Symyx®

Searching for Bioactivity Data using DiscoveryGate

DiscoveryGate®
Exercise Guide

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Exercise Guide

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Exercise descriptions

The following descriptions explain the goal of each exercise. If you like to figure things out on your own, use the descriptions to conduct the exercises. If you prefer step-by-step instructions, go to the page listed below the description.

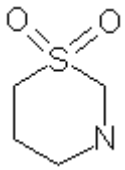
Exercise 1

Search for transformations in the Metabolite Database that have chloramphenicol as the parent compound. View the transformation, parent, and metabolite data. View the toxicity data if available.

For a step-by-step solution, see page 1-2.

Exercise 2

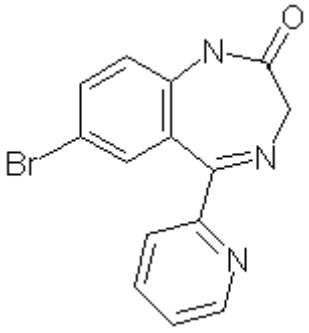
Search the Metabolite Database for transformations in which the following thiazane structure is contained in the substrate. Create a report of the search results.



For a step-by-step solution, see page 1-8.

Exercise 3

Search the CrossFire Beilstein database to retrieve pharmacological data for bromazepam.



For a step-by-step solution, see page 1-15.

Exercise 1

Search for Chloramphenicol as Parent

Search the MDL Metabolite Database for transformations that have chloramphenicol as the parent compound.

Launch the MDL Database Browser

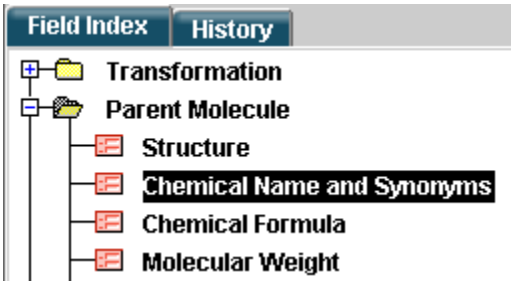
1. From the DiscoveryGate home page, click **Search Databases**.

Choose the MDL Metabolite Database

2. Choose **MDL Metabolite Database** from the Database list. If the default query form does not contain the field to search for Chemical Name, you need to add the field to the form.

Add the Chemical Name field to the query form

3. In the Field Index, open the **Parent Molecule** folder. Double-click the **Chemical Name and Synonyms** field.



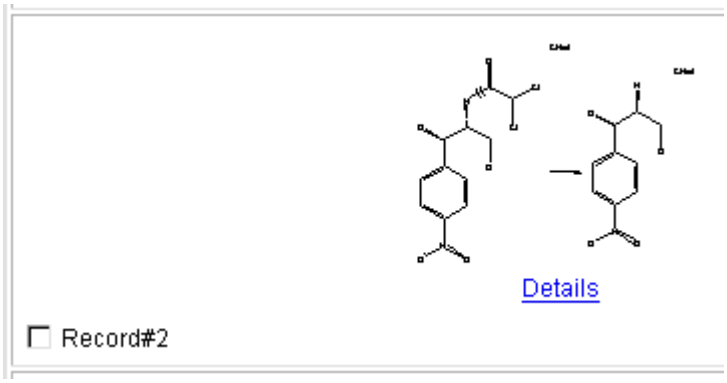
Enter the query

4. Enter **chloramphenicol** into the text box.

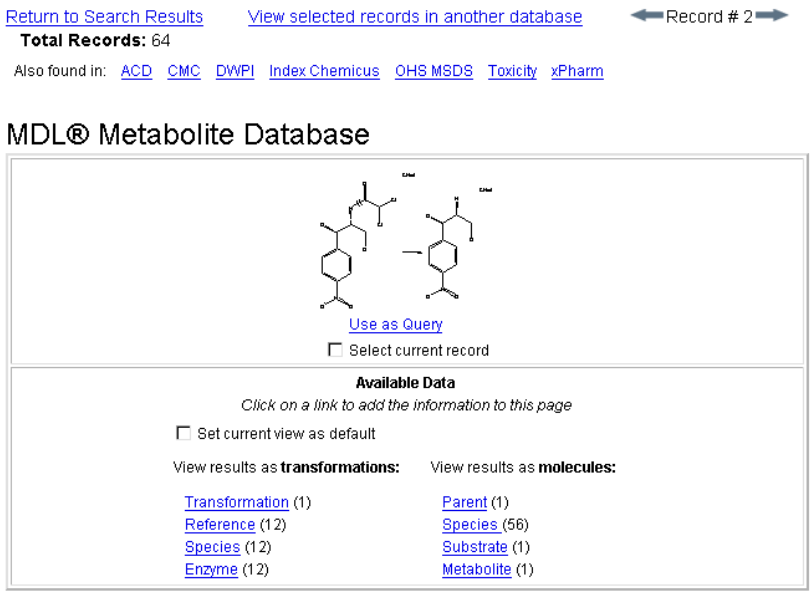
5. Click **start search**.

