



STN®: Structure Drawing in STN



Today's presenter is...



Gin-Yun
Eggerichs



Peter Blasi

STN[®] offers several tools to customize structures for your search needs

- Chemical structure searching has been used heavily in many drug discovery studies for years
- Often times, several types of fragments are used to attach to multiple types of core structures and in any orientation
- Other times, there is a need to make specific modifications to standard variables such as an alkyl chain (Ak)
- STN has the capability to draw structures and make specific modifications to the fragments and/or standard variables to achieve your needs

STN

COS
PharmLife

3

Goals for this seminar

- Attach user defined variable groups (G-groups) onto a structure (substituent G-groups)
 - STN defined variables
 - User defined fragments
- Incorporate G-groups into a core structure (embedded G-groups)
 - Two points of attachment on a single fragment
 - Refine answer set by atom elimination
- Apply variable points of attachments with bridging group between two rings

STN

COS
PharmLife

4

Drawing features are often used to expand or narrow variability

- STN defined
 - Shortcuts
 - Variables
 - System defaults for rings, bonds, and nodes
- User defined
 - Repeating groups
 - G-groups
 - Variable point of attachment (VPA)

Features differ in the amount of user control available for these characteristics

- Shortcuts
 - Specifically defined, no modification allowed
 - Valence warning appears with improper use
- Variables X, A, Q, M represent single atoms
 - Node characteristics
 - Hydrogen attachments
 - Non-H attachments

Features differ in the amount of user control available for these characteristics

- Variables Cb, Cy, Hy, Ak represent fragments
 - Non-H attachments
 - Generic definition
 - Saturation
 - Type of chain/ring system
 - Number of carbons
 - Number of hetero atoms
 - Element count

Users can specify variables by creating G-groups

- A query may contain up to 20 G-groups
- A G-group may contain up to 20 substituents
 - Specific elements
 - Shortcuts
 - System-defined variable groups
 - Structural fragments
 - Other G-groups

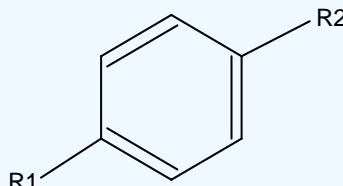
G-groups as substituents: single point of attachment

Search Question 1:

Find compounds described here:
Benzene ring with G1 and G2 variables attached at the para position.

R1 can be either a monocyclic ring system with less than 7 carbon atoms, 1 heteroatom, or a chain of 2-5 carbons.

R2 needs to be a butyl ester that can be attached at either end of the fragment.



Search Strategy

To find the cyclic compounds described...

Step 1. Draw the structures

- Draw the fragments
- Assign point of attachment to the fragments
- Attach the fragments to the core structure via G-group

Step 2. Upload the query to STN

Step 3. Run the search in CAS REGISTRYSM

- Sample search
- Full search

Draw all the structures on STN

Core structure

Hy Ak

Butyl ester is drawn twice to allow attachment to the core structures at different locations.

STN COS

11

Identify points of attachment for the butyl ester fragments

Note: R2 needs to be a butyl ester that can be attached at either end of the fragment.

1

2

3

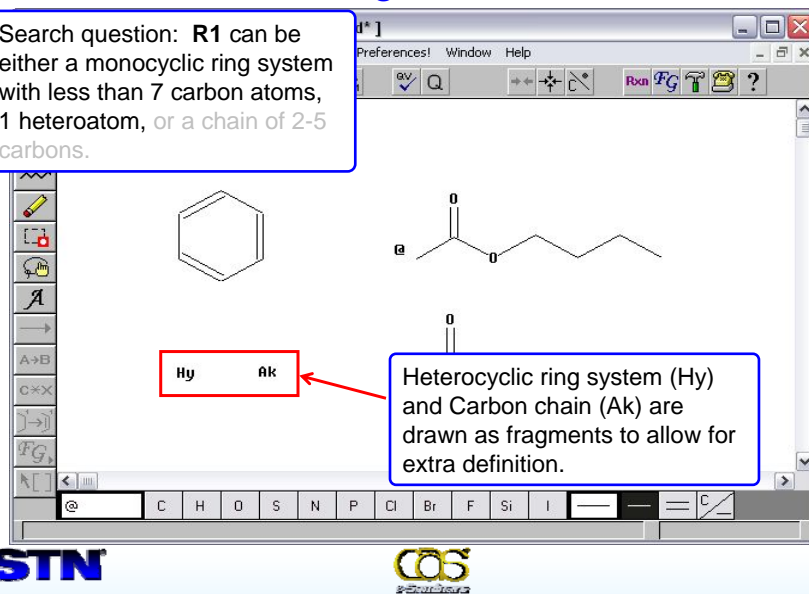
1. From the *Draw* menu, select G-groups
2. Highlight the @ point of attachment, click on multiple use
3. Place point of attachment on the C atom

