ▶ Reference Data—cities, roads, hospitals, federal land, and urban areas

**DISCLAIMER:** The co-occurrence of a substance and a particular health problem does not by itself imply an effect on human health by that substance.

## Searching and Creating Maps in TOXMAP

TOXMAP's **Quick Search** feature on the home page allows you to search TRI and Superfund data by chemical and to zoom the resulting map to a specific city, state, or zip code. More advanced search options are available by clicking the [More search options...](#) link or by selecting the **Search** tab at the top of the page.

The **Search** page allows users to search a chemical CAS/RN, TRI facility name/ID, release year ranges, release medium, release amount, Superfund NPL site name/ID/status, and Hazard Ranking System (HRS) score. You can also select specific geographic regions. Release color coding is calibrated only for releases in that region rather than for the entire nation.

**Quick Search**

Select Dataset(s):  
 TRI  Superfund NPL

Chemical Name

City

State ZIP [\[Lookup\]](#)

[Choose a region...](#)  
[More search options...](#)

  
 United States  
National Library  
of Medicine

**TOXMAP**<sup>®</sup>  
 Environmental Health e-Maps



[Home](#) [TRI Facilities](#) [TRI Releases](#) [TRI Trends](#) [Superfund](#) [Combo](#) [Search](#) [Help](#) [Contact Us](#)

[Edit Search](#) [Display Map](#) [Set Region](#) [Other Data](#) [Download](#)

**Search**  
 Click the "Set Region" tab to show results only in a specified geographic region. [?](#)

---

**CHOOSE A CHEMICAL** [?](#)

Chemical: 
 CAS RN [?](#):

TRI or Superfund Chemical [?](#)

**CHOOSE A DATASET**

**Toxics Release Inventory (TRI)** [?](#)

Search all TRI facilities  
 Search only facilities with the selected chemical  
 Do not search TRI facilities

**Superfund National Priorities List (NPL)** [?](#)

Search all Superfund sites  
 Search only NPL sites with the selected chemical  
 Do not search Superfund sites

TRI Facility Name

TRI Facility ID [?](#)

Release Medium [?](#)

Any Medium  
 Water  
 Air  
 Land  
 Underground Injection

Release Years [?](#)  to  [?](#)

Release Exceeds [?](#)  lbs.

NPL Site Name

EPA ID [?](#)

NPL Status [?](#)

All  
 Final  
 Proposed  
 Deleted

Hazard Ranking System Score [?](#)  to  [?](#)

Auto-zoom map to include all search results

[Return to map](#)

## Additional Resources

For further information, we recommend these additional resources:

- ▶ [TOXMAP Tour](http://toxmap.nlm.nih.gov/toxmap/tour/index.html)  
[toxmap.nlm.nih.gov/toxmap/tour/index.html](http://toxmap.nlm.nih.gov/toxmap/tour/index.html)
- ▶ [TOXMAP Brochure](http://toxmap.nlm.nih.gov/toxmap/home/TOXMAP_Brochure.pdf)  
[toxmap.nlm.nih.gov/toxmap/home/TOXMAP\\_Brochure.pdf](http://toxmap.nlm.nih.gov/toxmap/home/TOXMAP_Brochure.pdf)
- ▶ [TOXMAP Fact Sheet](http://nlm.nih.gov/pubs/factsheets/toxmap.html)  
[nlm.nih.gov/pubs/factsheets/toxmap.html](http://nlm.nih.gov/pubs/factsheets/toxmap.html)
- ▶ [Online Tutorial: TOXMAP Basics](http://toxmap.nlm.nih.gov/toxmap/tour/misc/ToxmapBasics.html)  
[toxmap.nlm.nih.gov/toxmap/tour/misc/ToxmapBasics.html](http://toxmap.nlm.nih.gov/toxmap/tour/misc/ToxmapBasics.html)

## Stay Connected



[Subscribe to TOXMAP news feed](http://toxmap.nlm.nih.gov/toxmap/news/atom.xml)  
[toxmap.nlm.nih.gov/toxmap/news/atom.xml](http://toxmap.nlm.nih.gov/toxmap/news/atom.xml)

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## TRI/TOXMAP Decision Tree

**TRI (Toxics Release Inventory)** is the Environmental Protection Agency's (EPA) publicly available database that contains information on toxic chemical releases and waste management activities, and more recently, source reduction and recycling information, reported annually by U.S. industrial and federal facilities beginning with the 1987 reporting year. TRI is accessible via the National Library of Medicine's (NLM) **TOXNET**(TOXicology Data NETwork) databases, which cover toxicology, hazardous chemicals, environmental health and related areas.

**TOXMAP** is a geographic information system from the NLM Division of Specialized Information Services that uses maps of the United States to help users visually explore data from the EPA's TRI and Superfund Program. With TOXMAP, users can create nationwide, regional, or local area maps showing where TRI chemicals are released on-site into the air, water, and ground. Information on the releasing facilities is provided. Maps can also show locations of Superfund sites, with listings of all chemical contaminants present at these sites.

Use this Decision Tree to choose the correct database:

TOXNET/TRI	TOXMAP
You want full-reference, book-style information on TRI facilities or releases	You are interested in a health-related presentation of data
You are using other TOXNET resources	You want to see TRI locations on a map
You want to benefit from chemical synonyms	You are interested only in on-site chemical releases
You would like to use a browse interface	You want to search by combinations of states and/or counties
You want to calculate the total release of chemicals	You are also interested in Superfund sites and/or demographic data
You want multiple sorting options for search results	You want location data from the Federal Registry System (not self-reported locations)

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## TRI/TOXMAP Search Exercises

### Scenario 1 – General Search by State using TRI

Michael, a senior in high school, is writing a report for chemistry class. He has decided to report on methanol, a widely used solvent. Michael would like to include an environmental section in his report and provide some information specific to his state, Mississippi. Michael would like to include information in his report such as: how much methanol was released in Mississippi, where did these release(s) occur, and what type of release(s) occurred.

**Search the Toxics Release Inventory to gather information.**

Suggested Solution:

- Type **methanol** in the Chemical Name or CAS Registry Number Search box
- Type **MS** in the Facility Location Search box
-  Note below the search box that “State” is selected by default.
- Click **Search**
- Click **Calculate Totals!** at the left of the page
-  Information is for the most recently reported year available from EPA.
- Click **TOXNET Home** to prepare for the next search

### Scenario 2 – Mapping TRI and Health Data in TOXMAP

Teresa, an epidemiologist, is familiar with the TRI database. She has learned about TOXMAP and decides to take a look at cancer data for females and chemical releases from 2001 to 2005 for styrene in her home state of New Jersey, excluding Superfund NPL. Monitoring data indicate that populations may be exposed to styrene through inhalation of air polluted by industrial sources, so she wants to limit her search to air releases. Teresa knows current studies do not provide adequate evidence to classify styrene as a human carcinogen.