View the details for a transformation

6. Click the **Details** link for one of the transformations retrieved. For example:



The details for the transformation are displayed.



View the references for the transformation

7. Click the **Reference** link for transformation results. In this example, 12 references are available:

View results as **transformations:**

Transformation (1)
Reference (12)
Species (12)
Enzyme (12)

The references are added to the bottom of the page.

Transformation Results -- References (hide)

Reference Full Citation 1 of 12	
Cravedi, J. P.; Perdu-Durand, E.; Baradat, M.; Alary, J.; Debrauwer, L.; Bories, G.; Chem Res Toxicol [CRTOEC] 1995, 8 (5), 642.	
Title	Chloramphenicol Oxamylethanolamine as an End Product of Chloramphenicol Metabolism in Rat and Humans: Evidence for the Formation of a Phospholipid Adduct
Analytical Data for Current Reference	(3)H , HPLC , MS , Scintillation Counter
Reactant Grade	
Product Grade	
Comments	

Reference Full Citation 2 of 12	
Cravedi, J. P.; Baradat, M.; Debrauwer, L.; Alary, J.; Tulliez, J.; Bories, G.; Drug Metab Dispos [DMDSAI] 1994, 22 (4), 578.	
Title	Evidence For New Metabolic Pathways of Chloramphenicol in The Duck
Analytical Data for Current Reference	HPLC , MS , TLC
Reactant Grade	
Product Grade	
Comments	

8. Scroll back to the top of the page, or click **Top of Page**.

Display the parent molecule data

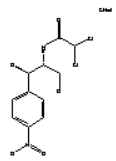
9. Click the **Parent** link for molecule results.

View results as **molecules:**

Parent (1)
Species (56)
Substrate (1)
Metabolite (1)

Molecule data for the Parent is added to the display.

Molecule Results -- Parent (hide)



Use As Query

CAS Number	Salt Form
56- 75- 7	None
Molecular Formula	C11 H12 Cl2 N2 O5
Molecular Weight	323.131
Use	1. Veterinary Agent 2. Veterinary Antibiotic
Scheme	MTB697

Chemical Name and Synonyms :

- Chloramphenicol
- D-(-)-threo-2-(Dichloroacetamido)-1-(p-nitrophenyl)-1,3-propanediol
- (R-(R*,R*))-2,2-Dichloro-N-(2-hydroxy-1-(hydroxymethyl)-2-(4-nitrophenyl)ethyl)acetamide
- (1R,2R)-1-(p-Nitrophenyl)-2-(2,2-dichloroacetamido)-1,3-propanediol
- D-threo-Chloramphenicol

Activity :

Antibacterial , Antibiotic , Antirickettsial , Toxic

Compound Class :

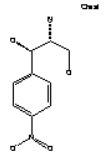
Alcohol , Aliphatic alcohol , Aliphatic amide , Aliphatic carboxylic acid amide , Aromatic nitro compound , Carboxamide , Halogen compound

Molecule References (56)

Display the metabolite molecule data

10. Return to the top of the page, and then click the Metabolite link for molecule results.

Molecule Results -- Metabolite (hide)



Use As Query

CAS Number	Salt Form
Molecular Formula	C9 H12 N2 O4
Molecular Weight	212.204
Use	
Scheme	MTB697

Chemical Name and Synonyms :

Activity :

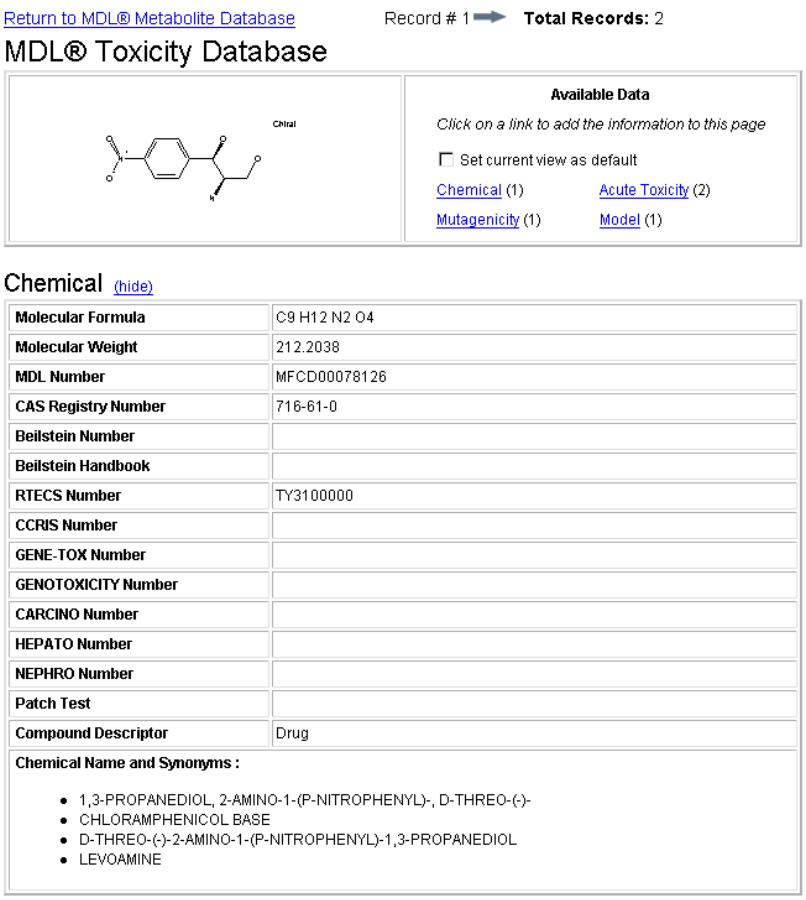
Compound Class :