STN COS

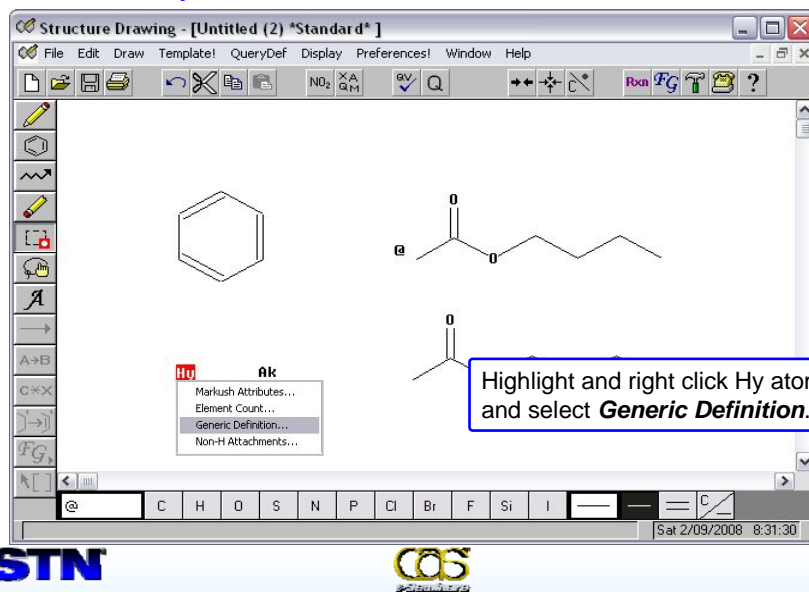
12

STN defined variables can be drawn as fragments

Search question: **R1** can be either a monocyclic ring system with less than 7 carbon atoms, 1 heteroatom, or a chain of 2-5 carbons.



The Hy variable can be defined to allow precise structure retrieval



Generic Definition options allow for precise structure retrieval

Generic Definition

Saturation: Any Mixture
 Unsaturated Saturated

Type of Chain: Any Mixture
 Branched Linear

Number of Hetero Atoms: Any Mixture
 2 or more Exactly 1

Type of Ring System: Any Mixture
 Monocyclic Polycyclic

Number of Carbon Atoms: Any Mixture
 7 or more less than 7

OK
Cancel

Search question: **R1** can be either a monocyclic ring system with less than 7 carbon atoms, 1 heteroatom, or a chain of 2-5 carbons.

STN

CCS
Chemical Structure Software

15

Define the Ak Element Counts

Search question: **R1** can be either a monocyclic ring system with less than 7 carbon atoms, 1 heteroatom, or a chain of 2-5 carbons.

Highlight and right click Ak atom and select **Element Count**.

STN

CCS
Chemical Structure Software

16

Define the Ak Element Count

① C

Search question: R1 can be either a monocyclic ring system with less than 7 carbon atoms, 1 heteroatom, or a chain of 2-5 carbons.

④ C.Range,2-5

④ Add

② Range

③ 2 to 5

1. Select **Carbon** atom
 2. Select **Range**
 3. Enter the number of carbons
 4. Click on **Add**. The number of carbon will appear in the text box

STN COS

17

Assign the points of attachments for Hy and Ak

Structure Drawing - [Untitled (2) *Standard*]

File Edit Draw Template QueryDef Display Preferences! Window Help

Hy @ Ak @

1. From the **Draw** menu, select G-groups
 2. Highlight the @ point of attachment, click on multiple use
 3. Place point of attachment on Hy and Ak fragment