**Search TOXMAP to examine information.**

Suggested Solution:

- Click **Search**
- Type **styrene** in the Chemical Name Search box
- Click the **Water**, **Land**, and **Underground Injection** checkboxes to deselect them
- Select **2001** and **2005** in the **Release Years** drop-down menus
- Click **Search**
-  Note that this shows releases for all of the U.S. and territories.
- Select the **Set Region** sub-tab

- Click the **Create a new region** link
- Click **New Jersey** in the Region Name text box
-  Note that assigning a region name is optional. However, naming the search makes it easy to identify when saved as a previous search.
- Click **Submit**
- Click **Continue to map**
- Click **Health Data** under Map Other Data on the left side of the page
- Select **All Malignant Cancers - All Races - Female** from the top-most list
- Click **Submit**
- Click **Show legend values** in the legend below the map
- View the map legend to interpret the information
- Click **Start Over** to prepare for the next search

### Scenario 3 – Mapping TRI and Health Data in TOXMAP

**You are a public health professional researching lung cancer. You are interested in all releases of benzene, a known carcinogen, in Texas between 1995 and 2001.**

**Search TOXMAP to examine information.**

Suggested Solution:

- Click **Search**
- Type **benzene** in the Chemical Name search box or select it from the chemical drop-down menu
- Select **1995** and **2001** in the **Release Years** drop-down menus
- Click **Search**
-  Note that this zooms the map to include all search results.
- Select **TX** from the ZOOM TO drop-down menu to the left of the map
- Click **Health Data** under Map Other Data on the left side of the page
- Select **Lung and Bronchus - All Races - Female** from the top-most list
- Click **Submit**
- Click **Show legend values** in the legend below the map
- View the map legend to interpret the information
- Click **Start over** at the top right of the page to prepare for the next search

## Additional Exercises

The following exercises have been designed to be searched in sequence, beginning in TRI and moving to TOXMAP.

 Go to **toxnet.nlm.nih.gov**.

 Click  in the **Select Database** column.

**Exercise 1: Did any facilities in Mississippi release more than 100 pounds of methanol to the air in 2006? Map the releases in TOXMAP and view the environmental release information for the first facility.**

Suggested Solution:

- |        |   |
|--------|---|
| Type   | <b>methanol</b> in the Chemical Name search box   |
| Select | <b>MS</b> in the <u>State Search</u> box  |
| Select | <b>100 lbs</b> from the <u>Greater Than</u> drop-down menu at the bottom of the TRI home page                     |
| Select | <b>Total Air Release</b> from the drop-down menu under <u>Greater Than</u>  |
| Click  | <b>Search</b>   |
| Click  | the first facility link in the list of <b>Facility/Substance</b> names  |
| Click  | <b>Environmental Release of Chemical</b> in the <u>Table of Contents</u>  |
| Review | the information in the right frame  |
| Click  | <b>Map it with TOXMAP</b> (  ) |
| Select | <b>MS</b> from the <u>ZOOM TO</u> drop-down menu at the right of the map  |
| Click  | <b>TRI on-site release details</b> at the right of the map under <u>Map Details</u>                               |
| Click  | the facility name link under <b>Facilities reporting to TRI</b> to the right of the map                           |
| Review | the <b>On-site Release Estimates</b> and <u>All chemicals reported by this facility</u>                           |

**Exercise 2: Link to HSDB to explore the human health effects of methanol.**

Suggested Solution (continued from previous exercise):

- |        |  |
|--------|--|
| Scroll | to the top of the page and find the <b>Chemical Information</b> section to the top left of the map |
| Click  | <b>Human Health Effects</b> under <u>Information about this Chemical</u>                           |
| Review | the information in the HSDB Search Results window  |
| Close  | the HSDB window and return to the TOXMAP results page  |
| Click  | <b>Start over</b> at the top right of the page to prepare for the next search                      |

**Exercise 3: What TRI facility in EPA Region 5 released the most chemicals on site in 2004? What were the top five chemicals released by that facility in 2004?**

Suggested Solution:

- Click **Choose a Region** in the Quick Search box
- Select **EPA Region 5** from the Predefined Region list
- Click **Submit**
- Select **Define Map** sub-tab
- Select **2004** from the Facilities drop-down menu
- Click **Submit**
- Click **TRI Facilities Details** in the Map Details box
- Click the first facility name in the **Facilities Reporting to TRI** list
- View the facility name and the chemicals listed in the chemical summary table
- Click **Start over** at the top right of the page to prepare for the next search

**Exercise 4: How many NPL Final Superfund sites are located in New England?**

Suggested Solution:

- Click **Choose a Region** in the Quick Search box
- Select **New England** from the Predefined Region list
- Click **Submit**
- Click **Superfund** at the top of the page
- Click **NPL Final** sub-tab
- View the search results above the map to see how many NPL Final sites are in this region

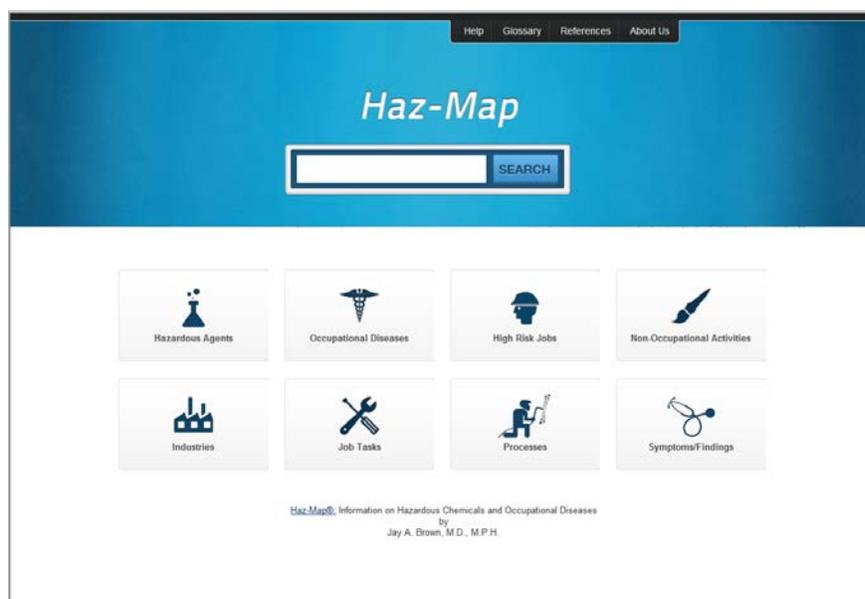
13

**Haz-Map**



## Haz-Map

**Haz-Map** is an occupational health database designed for health and safety professionals and for consumers seeking information about the adverse effects of workplace exposures to chemical and biological agents. The main links in Haz-Map are between chemicals and occupational diseases. Haz-Map shows the diseases linked to each agent and the agents linked to each disease. Agents are chemicals such as formaldehyde, or biological such as grain dust. Haz-Map links jobs and hazardous job tasks with occupational diseases and their symptoms. In Haz-Map, chronic occupational diseases are linked to both jobs and industries, while acute diseases and infectious diseases are linked only to jobs. Cancers are not linked to jobs, industries or findings.



[hazmap.nlm.nih.gov](http://hazmap.nlm.nih.gov)

### Searching Haz-Map

Text words can be searched in all Haz-Map text fields. Search results display in relevancy ranked order. You can also browse alphabetically in each category or by Types of Agents, Adverse Effects, Types of Diseases, Jobs and Symptoms, or Types of Jobs.

### Browse agents by adverse effects

You can search for all agents that have one or more potential adverse effects. Adverse effects in some categories are displayed in a list of radio buttons. For radio buttons, you may select only one option in each group. When checkboxes are used, it means that each agent may have one or more of the listed adverse effects. When radio buttons are used, it means that each agent may have only one of the adverse effects. In the search result page, you can click on the Search Details link to see the conditions that were checked for the search.

## Find diseases by jobs and symptoms

**Search by Jobs:** You can search diseases related to a job by selecting a job from the pull-down menu.

**Search by Symptoms:** You can search diseases from their symptoms by checking the symptoms grouped by organ/tissue systems.

**Search by Jobs and Symptoms:** By selecting both Job and Symptoms, you can find diseases related to both. For example: searching carpenters and cough.