View the toxicity data

11. Return to the top of the page. Click the **Toxicity** link for "Also found in".

Also found in: ACD CMC DWPI Index Chemicus OHS MSDS Toxicity xPharm

In this example, two records are retrieved from the MDL Toxicity Database. The first record is for the metabolite.



Return to MDL® Metabolite Database Record # 1 → **Total Records:** 2

MDL® Toxicity Database

Chiral

Available Data

Click on a link to add the information to this page

☐ Set current view as default

Chemical (1) Acute Toxicity (2)

Mutagenicity (1) Model (1)

Chemical (hide)

Molecular Formula	C9 H12 N2 O4
Molecular Weight	212.2038
MDL Number	MFCD00078126
CAS Registry Number	716-61-0
Beilstein Number	
Beilstein Handbook	
RTECS Number	TY3100000
CCRIS Number	
GENE-TOX Number	
GENOTOXICITY Number	
CARCINO Number	
HEPATO Number	
NEPHRO Number	
Patch Test	
Compound Descriptor	Drug

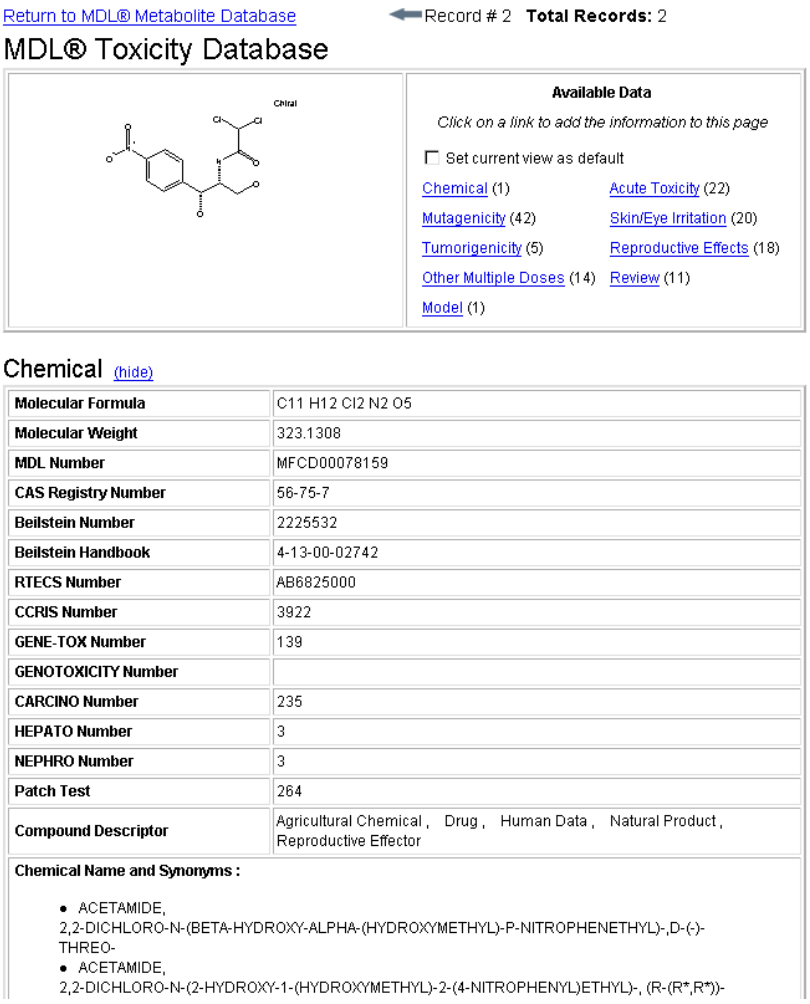
Chemical Name and Synonyms :

