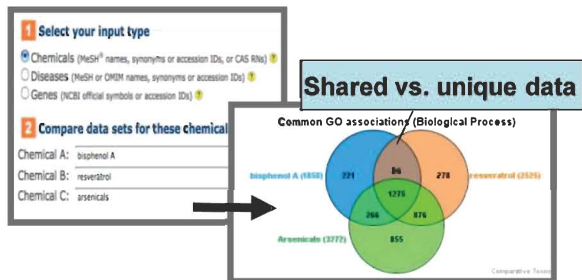


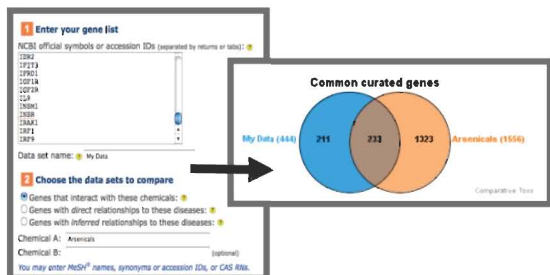
Tools

Analyze Results

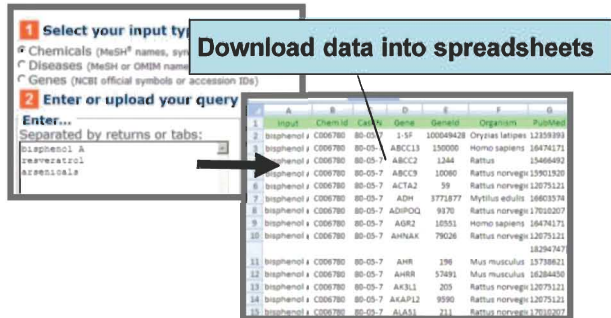
VennViewer compares customized data sets (Example: GO annotations shared by bisphenol A, resveratrol, and arsenicals)



MyGeneVenn compares *your* gene list with CTD data (Example: custom gene list and arsenicals)



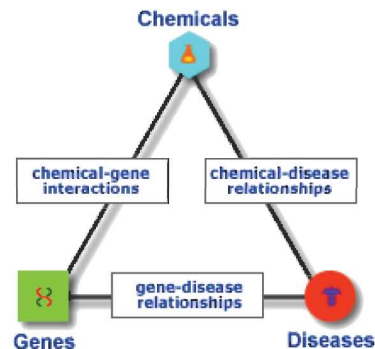
Batch Query retrieves data based on input type, query terms, and results (Example: chemical-gene interactions involving bisphenol A, resveratrol or arsenicals)



Resources

Access Information

CTD is a public research tool that advances understanding of the effects of chemicals on human health



CTD curates scientific literature for

- chemical-gene interactions
- chemical-disease associations
- gene-disease associations

CTD data are integrated with external chemical, gene, disease and pathway resources

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Nucleic Acids Res. 2009;37:D786-92



Comparative Toxicogenomics Database

2010

<http://ctd.mdibl.org>

Chemicals

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Tools

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Chemicals

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Chemical Pages

Chemical: resveratrol

MeSH ID: C039514

Top Interacting Genes:

Gene	Interactions
THF	75
MAPK1	65
MAPK3	60
TP53	55
Akt1	50
PTGS2	45
CASP2	40
ESR1	35
IL1B	30
CYP1A1	25

Chemical data tabs link to

- Basic chemical information
- Interacting genes
- Chemical-gene interactions
- Comparable chemicals
- Disease associations
- Molecular pathways
- References
- External Databases

ChemComps compares chemicals with similar gene interaction profiles

Chemical: bisphenol A

The following chemicals have comparable sets of interacting genes to bisphenol A.

Similarity Index	Chemical	Common Interacting Genes
0.371	Polychlorinated Biphenyls	188
0.291	Genistein	317
0.180	Estradiol	
0.138	nonylphenol	
0.104	tetrachlorodibenzo-dioxin	
0.101	Diethylstilbestrol	
0.097	4-nonylphenol	114
0.097	Progesterone	49
0.093	sodium arsenite	156
0.093	deoxycubidine	119
0.090	resveratrol	111
0.088	Desamethasone	89
0.087	Raloxifene	71
0.087	Raloxifene	83
0.084	fulvestrant	55
0.083	Cadmium Chloride	59

Genes

Investigate Proteins

Search CTD for chemicals, genes, or diseases by keyword or advanced queries

Search by Keyword

Search **Genes** for

Gene Pages

Gene: HMOX1

Top Interacting Chemicals:

Chemical	Interactions
Sodium arsenite	45
Curcumin	40
Carbon Tetrachloride	35
Heme	30
Cadmium	25
3,3',4,4'-Tetrahydroxy stilbene	20
Hydroxytyrosine	15
Acetone	10
Cadmium Chloride	5
Paracetamol	5

Link to Entrez gene sequences

Gene data tabs link to

- Basic gene information
- Interacting chemicals
- Chemical-gene interactions
- Comparable genes
- Disease associations
- Molecular pathways
- References
- Gene Ontology annotations
- External databases

Interactions tab details curated gene-chemical associations

Gene: HMOX1

Interacting Chemical	Organism	Interaction	Reference
1,2-bis(2-aminophenoxy)ethane	Bos taurus	1,2-bis(2-aminophenoxy)ethane N,N,N',N'-tetraacetic acid acetoxyethyl ester does not affect the reaction [3,3',4,5'-tetrahydroxy stilbene results in increased expression of HMOX1 protein]	Wang BS, et al (2006)
1,3-dimethylthiourea	Mus musculus	1,3-dimethylthiourea inhibits the reaction [Cisplatin results in increased expression of HMOX1 mRNA]	Ramesh G, et al (2005)
1,3-dimethylthiourea	Rattus norvegicus	1,3-dimethylthiourea inhibits the reaction [Phencyclidine results in increased expression of HMOX1 protein]	Rajdev S, et al (1998)

Link to references

Diseases

Discover Associations

Chemical-Disease Associations

Disease: Asthma

Chemical	Disease	Drug	CTD Interaction	References
1. Dexamethasone	Asthma	via 22 genes: ADRB1, ADRB2, ADRB3, ADRB4, CAT, COL11, COL2, GATA1, GATA2, HMOX1, IL1B, IL13, IL15, IL17, IL18, IL2, IL21, IL22, IL23, IL24, IL25, IL26, IL27, IL28, IL29, IL30, IL31, IL32, IL33, IL34, IL35, IL36, IL37, IL38, IL39, IL40, IL41, IL42, IL43, IL44, IL45, IL46, IL47, IL48, IL49, IL50, IL51, IL52, IL53, IL54, IL55, IL56, IL57, IL58, IL59, IL60, IL61, IL62, IL63, IL64, IL65, IL66, IL67, IL68, IL69, IL70, IL71, IL72, IL73, IL74, IL75, IL76, IL77, IL78, IL79, IL80, IL81, IL82, IL83, IL84, IL85, IL86, IL87, IL88, IL89, IL90, IL91, IL92, IL93, IL94, IL95, IL96, IL97, IL98, IL99, IL100, IL101, IL102, IL103, IL104, IL105, IL106, IL107, IL108, IL109, IL110, IL111, IL112, IL113, IL114, IL115, IL116, IL117, IL118, IL119, IL120, IL121, IL122, IL123, IL124, IL125, IL126, IL127, IL128, IL129, IL130, IL131, IL132, IL133, IL134, IL135, IL136, IL137, IL138, IL139, IL140, IL141, IL142, IL143, IL144, IL145, IL146, IL147, IL148, IL149, IL150, IL151, IL152, IL153, IL154, 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