## Additional Resources

For further information, we recommend these additional resources:

- ▶ [Haz-Map Help](http://hazmap.nlm.nih.gov/help)  
**hazmap.nlm.nih.gov/help**
- ▶ [Haz-Map Fact Sheet](http://nlm.nih.gov/pubs/factsheets/hazmap.html)  
**nlm.nih.gov/pubs/factsheets/hazmap.html**

## Haz-Map Search Exercises

### Scenario – Jobs and Agents Associated with Disease

Gloria, an occupational analyst, performs research used to assist in the processing of employee compensation claims for a government agency. Gloria has a list of specific chemicals from various work sites where certain job tasks were performed. She needs to determine if specific conditions/diseases are associated with these chemicals and job tasks. Gloria needs to begin her research by determining if aplastic anemia is associated with aviation mechanics that performed maintenance on fuel tanks.

**Search Haz-Map to identify associations: Browse the High Risk Jobs by type. Select the appropriate job category. Select the appropriate job name. Select the appropriate job task. Browse related information.**

Suggested Solution:

- |        |   |
|--------|---|
| Click  | <b>High Risk Jobs</b>   |
| Click  | <b>By Types of Jobs</b>   |
| Click  | <b>Installation, Maintenance &amp; Repair</b>                               |
| Click  | <b>Aircraft Mechanics &amp; Service Technicians</b>                         |
| Click  | <b>Repair or maintain gasoline or jet fuel tanks</b>                        |
| Review | the job task record and note any chemicals and diseases listed              |
| Click  | <b>aplastic anemia</b> under <u>Diseases associated with this job task:</u> |
| Review | the disease record and note additional information and references           |
| Click  | <b>Home</b> to prepare for the next search                                  |

### Additional Exercises



Got to **toxnet.nlm.nih.gov**.



Click **Haz-Map** in the **Select Database** column.

### Exercise 1: What are some high risk tasks associated with sheet metal workers?

Suggested Solution:

- |        |   |
|--------|---|
| Click  | <b>High Risk Jobs</b>                                   |
| Click  | <b>Alphabetically</b>                                   |
| Select | <b>S</b> from the <u>Select a Letter</u> pull-down menu |
| Click  | <b>Sheet Metal Workers</b>                              |

- Click the high risk job task of your choice under **Related Information in Haz-Map**
- Review the information about this job task
- Click **Home** to prepare for the next search

**Exercise 2: What are some of the agents, diseases, and jobs associated with asthma? Perform a text search.**

Suggested Solution:

- Type **asthma** in the Search box
- Click **Search**
- Click the record of your choice in the **Agents** list
- Click your browser's **back** button to return to the search results page
- Click **Diseases Results** and select the record of your choice
- Click your browser's **back** button to return to the search results page
- Click **Jobs Results** and select the record of your choice

**14**

## **Household Products Database**



## Household Products Database

**Household Products Database** contains links for more than 11,000 consumer brands of household products to health effects from Material Safety Data Sheets (MSDS) provided by the manufacturers.

The screenshot shows the homepage of the Household Products Database. At the top, it features the U.S. Department of Health & Human Services logo and the website URL www.hhs.gov. The main title is "Household Products Database" with the subtitle "Health & Safety Information on Household Products". Below the title are navigation tabs for Home, Products, Manufacturers, Ingredients, and Health Effects. A search bar is located on the left side, with a "Quick Search" section and an "Advanced Search" link. The main content area is divided into a grid of product categories, each with a representative image and a list of products. The categories include Auto Products, Inside the Home, Pesticides, Landscape/Yard, Personal Care, Home Maintenance, Arts & Crafts, Pet Care, and Home Office. A footer note advises calling the local Poison Center at 1-800-222-1222 for advice if someone is poisoned.

[hpd.nlm.nih.gov](http://hpd.nlm.nih.gov)

Household Products Database is designed to help answer the following typical questions:

- ▶ What are the chemical ingredients and their percentage in specific brands?
- ▶ Which products contain specific chemical ingredients?
- ▶ Who manufactures a specific brand? How do I contact this manufacturer?
- ▶ What are the acute and chronic effects of chemical ingredients in a specific brand?

### Searching Household Products Database

The Household Products Database is divided into four categories: **Products**, **Manufacturers**, **Ingredients**, and **Health Effects**. Navigate to a category by clicking the appropriate tab at the top of the page.

Search Household Products by using the **Quick Search** box on the home page or by selecting the **Advanced Search** link for a more detailed search. Clicking the Health Effects tab will bring up the Advanced Search screen with the Health Effects category selected for searching.

Browse Household Products by product category or alphabetically by product names, types of products, manufacturers, or ingredients (see left sidebar).

## Additional Resources

For further information, we recommend these additional resources:

### MSDS Information Resources

- ▶ [SIRI MSDS Archive](http://www.hazard.com/msds)  
**hazard.com/msds**
- ▶ [MSDSprovider: Free Access to Manufacturer-Direct MSDSs](http://www.msdsprovider.com)  
**msdsprovider.com**

### Government Information Resources

- ▶ [OSHA's MSDS Regulation – Hazard Communication 1910.1200](http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=standards&p_id=10099)  
**osha.gov/pls/oshaweb/owadisp.show\_document?p\_table=standards&p\_id=10099**
- ▶ [Read the Label First! Campaign \(EPA\)](http://www.epa.gov/pesticides/regulating/labels/consumer-labeling.htm#read)  
**epa.gov/pesticides/regulating/labels/consumer-labeling.htm#read**
- ▶ [Household Hazardous Waste \(EPA\)](http://www.epa.gov/epawaste/conserves/materials/hhw.htm)  
**epa.gov/epawaste/conserves/materials/hhw.htm**

### From the National Library of Medicine

- ▶ [TOXNET—databases in toxicology and environmental health](http://www.toxnet.nlm.nih.gov)  
**toxnet.nlm.nih.gov**
- ▶ [Tox Town—an interactive guide to commonly encountered toxic substances](http://www.toxtown.nlm.nih.gov)  
**toxtown.nlm.nih.gov**

### Product Recalls

- ▶ [Product Safety and Recall Lists](http://www.hpd.nlm.nih.gov/recalls.htm)  
**hpd.nlm.nih.gov/recalls.htm**

## Household Products Database Search Exercises

### Scenario – Browse by Category

Cassie, an avid home gardener, adopted a puppy to enjoy with her grandchildren. She is concerned about a weed killer product she uses in spring and fall since the children and puppy will be playing in the yard. She uses a popular brand of extended residual fertilizer with weed control. Are there health effects Cassie should be aware of?

**Browse the Household Products Database to find information: Select the appropriate product category. Select the appropriate Landscape/Yard product category. Select the appropriate type of product. Select the appropriate product.**

Suggested Solution:

- Click **Landscape/Yard** in the left margin or next to the picture on the main page
- Click **Weed Killer**
- Click **preemergent weed killer** under Type
- Click the extended residual product with weed control
- View the **Health Effects** and Handling/Disposal information

### Additional Exercises



Go to **hpd.nlm.nih.gov**.



Click **Household Products** in the **Select Database** column.