- 1,3-PROPANEDIOL, 2-AMINO-1-(P-NITROPHENYL)-, D-THREO-(-)-
- CHLORAMPHENICOL BASE
- D-THREO-(-)-2-AMINO-1-(P-NITROPHENYL)-1,3-PROPANEDIOL
- LEVOAMINE

12. Click the right arrow to view the second Toxicity record. This data pertains to the parent molecule.

Return to the MDL Metabolite Database

13. Click **Return to MDL Metabolite Database**.



Return to MDL® Metabolite Database Record # 2 **Total Records:** 2

MDL® Toxicity Database

Chiral

Available Data

Click on a link to add the information to this page

Set current view as default

Chemical (1) Acute Toxicity (22)
Mutagenicity (42) Skin/Eye Irritation (20)
Tumorigenicity (5) Reproductive Effects (18)
Other Multiple Doses (14) Review (11)
Model (1)

Chemical (hide)

Molecular Formula	C11 H12 Cl2 N2 O5
Molecular Weight	323.1308
MDL Number	MFCD00078159
CAS Registry Number	56-75-7
Beilstein Number	2225532
Beilstein Handbook	4-13-00-02742
RTECS Number	AB6825000
CCRIS Number	3922
GENE-TOX Number	139
GENOTOXICITY Number	
CARCINO Number	235
HEPATO Number	3
NEPHRO Number	3
Patch Test	264
Compound Descriptor	Agricultural Chemical , Drug , Human Data , Natural Product , Reproductive Effector

Chemical Name and Synonyms :

- ACETAMIDE, 2,2-DICHLORO-N-(BETA-HYDROXY-ALPHA-(HYDROXYMETHYL)-P-NITROPHENETHYL)-,D-(-)-THREO-
- ACETAMIDE, 2,2-DICHLORO-N-(2-HYDROXY-1-(HYDROXYMETHYL)-2-(4-NITROPHENYL)ETHYL)-, (R-(R*,R*))-

Search for Thiazane substructure as Substrate

Exercise 2

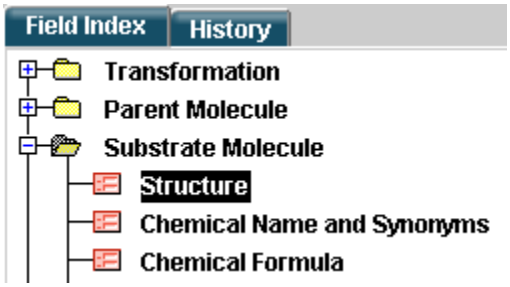
Search the MDL Metabolite Database for transformations in which a particular thiazane structure is contained in the substrate. Create a report of the search results.

1. Click the **queries** tab.

2. Click **clear form** from the top menu bar. Click **OK** at the confirmation prompt.

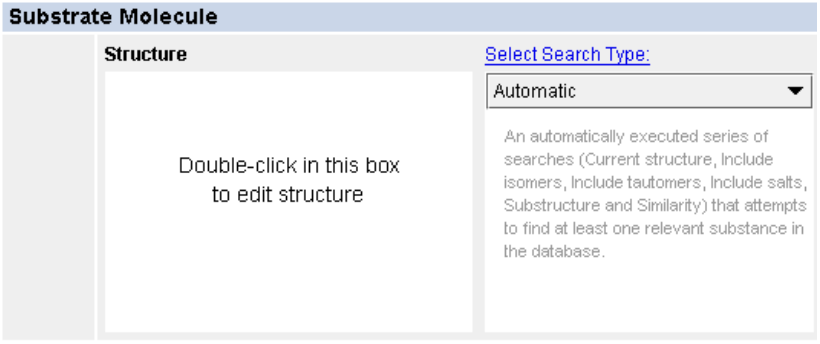
Add the Substrate structure field to the query form

3. In the Field Index, open the **Substrate Molecule** folder. Double-click the **Structure** field.

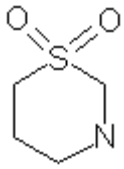


Draw the structure query

4. Double-click the **Structure** box to launch MDL Draw.

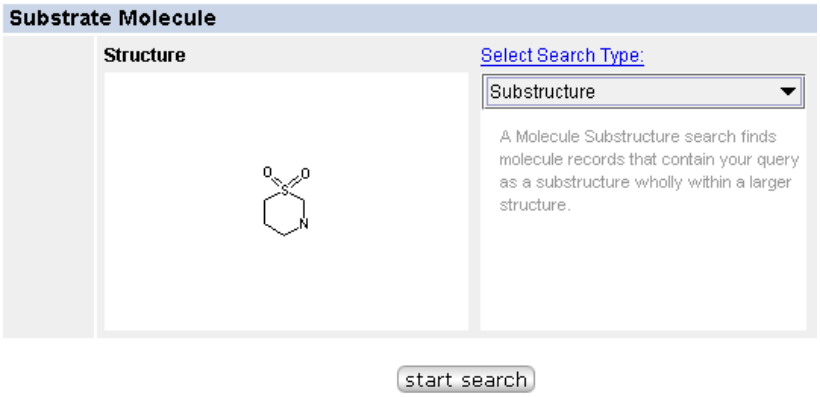


5. Draw the thiazane structure.



6. Click **Done**.

7. Choose **Substructure** as the search type.

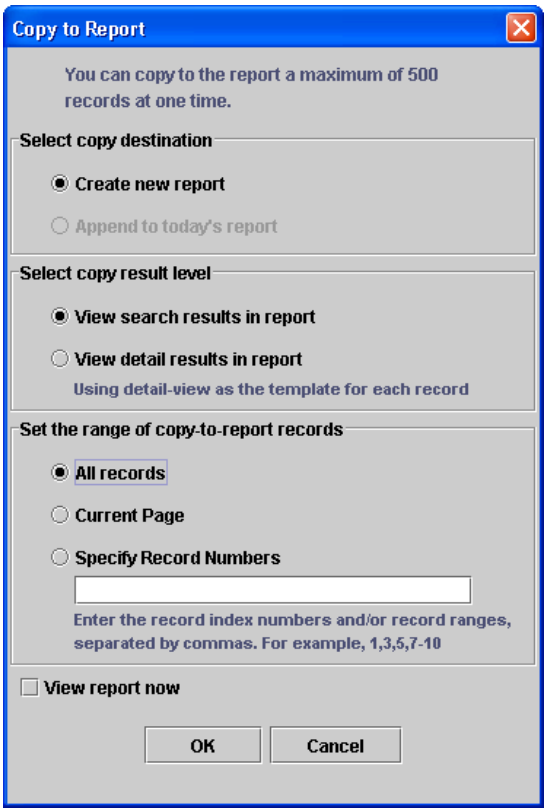


Conduct the search

8. Click **start search**.

Create a report

9. When the search is complete, click **copy to report** on the top menu bar. Select **All records**.

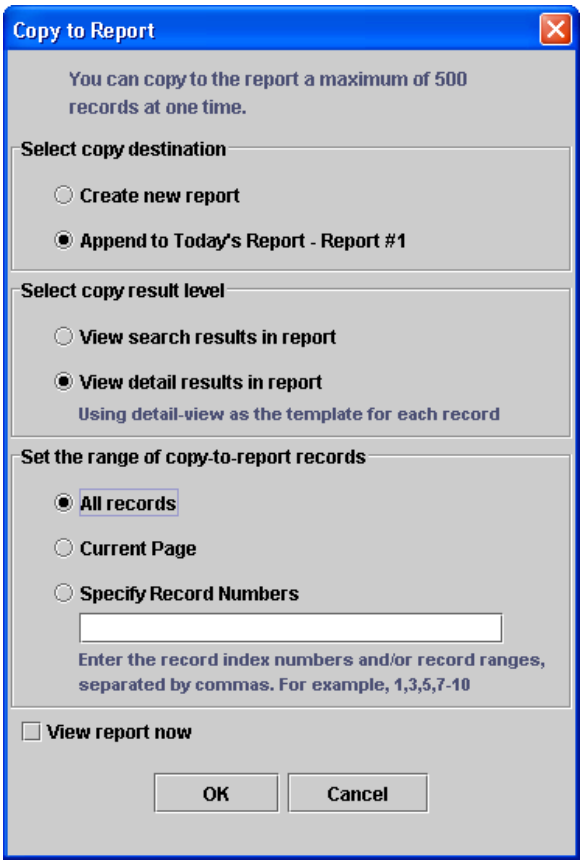


10. Click **OK**. The table of transformation schemes is copied to Today's Report.

Append details to the report

11. Click **Details** for one of the transformations.

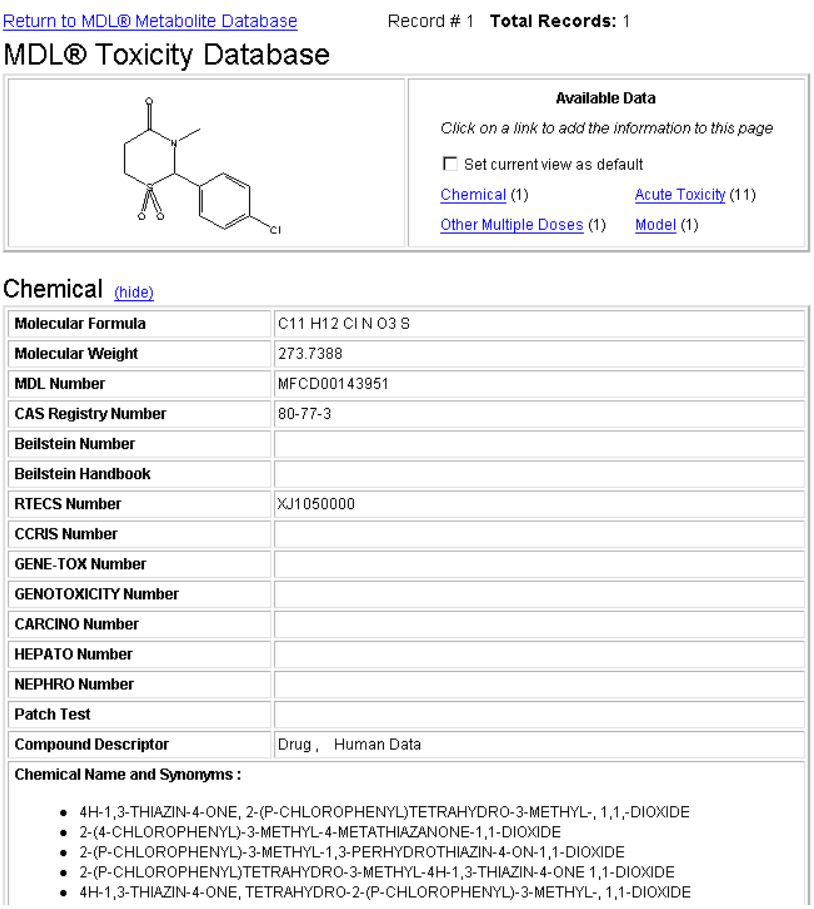
12. Click **copy to report**. Select **All records**.