**Exercise 1: How can I find information about specific brands of teeth whiteners, including their manufacturing information, ingredients, and health effects?**

Suggested Solution:

- Click **Personal Care**
- Click **Oral Hygiene** in the Personal Care column
- Click **teeth whitener** in the Type column
- Click the **Brand Name** of your choice and review the product information
- Click the **Home** tab to prepare for the next search

### Exercise 2: What household products are associated with cyanosis?

Suggested Solution:

- Click **Health Effects**
- Type **cyanosis** in the Search box
- Click **Search** and view the list of products
- Click a product of your choice and review the information under **Health Effects**
- Click the **Home** tab to prepare for the next search

### Exercise 3: How can I do a quick search to find information on bleach?

Suggested Solution:

- Type **bleach** in the Quick Search box on the left of the home page
- Click **Go**
- Click **Bleach (unspecified)** at the top of the page
- Click **Search TOXNET** in the Chemical Information section to the right of **Toxicity Information** to launch a search in TOXNET
- Click **HSDB** in the results list under Chemical, Toxicological, and Environmental Health Data
- Click record(s) of your choice and review the information
- Close the HSDB window and return to Household Products Database
- Click **Home** to prepare for the next search

### Exercise 4: What auto products contain oleic acid?

Suggested Solution:

- Click **Ingredients**
- Click **O** in the alphabetic list at the top
- Select **Oleic acid** from the list of ingredients
- Click the **brand name** of your choice with Auto products in the **Category** column
- Review the information retrieved

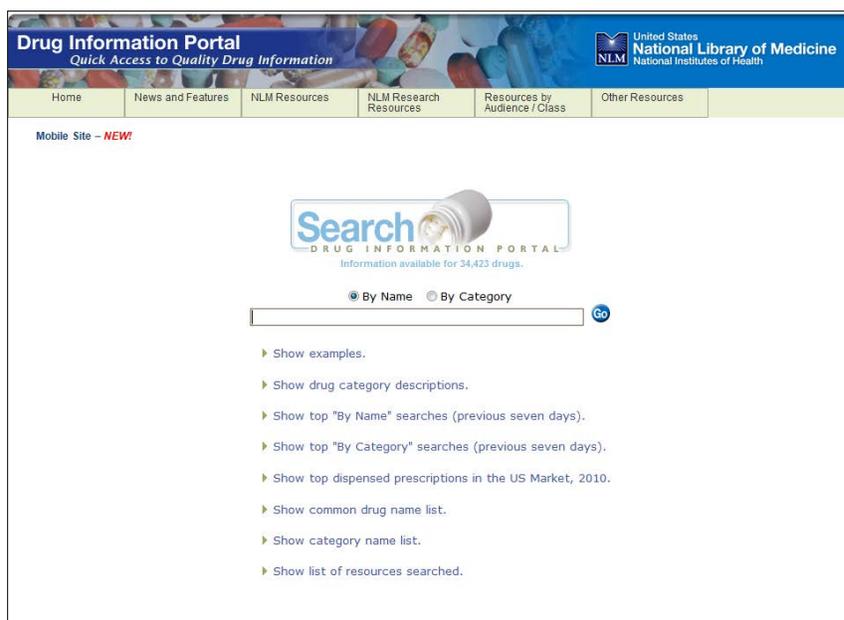
## More to Explore

- ▶ Drug Information Portal
- ▶ Dietary Supplements Labels Database (DSLDD)
- ▶ Tox Town
- ▶ Radiation Emergency Medical Management (REMM)
- ▶ Wireless Information System for Emergency Responders (WISER)
- ▶ Enviro-Health Links



## Drug Information Portal

**Drug Information Portal** provides current information on more than 34,000 selected drugs from their entry into clinical trials through entry into the market place. Information includes consumer health, clinical trials, AIDS-related drug information, MeSH<sup>®</sup> pharmacological actions, PubMed biomedical literature. The Drug Information Portal is also available as a mobile site. Smart Phones accessing the main Drug Portal site will be taken the mobile site.



[druginfo.nlm.nih.gov](http://druginfo.nlm.nih.gov)

Resources include summaries tailored to various audiences, NLM search systems useful in searching for a drug, NLM research resources, resources organized by drug audience and class, and other NIH and government resources such as FDA and CDC. Resources are shown as links at the top of the page. Experimental drugs or untested folk remedies not covered by NIH and government resources are not covered in this portal.

### Searching the Drug Information Portal

Search on a drug's trade name or generic name by entering your search term(s) in the search box on the home page to search many resources simultaneously. A spellchecker provides suggestions for misspelled names. You can find embedded portions of names by using an asterisk (\*) at the beginning and/or end of a search term. Results will include the drug's type and usage as well as links leading to further information. JavaScript must be enabled in your browser for the NLM Drug Information Portal to work properly.

## Additional Resources

For further information, we recommend these additional resources:

- ▶ [Drug Information Portal Mobile site](http://druginfo.nlm.nih.gov/m.drugportal/m.drugportal.jsp)  
**druginfo.nlm.nih.gov/m.drugportal/m.drugportal.jsp**
- ▶ [Drug Information Portal Fact Sheet](http://nlm.nih.gov/pubs/factsheets/druginfoportalfs.html)  
**nlm.nih.gov/pubs/factsheets/druginfoportalfs.html**
- ▶ [MedlinePlus](http://medlineplus.gov)  
**medlineplus.gov**
- ▶ [PubMed](http://pubmed.gov)  
**pubmed.gov**
- ▶ [DailyMed](http://dailymed.nlm.nih.gov/dailymed)  
**dailymed.nlm.nih.gov/dailymed**
- ▶ [AIDSinfo](http://aidsinfo.nih.gov)  
**aidsinfo.nih.gov**
- ▶ [Federal Drug Administration Center for Drug Evaluation and Research](http://www.fda.gov/Drugs/default.html)  
**www.fda.gov/Drugs/default.html**
- ▶ [CDC Drug Service Scientific Resources Program](http://cdc.gov/ncidod/srp/drugs/drug-service.html)  
**cdc.gov/ncidod/srp/drugs/drug-service.html**
- ▶ [U.S. Drug Enforcement Administration Drug Information](http://justice.gov/dea/index.shtml)  
**justice.gov/dea/index.shtml**
- ▶ [USA.gov – Prescription Drugs](http://usa.gov/Citizen/Topics/Health/Prescription_Drugs.shtml)  
**usa.gov/Citizen/Topics/Health/Prescription\_Drugs.shtml**
- ▶ [National Guideline Clearing house](http://guideline.gov)  
**guideline.gov**

## Dietary Supplements Labels Database

The **Dietary Supplements Labels Database** contains information about label ingredients in more than 7,000 selected brands of dietary supplements in the marketplace, including online stores and practitioners, and provides direct links to pertinent health information, fact sheets, research findings and on-going clinical studies at the National Institutes of Health (NIH).

The Dietary Supplements Labels Database offers information about label ingredients in more than 7,000 selected brands of dietary supplements. It enables users to compare label ingredients in different brands. Information is also provided on the "structure/function" claims made by manufacturers. *These claims by manufacturers have not been evaluated by the Food and Drug Administration. Companies may not market as dietary supplements any products that are intended to diagnose, treat, cure or prevent any disease.*

Ingredients of dietary supplements in this database are linked to other National Library of Medicine databases such as [MedlinePlus®](#) and [PubMed®](#) to allow users to understand the characteristics of ingredients and view the results of research pertaining to them, including the following characteristics:

- Uses in humans
- Adverse effects
- Mechanism of action

The Database can be searched by brand names, uses noted on product labels, specific active ingredients, and manufacturers.

[Recalls](#) from the U.S. Food and Drug Administration (FDA) and [enforcement actions](#) from the Federal Trade Commission (FTC) related to specific ingredients and supplement brands have also been provided.

[dietarysupplements.nlm.nih.gov](http://dietarysupplements.nlm.nih.gov)

Features include a glossary, Warnings and Recalls from the U.S. Food and Drug Administration, and links to other NLM databases such as MedlinePlus and PubMed for further information including that on the characteristics of ingredients and the results of research pertaining to them.

### Searching the Dietary Supplements Labels Database

Enter an active ingredient or a manufacturer in the Quick Search box to query the whole database. You can also search or browse brand names, active ingredients, and manufacturers by clicking the appropriate link in the left sidebar.