13. Click **OK**. The detail pages for all of the transformations will be appended to Today's Report.

Append toxicity data to the report

14. If present, click the **Toxicity** link for the current transformation. In this example, one record is retrieved from the **MDL Toxicity Database**.



Return to MDL® Metabolite Database Record # 1 **Total Records:** 1

MDL® Toxicity Database

Available Data

Click on a link to add the information to this page

☐ Set current view as default

Chemical (1) Acute Toxicity (11)

Other Multiple Doses (1) Model (1)

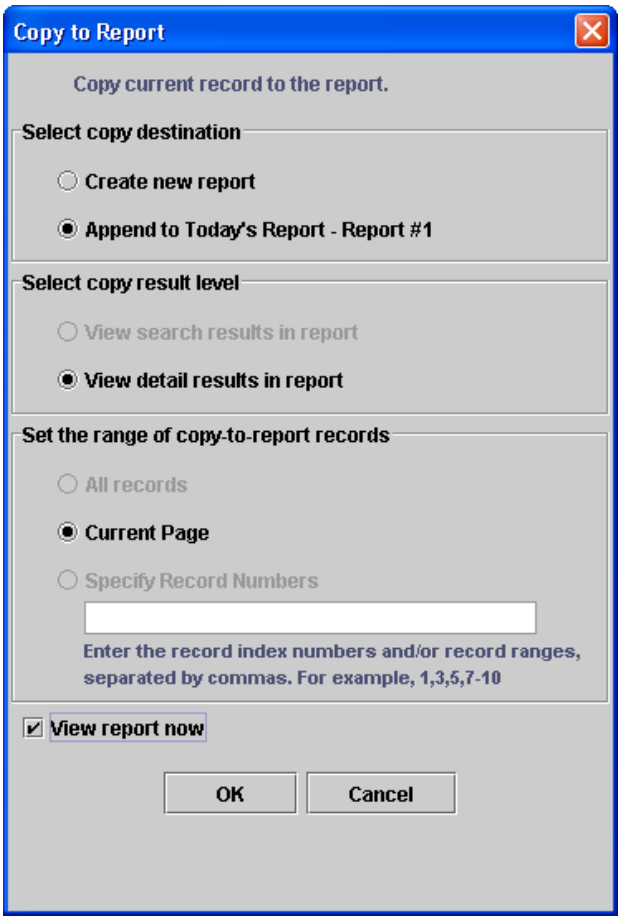
Chemical (hide)

Molecular Formula	C11 H12 Cl N O3 S
Molecular Weight	273.7388
MDL Number	MFCD00143951
CAS Registry Number	80-77-3
Beilstein Number	
Beilstein Handbook	
RTECS Number	XJ1050000
CCRIS Number	
GENE-TOX Number	
GENOTOXICITY Number	
CARCINO Number	
HEPATO Number	
NEPHRO Number	
Patch Test	
Compound Descriptor	Drug , Human Data

Chemical Name and Synonyms :