### Additional Resources

For further information, we recommend these additional resources:

- ▶ [Office of Dietary Supplements  
dietary-supplements.info.nih.gov](http://dietary-supplements.info.nih.gov)
- ▶ [MedlinePlus Herbs and Supplements  
nlm.nih.gov/medlineplus/druginfo/herb\\_All.html](http://nlm.nih.gov/medlineplus/druginfo/herb_All.html)

## Tox Town

**Tox Town** provides an introduction to toxic chemicals and environmental health risks that may be encountered in everyday life, in everyday places. Tox Town allows visitors to tour a Town, City, Farm, Port, US Border, and US Southwest region to identify common environmental hazards. It is a companion to the extensive information in the TOXNET collection of databases that are typically used by toxicologists and health professionals. Tox Town also offers some resources in Spanish has a text version.



[toxtown.nlm.nih.gov](http://toxtown.nlm.nih.gov)

Tox Town is highly interactive, with graphics, animation, and sound to add interest to learning about connections between chemicals, the environment, and the public's health. It is recommended for high school and college students, educators, and the concerned public. This is an excellent resource for health educators who are asked to find easy-to-understand information about environmental toxins in their community.

The Tox Town Web site is designed to give you information on:

- ▶ Everyday locations where you might find toxic chemicals
- ▶ Non-technical descriptions of chemicals
- ▶ Links to selected, authoritative chemical information on the Internet
- ▶ How the environment can impact human health
- ▶ Internet resources on environmental health topics

## Radiation Emergency Medical Management System

**Radiation Emergency Medical Management System (REMM)** provides easy-to-follow algorithms on clinical diagnosis, treatment, and management of radiation contamination and exposure during mass casualty radiological/nuclear emergencies. REMM is primarily for physicians with little to no formal radiation training. REMM also provides information for those who may be involved in responding to a radiation emergency in other capacities. REMM is available for download for multiple types of mobile devices including Microsoft Windows Mobile, Apple iPhone, iPod touch and iPad, Android, and BlackBerry devices.

[remm.nlm.gov](http://remm.nlm.gov)

**REMM** is extensively hyperlinked and interconnected. The hyperlinks are organized in eight content categories. The following are the most commonly used categories and appear across the top of the page beneath the REMM logo.

- ▶ **What Kind of Emergency?**—information relevant to each type of radiation emergency, including radiological dispersal devices, radiological exposure devices, nuclear explosions, nuclear reactor accidents, and transportation accidents
- ▶ **Initial Event Activities**—information regarding activities that should occur as part of an initial response following an emergency, including onsite activities, triage guidelines, and hospital activities
- ▶ **Patient Management**—patient management procedures to assist medical responders following a radiological or nuclear emergency determine whether patients have been exposed contaminated, or both

- ▶ **Management Modifiers**—provides detailed information about radiation + trauma (combined injury), burn triage and treatment, mass casualty, psychological issues and specific populations
- ▶ **Tools & Guidelines**—tools to facilitate quick look-up of information

“Quick Links,” on the right side of most REMM pages, can help you navigate through the portal. Quick Links offers easy access to some of the portal’s most important features and tools, including a link to all of the animations, illustrations, and photos founding REMM.

REMM was produced by the Department of Health and Human Services, Office of the Assistant Secretary for Preparedness and Response, Office of Planning and Emergency Operations, in cooperation with the National Library of Medicine, Division of Specialized Information Services, with subject matter experts from the National Cancer Institute, the Centers for Disease Control and Prevention, and many U.S. and international consultants.

### Additional Resources

For further information, we recommend these additional resources:

- ▶ Sources of Radiological/Nuclear Information  
[remm.nlm.nih.gov/remm\\_SourcesofRadInfo.htm](http://remm.nlm.nih.gov/remm_SourcesofRadInfo.htm)
- ▶ Animated, 13-minute tour of REMM  
[remm.nlm.gov/quicktour/index.htm](http://remm.nlm.gov/quicktour/index.htm)
- ▶ Earn Continuing Medical Education Credits  
<http://www.remm.nlm.gov/training.htm>
- ▶ Download REMM to Your Computer  
[remm.nlm.gov/download.htm](http://remm.nlm.gov/download.htm)
- ▶ Join REMM Listserv  
[remm.nlm.gov/email.htm](http://remm.nlm.gov/email.htm)

## Wireless Information System for Emergency Responders

**Wireless Information System for Emergency Responders (WISER)** is a system designed to assist emergency responders in hazardous material incidents. Developed by the National Library of Medicine (NLM), WISER provides a wide range of information on hazardous substances, including substance identification support, physical characteristics, human health information, and containment and suppression guidance. WISER is available for download on Microsoft Windows PC and Mobile devices, Apple iPhone, iPod touch, and iPad, Android, BlackBerry, Palm OS PDAs and via WebWISER.

The screenshot shows the WISER website homepage. At the top, there is a red banner with the text "Wireless Information System for Emergency Responders" and the WISER logo. To the right of the banner is the NLM logo and the text "United States National Library of Medicine Specialized Information Services". Below the banner is a navigation menu with links for Home, About, News, Download, WebWISER, Help, and Contact Us. The main content area is titled "Welcome to WISER" and includes a sub-header "Wireless Information System for Emergency Responders". The main text describes WISER as a system designed to assist first responders in hazardous material incidents. Below this is a "Latest News" section with three news items. The "Download" section describes the application's availability on various devices. The "WebWISER" section describes the web interface. The "Join the E-mail List" section provides a link to the WISER E-mail List. On the right side, there is a sidebar with "Other Chemical Emergency Resources at NLM" and "Other Chemical Emergency Resources".

[wiser.nlm.nih.gov](http://wiser.nlm.nih.gov)

### Features

- ▶ Mobile support, providing emergency responders with critical information in the palm of their hand
- ▶ Comprehensive decision support, including assistance in identification of an unknown substance and, once the substance is identified, providing guidance on immediate actions necessary to save lives and protect the environment
- ▶ Access to more than 460 substances from NLM Hazardous Substances Data Bank (HSDB)
- ▶ Rapid access to the most important information about a hazardous substance by an intelligent synopsis engine and display called "Key Info"

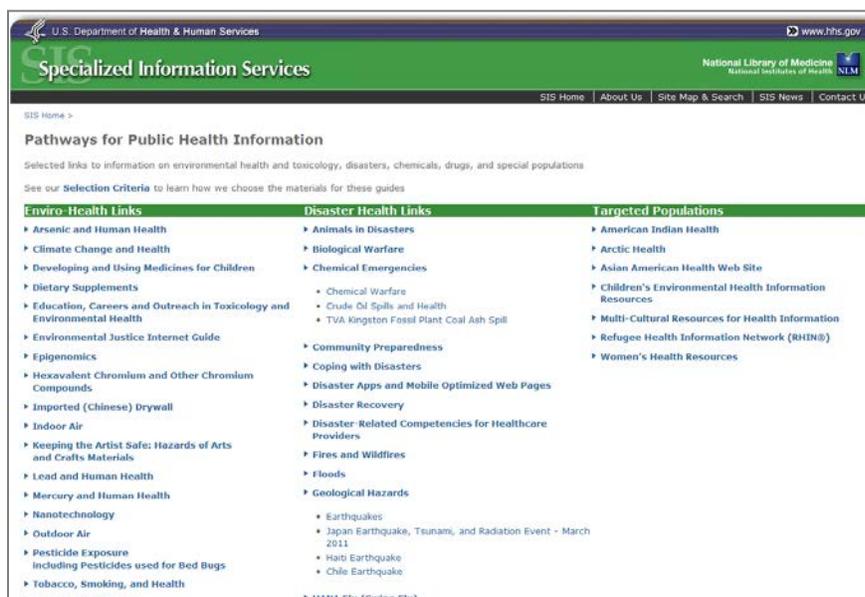
- ▶ Visualization of protective distance zones on an interactive map
- ▶ Radiological support, including radioisotope substance data, tools, and reference materials
- ▶ Biological support, including biological agent data, tools, and reference materials
- ▶ General tools, including an electronic version of the ERG
- ▶ Intuitive, simple, and logical user interface developed by working with experienced emergency responder

### Additional Resources

- ▶ WISER Fact Sheet  
[nlm.nih.gov/pubs/factsheets/wiser.html](http://nlm.nih.gov/pubs/factsheets/wiser.html)
- ▶ WISER Training Resources  
[wiser.nlm.nih.gov/training.html](http://wiser.nlm.nih.gov/training.html)
- ▶ WISER updates and news  
[wiser.nlm.nih.gov/listserv\\_join.html](http://wiser.nlm.nih.gov/listserv_join.html)
- ▶ Department of Transportation –Emergency Response Guidebook (DOT –ERG)  
[phmsa.dot.gov/hazmat/library/erg](http://phmsa.dot.gov/hazmat/library/erg)

## Enviro-Health Links

**Enviro-Health Links**, available from the NLM Environmental Health and Toxicology Portal, is a list of links to Internet resources on toxicology and environmental health issues of recent special interest. All resources are evaluated and selected according to specific criteria.



[sis.nlm.nih.gov/pathway.html](http://sis.nlm.nih.gov/pathway.html)

Links to information of special interest include:

- ▶ Arsenic and Human Health
- ▶ Biological Warfare Agents
- ▶ Chemical Emergencies
- ▶ Climate Change and Health
- ▶ Disaster and Emergency Response Tools
- ▶ Disaster Recovery
- ▶ Fires and Wild Fires
- ▶ Geological Hazards
- ▶ Health Effects from the Collapse of the World Trade Center
- ▶ H1N1 (Swine Flu)
- ▶ Indoor Air
- ▶ Japan Disaster in 2011
- ▶ Nanotechnology
- ▶ Personal Preparedness
- ▶ Public Health Preparedness for Mass Gatherings
- ▶ Special Populations: Emergency and Disaster Preparedness
- ▶ Toxicogenomics
- ▶ Water Pollution
- ▶ Weather and Storms

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## Additional Resources

- ▶ Disaster Information Management Research Center (DIMRC)
- ▶ Carcinogenic Potency Database (CPDB)
- ▶ Comparative Toxicogenomics Database (CTD)
- ▶ LiverTox



## Disaster Information Management Research Center

The core purpose of the **Disaster Information Management Research Center (DIMRC)** is to develop and provide access to health information resources and technology for disaster preparedness, response, and recovery. The goal of DIMRC is to connect people to quality disaster health information and foster a culture of community resiliency.

[disasterinfo.nlm.nih.gov](http://disasterinfo.nlm.nih.gov)

DIMRC is committed to help prepare for, respond to, recover from, and mitigate the adverse health effects of disasters in conjunction with federal, state, and local governments, organizations, and local communities. To accomplish this, DIMRC is focused on several areas:

- ▶ Maintain access to health information during disasters
- ▶ Develop innovative products and services to serve health professionals and the public
- ▶ Conduct research to support disaster health information management
- ▶ Collaborate with other agencies and communities

## Additional Resources

For further information, we recommend these additional resources:

- ▶ [Archived Videocast of the DIMRC Disaster Information Outreach Symposium](https://videocast.nih.gov/summary.asp?Live=10101)  
**videocast.nih.gov/summary.asp?Live=10101**
- ▶ [DIMRC Fact Sheet](https://nlm.nih.gov/pubs/factsheets/dimrcfs.html)  
**nlm.nih.gov/pubs/factsheets/dimrcfs.html**
- ▶ [Resource Guide for Disaster Medicine and Public Health](https://disasterlit.nlm.nih.gov)  
**disasterlit.nlm.nih.gov**

## Carcinogenic Potency Database

The **Carcinogenic Potency Database (CPDB)**, developed at the University of California, Berkeley, and Lawrence Berkeley Laboratory, provides standardized analyses of the results of 6540 chronic, long-term animal cancer tests (both positive and negative for carcinogenicity) that have been conducted since the 1950's and reported in the general published literature or by the National Cancer Institute and the National Toxicology Program.

The screenshot shows the TOXNET website interface. At the top left is the United States National Library of Medicine (NLM) logo. The main header is 'TOXNET Toxicology Data Network'. Below this is a navigation bar with links for 'TOXNET Mobile Access', 'SIS Home', 'About Us', 'Site Map & Search', and 'Contact Us'. A breadcrumb trail indicates the current location: 'Env. Health & Toxicology > TOXNET > CPDB'. The main content area is titled 'Carcinogenic Potency Database - The Carcinogenic Potency Database, developed at the University of California, Berkeley, and Lawrence Berkeley Laboratory, provides standardized analyses of the results of 6540 chronic, long-term animal cancer tests that have been conducted since the 1950's and reported in the general published literature or by the National Cancer Institute and the National Toxicology Program.' Below this is a 'List of Chemicals' section with a grid of color-coded letters (A-Z) for navigation. A note states: 'Colors are listed under the first letter of the color name (e.g. blue, red) regardless of initials that may precede the color.' A list of chemical names with their CAS numbers is provided, including: A-a-C (CAS 26148-68-5), Acesulfame-K (CAS 55589-62-3), Acetaldehyde (CAS 75-07-0), Acetaldehyde methylformylhydrazone (CAS 16568-02-8), Acetaldoxime (CAS 107-29-9), Acetamide (CAS 60-35-5), Acetaminophen (CAS 103-90-2), Acetohexamide (CAS 968-81-0), Acetone[4-(5-nitro-2-furyl)-2-thiazolyl]hydrazone (CAS 18523-69-8), Acetonitrile (CAS 75-05-8), Acetoxime (CAS 127-06-0), 1'-Acetoxysafrole (CAS 34627-78-6), N'-Acetyl-4-(hydroxymethyl)phenylhydrazine (CAS 65734-38-5), 1-Acetyl-2-isonicotinoylhydrazine (CAS 1078-38-2), 3-Acetyl-6-methyl-2,4-pyridandione (CAS 520-45-6), and 1-Acetyl-2-phenylhydrazine (CAS 114-83-0). On the right side, there are two sidebar sections: 'Env. Health & Toxicology' with a 'VISIT SITE' button, and 'Support Pages' with links to 'Fact Sheet', 'Sample Record', 'CPDB Overview', 'CPDB Methods', and 'TOXNET FAQ'.

[toxnet.nlm.nih.gov](http://toxnet.nlm.nih.gov)

### Searching CPDB

Search by chemical name or fragment, or Chemical Abstracts Service Registry Number. Results include a summary for each sex-species tested, including carcinogenicity, target organs, and carcinogenic potency values. Detailed results from each experiment on that particular chemical are given in a plot format suitable for screen viewing.

### Additional Resources

For further information, we recommend these additional resources:

- ▶ [Carcinogenic Potency Database Fact Sheet  
nlm.nih.gov/pubs/factsheets/cpdbfs.html](http://nlm.nih.gov/pubs/factsheets/cpdbfs.html)

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## Comparative Toxicogenomics Database (CTD)

The **Comparative Toxicogenomics Database (CTD)** elucidates molecular mechanisms by which environmental chemicals affect human disease. CTD is a data file on the National Library of Medicine (NLM) Toxicology Data Network (TOXNET). It contains manually curated data describing cross-species chemical–gene/protein interactions and chemical– and gene–disease relationships. The results provide insight into the molecular mechanisms underlying variable susceptibility and environmentally influenced diseases. These data will also provide insights into complex chemical–gene and protein interaction networks.