- 4H-1,3-THIAZIN-4-ONE, 2-(P-CHLOROPHENYL)TETRAHYDRO-3-METHYL-, 1,1,-DIOXIDE
- 2-(4-CHLOROPHENYL)-3-METHYL-4-METATHIAZANONE-1,1-DIOXIDE
- 2-(P-CHLOROPHENYL)-3-METHYL-1,3-PERHYDROTHIAZIN-4-ON-1,1-DIOXIDE
- 2-(P-CHLOROPHENYL)TETRAHYDRO-3-METHYL-4H-1,3-THIAZIN-4-ONE 1,1-DIOXIDE
- 4H-1,3-THIAZIN-4-ONE, TETRAHYDRO-2-(P-CHLOROPHENYL)-3-METHYL-, 1,1-DIOXIDE

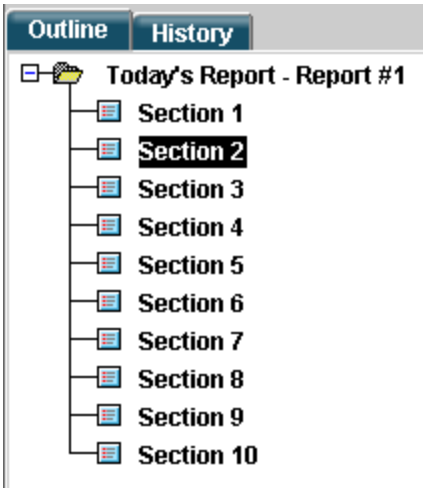
15. Click **copy to report**. Check the box for **View report now**.



16. Click **OK**. The toxicity data for the single compound is appended to Today's Report, and you are taken immediately to the Reports page to view it.

View the report

17. Scroll the report to view it, or to jump to a specific section, click the section name in the Outline pane.



18. Click the **results** tab to return to the Results page.

Return to the MDL Metabolite Database

19. Click **Return to MDL Metabolite Database**.

20. Click **Return to Search Results**.

Retrieve pharmacological data for Bromazepam

Exercise 3

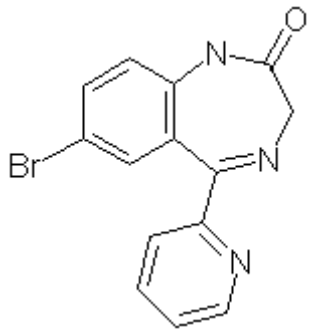
Search the CrossFire Beilstein database using the bromazepam structure.

Open the CrossFire Beilstein database

1. Click the **queries** tab.
2. Choose **CrossFire Beilstein** from the Database list.
3. Click the **Reset** link located to the right of the structure box.

Draw the structure query

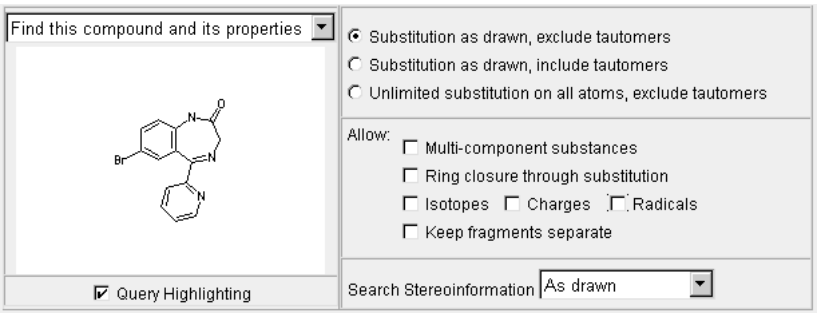
4. Double-click the **Structure** box to launch MDL Draw.
5. Draw bromazepam.



6. Click **Done**.

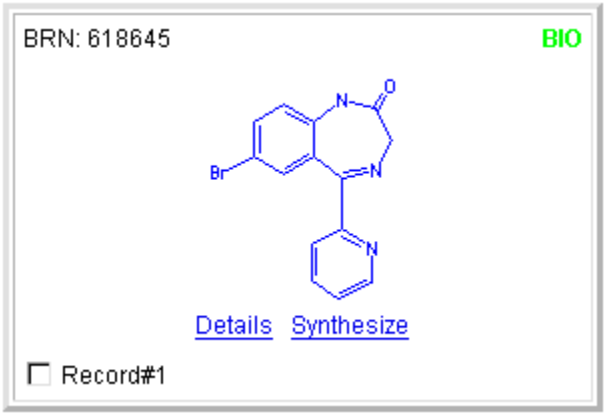
Set the structure search options

7. Select **Substitution as drawn, exclude tautomers**. Uncheck all of the boxes under Allow.



Conduct the search

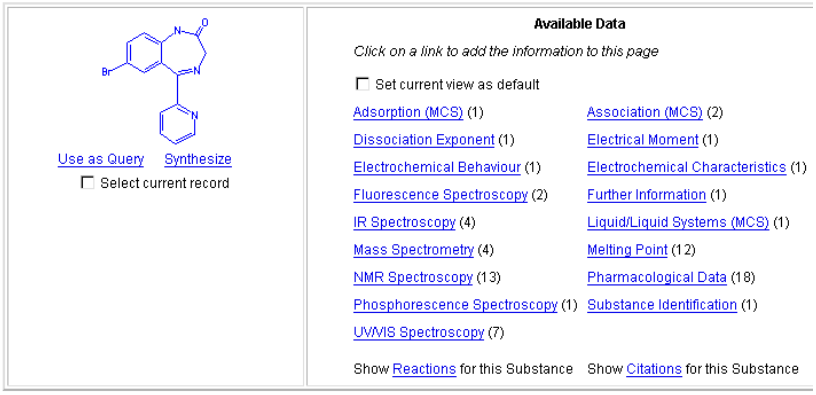
8. Click **start search**. One compound is retrieved. The green BIO label indicates that biological data is available.



View the pharmacological data

9. Click **Details**.

CrossFire Beilstein Substance 618645



Substance Identification (hide)

Substance Identification record 1 of 1	
Beilstein Registry Number	618645
Beilstein Preferred RN	1812-30-2
CAS Registry Number	1812-30-2
Chemical Name	• 7-bromo-5-pyridin-2-yl-1,3-dihydro-benzo[e][1,4]diazepin-2-one • bromazepam
Autoname	7-bromo-5-pyridin-2-yl-1,3-dihydro-benzo[e][1,4]diazepin-2-one
Fragment Molecular Formula	Molecular Weight: 316.16
Molecular Formula	C14H10BrN3O
Lawson Number	30122
Type of Substance	heterocyclic
Constitution ID	607173
Tautomer ID	646319
Beilstein Reference	5-26-05-00078, 6-26
Entry Date	1988/11/28
Update Date	2005/01/21

10. Click the link for **Pharmacological Data**.

Pharmacological Data (hide)

Pharmacological Data record 1 of 18	
Citation Pointer	6431906
Pharmacological Data Citations	• Journal; Usami, Noriyuki; Yamamoto, Tomohiro; Shintani, Syunichi; Higaki, Yu; Ishikura, Shuhei; Katagiri, Yoshihiro; Hara, Akira; BPBLEO; Biol. Pharm. Bull.; EN; 25; 4; 2002; 441 - 445;
Effect	enzyme; inhib. of
Species or Test-System	human 3α-hydroxysteroid dehydrogenase AKR1C3 isoenzyme
Kind of Dosing	title comp. was dissolved in methanol and added to reaction mixture (final conc. of methanol was < 2.5 percent)
Method	enzyme incubated with title comp. in 0.1 mol/l potassium phosphate buffer (pH 7.4) containing 0.25 mmol/l NADP(1+) and 1.0 mmol/l S-tetralol; dehydrogenase activity determined
Further Details	S-tetralol: S-(+)-1,2,3,4-tetrahydronaphth-1-ol
Type	IC50
Value of Type	81 µmol/l
Entry Date	2004/08/03

Pharmacological Data record 2 of 18	
Citation Pointer	6431906
Pharmacological Data Citations	• Journal; Usami, Noriyuki; Yamamoto, Tomohiro; Shintani, Syunichi; Higaki, Yu; Ishikura, Shuhei; Katagiri, Yoshihiro; Hara, Akira; BPBLEO; Biol. Pharm. Bull.; EN; 25; 4; 2002; 441 - 445;
Effect	enzyme; inhib. of
Species or Test-System	human 3α-hydroxysteroid dehydrogenase AKR1C4 isoenzyme
Concentration	0.1 mmol/l
Kind of Dosing	title comp. was dissolved in methanol and added to reaction mixture (final conc. of methanol was < 2.5 percent)
Method	enzyme incubated with title comp. in 0.1 mol/l potassium phosphate buffer (pH 7.4) containing 0.25 mmol/l NADP(1+) and 1.0 mmol/l S-tetralol; dehydrogenase activity determined
Further Details	S-tetralol: S-(+)-1,2,3,4-tetrahydronaphth-1-ol
Results	title comp. inhibited AKR1C4 isoenzyme by 15 percent
Entry Date	2004/08/03

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Pharmacological Data record 12 of 18	
Citation Pointer	5833840
Pharmacological Data Citations	• Journal; Chambon, J. P.; Perio, A.; Demarne, H.; Hallot, A.; Dantzer, R.; et al.; ARZNAD; Arzneim. Forsch.; EN; 35; 10; 1985; 1572-1577;
Entry Date	1988/06/27
Comment	activity in: antagonizing MES - ED 50: 5.4 mg/kg and PTZ-induced 1)seizures - ED 50: 1.0 and 0.4 mg/kg 2)lethality - ED 50: 0.3 mg/kg; impairement of motor coordination - ED 50: 2.5 mg/kg; p.o., female mice

More Pharmacological Data
Top of Page

11. The first 12 records are displayed. At the bottom of the Results page, click **More Pharmacological Data** to see the other records.