The screenshot displays the TOXNET website interface. At the top left is the NLM logo and the text "United States National Library of Medicine". The main header features the "TOXNET Toxicology Data Network" logo. Below the header is a navigation bar with links for "TOXNET Mobile Access", "SIS Home", "About Us", "Site Map & Search", and "Contact Us". The main content area is titled "Comparative Toxicogenomics Database (CTD)™ - elucidates molecular mechanisms by which environmental chemicals affect human disease © 2004-2010 Mount Desert Island Biological Laboratory." Below this title are three main sections: "Select Database", "Search CTD", and "Env. Health & Toxicology".

**Select Database**

- ChemIDplus
- HSDB
- TOXLINE
- CCRIS
- DART
- GENETOX
- IRIS
- ITER
- LactMed
- Multi-Database
- TRI
- Haz-Map
- Household Products
- TOXMAP
- TOXNET Home

**Search CTD**

Search input field: (e.g. Alzheimer's, ABCC6, nickel, 57-83-0)

Buttons: Search, Clear, Help

For chemicals, add synonyms and CAS numbers to search:

Yes  No

Button: Browse the Index

**Env. Health & Toxicology**

Portal to environmental health and toxicology resources

Button: VISIT SITE

**Support Pages**

- ▶ Help
- ▶ Fact Sheet
- ▶ Sample Record
- ▶ TOXNET FAQ

**Additional Resources**

- CPDB
- CTD

[toxnet.nlm.nih.gov](http://toxnet.nlm.nih.gov)

### Searching CTD

In TOXNET, users can search CTD by chemical or other name, diseases, Chemical Abstracts Service Registry Number, genes, GO terms, organisms, pathways, and references. Use truncation (asterisks: \*), Boolean operators (AND, OR, NOT), and index browsing to refine your search results. Users can then be taken via the TOXNET's CTD results to the complete CTD site for further details.

Once in the complete CTD site via TOXNET, users can perform several types of searches, for example:

- ▶ Browse relationships among chemicals, and obtain detailed information about them, including structure, toxicology data and related genes, diseases, pathways and references
- ▶ Browse relationships among diseases, and obtain detailed information about them, including related chemicals, genes, pathways and references
- ▶ Browse search for genes from diverse vertebrates and invertebrates by symbol, synonym, accession ID, organism taxon, chemical, interaction type, disease or Gene Ontology annotation
- ▶ Search for cross-species chemical–gene and protein interactions curated from the published literature. Interactions may be retrieved by chemical, interaction type, gene, organism or Gene Ontology annotation
- ▶ Search for references by gene, organism taxon, chemical, chemical–gene interaction type, disease, citation information or accession ID

Users can also easily conduct their CTD search strategy against other databases, e.g., Hazardous Substances Data Bank, TOXLINE, and ChemIDplus.

### Additional Resources

For further information, we recommend these additional resources:

- ▶ [CTD Resource Guide](http://ctd.mdibl.org/documents/ctd_resource_guide.pdf)  
[ctd.mdibl.org/documents/ctd\\_resource\\_guide.pdf](http://ctd.mdibl.org/documents/ctd_resource_guide.pdf)
- ▶ [Glossary](http://ctd.mdibl.org/help/glossary.jsp)  
[ctd.mdibl.org/help/glossary.jsp](http://ctd.mdibl.org/help/glossary.jsp)
- ▶ [Tutorials](http://ctd.mdibl.org/help/emailListHelp.jsp)  
[ctd.mdibl.org/help/emailListHelp.jsp](http://ctd.mdibl.org/help/emailListHelp.jsp)
- ▶ [CTD – Users Email List](http://ctd.mdibl.org/help/emailListHelp.jsp)  
[ctd.mdibl.org/help/emailListHelp.jsp](http://ctd.mdibl.org/help/emailListHelp.jsp)
- ▶ [Frequently Asked Questions](http://ctd.mdibl.org/help/faq)  
[ctd.mdibl.org/help/faq](http://ctd.mdibl.org/help/faq)

## LiverTox

**LiverTox is a** central repository of up-to-date, accurate, and easily accessed information on the diagnosis, cause, frequency, patterns, and management of liver injury attributable to prescription and nonprescription medications, herbals, and dietary supplements. LiverTox is a joint effort of the Liver Disease Research Branch of the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK) and the Division of Specialized Information Services of the National Library of Medicine (NLM), National Institutes of Health.

United States  
National Library  
of Medicine  
NLM

NIDDK NATIONAL INSTITUTE OF  
DIABETES AND DIGESTIVE  
AND KIDNEY DISEASES

**LiverTox**  
Clinical and Research Information on Drug-Induced Liver Injury

Home NIDDK NLM SIS Home About Us Contact Us Search Enter a drug name

Home  
Introduction  
Clinical Course  
Phenotypes  
Immune Features  
Clinical Outcomes  
Causality  
Severity Grading  
Likelihood Scale  
Classes of Drugs  
Submit a Case Report  
Clinical Alerts/News  
Conference Proceedings  
Information Resources  
Glossary  
Abbreviations

SEARCH THE LIVERTOX DATABASE

Search for a specific medication,  
herbal or supplement:

Search

Browse by first letter of medication,  
herbal or supplement:

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

**LIVERTOX** provides up-to-date, accurate, and easily accessed information on the diagnosis, cause, frequency, patterns, and management of liver injury attributable to prescription and nonprescription medications, herbals and dietary supplements. LIVERTOX also includes a case registry that will enable scientific analysis and better characterization of the clinical patterns of liver injury. The LIVERTOX website provides a comprehensive resource for physicians and their patients, and for clinical academicians and researchers who specialize in idiosyncratic drug induced [hepatotoxicity](#).

LIVERTOX content produced by the NIDDK and NLM is in the public domain and its free use is encouraged. It is requested that any subsequent published use be given appropriate acknowledgement.

For more information about LIVERTOX, see [About Us](#).

**Disclaimer.** Information presented in the LiverTox database is derived from the scientific literature and public databases and reflects professional expertise of the authors. Such information does not represent official policy of the U.S. Government or any agency thereof. The information in LiverTox is not meant as a substitute for FDA approved product labeling and professional judgment in the diagnosis and treatment of drug induced liver injury. The U.S. Government and its individual

[livertox.nih.gov](http://livertox.nih.gov)

### Searching LiverTox

Use the search box at the top of each page to search for a specific prescription and nonprescription medications, herbals and dietary supplements or browse using the alphabetical listing on the homepage

LiverTox has three major components:

- ▶ Introduction and overview of drug induced liver injury
- ▶ Specific drug records that provide concise data on the hepatotoxicity of medications, herbals and dietary supplements
- ▶ Case submission registry that allows users to provide comments about the LiverTox database and submit clinical cases to the LiverTox website and U.S. Food and Drug Administration (FDA)

### Additional Resources

- ▶ [The National Institute of Diabetes and Digestive and Kidney Diseases \(NIDDK\)](http://www2.niddk.nih.gov)  
**[www2.niddk.nih.gov](http://www2.niddk.nih.gov)**

17

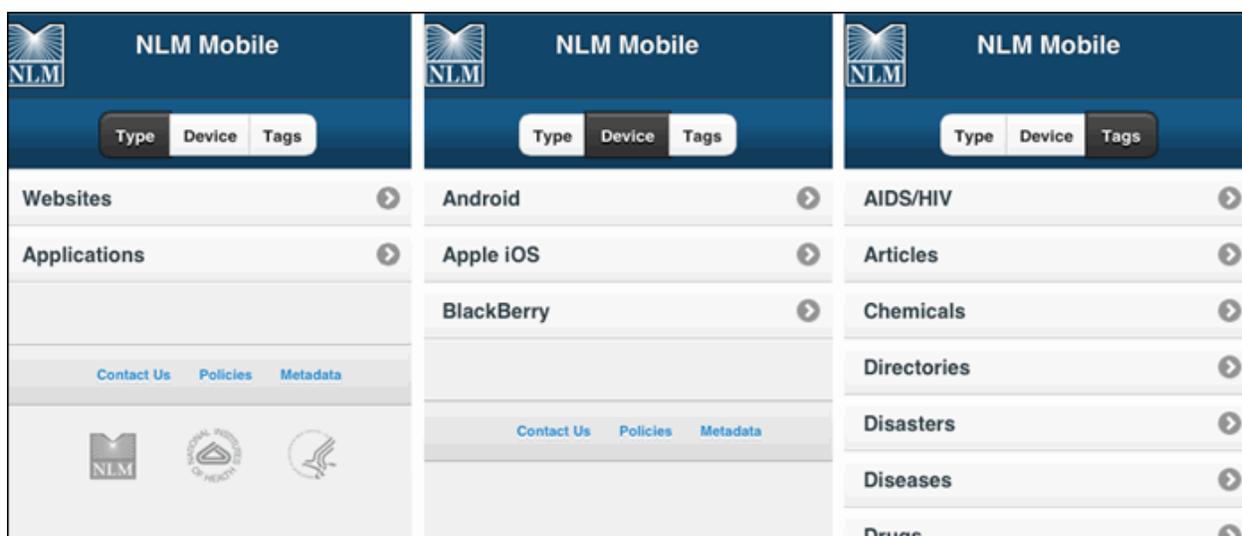
## Mobile Tools



## Mobile Tools

The National Library of Medicine (NLM) offers a mobile app that is intended to serve as the authoritative guide to NLM mobile resources. This app improves your ability to find and use NLM mobile apps and sites. The app was created as an HTML 5 mobile Website in support of the Library's ongoing efforts to make our information broadly available. Support for HTML 5 is available in Web browsers on many mobile devices including, iPhone, iPad, Android smart phone, Blackberry, or Microsoft phone.

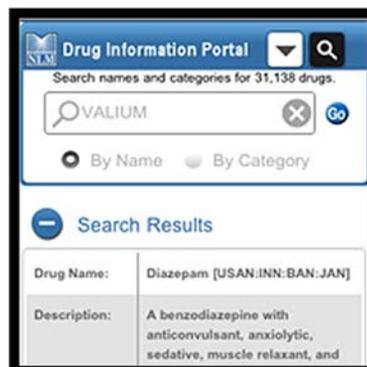
Information on all NLM mobile resources is available through this app.



[nlm.nih.gov/mobile\\_app](http://nlm.nih.gov/mobile_app)

Each mobile resource is represented by an entry which includes:

- ▶ Brief description
- ▶ Descriptive tag(s)
- ▶ Image
- ▶ Link to install App or launch Web site



[nlm.nih.gov/mobile](http://nlm.nih.gov/mobile)

# Environmental Health & Toxicology Portal

## Decision Tree

The National Library of Medicine Environmental Health and Toxicology Portal provides access to many resources. The following chart is a guide to selecting the appropriate resource or database depending on user information needs. Database and resource links can be accessed at: [sis.nlm.nih.gov/enviro.html](http://sis.nlm.nih.gov/enviro.html)

**Use this Decision Tree to choose the correct database or resource:**

<b>FOR THE FOLLOWING TYPE OF INFORMATION:</b>	<b>GO TO:</b>
Journal references to toxicology literature including developmental/reproductive and teratology (birth defects) information	TOXLINE or DART
Summary of peer-reviewed human health effects and emergency medical treatment for chemicals	HSDB
Animal Toxicity Studies	HSDB
Environmental Fate, Exposure, Standards and Regulations	HSDB
Chemical/Physical properties and safety/handling/disposal of chemicals	HSDB
Manufacturing, formulation and use of chemicals	HSDB
Chemical names and synonyms	ChemIDplus or HSDB
Chemical structures and structure searching/drawing capability	ChemIDplus
InChI and/or SMILES structure notations	ChemIDplus
List of links to NLM/NIH and other government agency information for a single chemical	ChemIDplus
Carcinogenicity, mutagenicity, tumor promotion and tumor inhibition data from the National Cancer Institute (NCI)	CCRIS
Peer-reviewed mutagenicity test data from the U.S. Environmental Protection Agency (EPA) including species, type of assay, test result and more	GENE-TOX
Hazard identification and dose-response risk assessment information from the U.S. EPA	IRIS
Cancer and noncancer oral and inhalation risk values and types from government and independent risk information groups worldwide	ITER
Results and analyses of chronic and long-term animal cancer test from NCI, the National Toxicology Program (NTP) and the general published literature	CPDB

<b>FOR THE FOLLOWING TYPE OF INFORMATION:</b>	<b>GO TO:</b>
Drug information related specifically to breastfeeding mothers and their nursing infants including maternal/infant drug levels, possible effects and more	LactMed
Environmental releases of chemicals and waste management activities reported by facilities to the U.S. EPA	TRI
Electronic maps of chemical releases, Superfund sites, health, census, income data and more	TOXMAP
Chemicals, occupations, job tasks, and associated diseases/conditions	Haz-Map
Drug information including names, descriptions, labels, drug categories and links to additional resources	Drug Information Portal
Ingredient, health benefit claims and manufacturer information for dietary supplements with links to research	Dietary Supplements Labels Database
Safety and health information for products used in and around the home	Household Products Database
Material Safety Data Sheets (MSDS) and consumer product recalls	Household Products Database
Health information and research related to natural, accidental or deliberate disasters	DIMRC
PDA and/or online tool about chemicals of concern for first responders, hazmat workers, firefighters and others	WISER
Diagnosis and treatment information for radiological events and emergencies	REMM
Interactive website on toxic chemicals and environmental health concerns in the community	ToxTown
Bibliography on alternatives to animal testing in biomedical research	ALTBIB
Selected links to internet resources on environmental issues of special interest	Enviro-Health Links
Directory of Health Organizations	DIRLINE
Online tutorials on basic toxicology principles and concepts	Toxicology Tutorials
Interactive children's learning site about household chemical hazards	ToxMystery
Information about drug induced liver injury caused by prescription and nonprescription drugs, herbals and dietary supplements	LiverTox
Data explaining molecular mechanisms by which environmental chemicals affect human disease	CTD

# Contacting the National Library of Medicine for Database Assistance

Toll-free: 888.FIND.NLM (346.3656)  
E-mail: [custserv@nlm.nih.gov](mailto:custserv@nlm.nih.gov)  
TOXNET E-mail: [tehip@teh.nlm.nih.gov](mailto:tehip@teh.nlm.nih.gov)

## Online TOXNET Resources

Training Manuals	<a href="http://sis.nlm.nih.gov/enviro/manuals.html">sis.nlm.nih.gov/enviro/manuals.html</a>
Toxicology Tutorials	<a href="http://sis.nlm.nih.gov/enviro/toxtutor.html">sis.nlm.nih.gov/enviro/toxtutor.html</a>
Fact Sheets	<a href="http://sis.nlm.nih.gov/sisfactsheets.html">sis.nlm.nih.gov/sisfactsheets.html</a>
Frequently Asked Questions	<a href="http://sis.nlm.nih.gov/toxnet_faq.html">sis.nlm.nih.gov/toxnet_faq.html</a>
See also Help and FAQ links on each database home page.	

## National Network of Libraries of Medicine

Toll-free number for all Regional Medical Libraries: 800.338.7657  
Monday-Friday 8:30 a.m. – 5:00 p.m. in all time zones

Web site: [nmlm.gov](http://nmlm.gov)

## National Training Center

Toll-free number: 800.338.7657, press 2

Web site: [nmlm.gov/ntcc](http://nmlm.gov/ntcc)