STN COS

18

Define G-groups with fragments

1. From the **Draw** menu, select G-groups

2. Click on **New**

3. Click on **Fragments** in the Define New G-Group window

STN

CCS

19

Define G-groups with fragments

1. Check **Include This Fragment** box

2. Go to the **Next Fragment** and check the **Include This Fragment** box

3. Click **OK** when all fragments have been selected for the G1 Group

4. Click **Save** to save the G1 definition

5. Click on **Single Use** to draw the G1 group on to the core structure

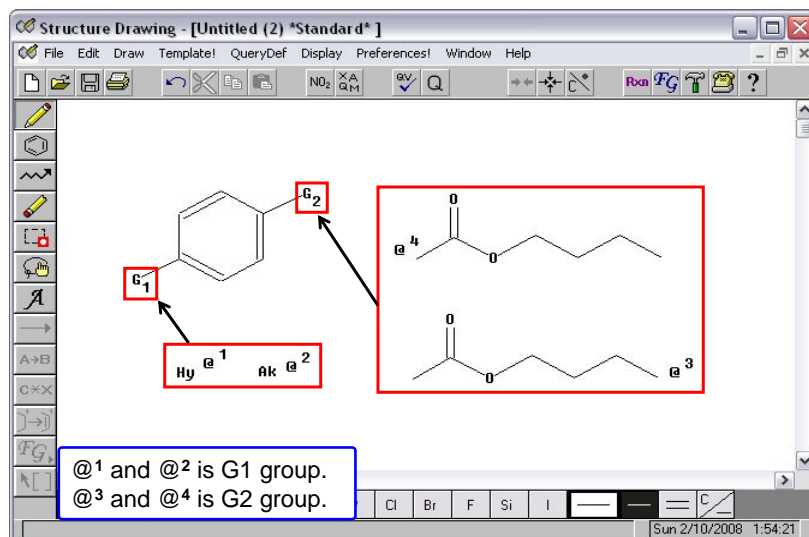
6. Repeat for the other fragments

STN

CCS

20

Place the G1 and G2 groups on to the core structure



STN

COS
Chemicals

21

Upload structure and check query

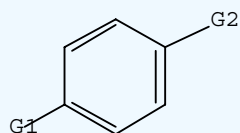
=> **FIL REG**

=> Uploading C:\CASNC\STN Express\Queries\Structure Drawing E-seminar\Query 1\Query

L1 STRUCTURE UPLOADED

=> **D L1 QUERY**

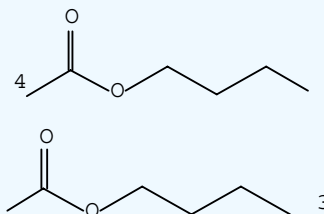
L1 STR



Hy 1 Ak 2

G1 [@1], [@2]
G2 [@3], [@4]

Check the query before running the search.



STN

COS
Chemicals

22

Run the substructure search

=> S L1 SSS SAM

SAMPLE SEARCH INITIATED 15:44:24 FILE 'REGISTRY'
 SAMPLE SCREEN SEARCH COMPLETED - 10368 TO ITERATE

FULL FILE PROJECTIONS: ONLINE **COMPLETE**
 BATCH **COMPLETE**

PROJECTED ITERATIONS: 201258 TO 213462

PROJECTED ANSWERS: 75 TO 547

L2 3 SEA SSS SAM L

The sample search is useful to determine if the search will run to completion within system limits before running a full structure search.

=> S L1 SSS FULL

FULL SEARCH INITIATED 15:42:4
 FULL SCREEN SEARCH COMPLETED - 207081 TO ITERATE

100.0% PROCESSED 207081 ITERATIONS 386 ANSWERS

L3 386 SEA SSS FUL L1

STN

CCS
Chemical Structure System

23

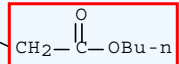
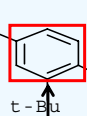
G1/G2 groups are attached to the core structure as substituents

=> D SCAN

L3 386 ANSWERS REGISTRY COPYRIGHT 2008 ACS on STN
 IN Acetic acid, (2,4-di-tert-butylphenyl)-, butyl ester
 (7CI, 8CI)
 MF C20 H32 O2

4 Carbon Chain
 (G1/R1)

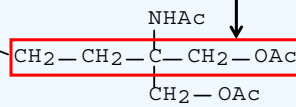
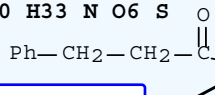
t-Bu



Butyl ester
 (G2/R2)

L3 386 ANSWERS REGISTRY COPYRIGHT 2008 ACS on STN
 IN Acetamide, N-[1,1-bi(methyl)-3-[4-[5-(1-oxo-3-phenylpropyl)-2-thienyl]phenyl]propyl]-
 MF C30 H33 N O6 S

Core structure



Monocyclic ring with 1 heteroatom
 (G1/R1)

STN

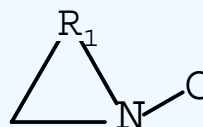
CCS
Chemical Structure System

24

G-groups: fragment with 2 points of attachment

Search Question 2:

Find compounds described here:
Cyclic compound containing 3-8 members with oxygen located at R₁. In case of the 5 member ring, the oxygen can attach through the carbon as well as the nitrogen. The carbon attached to the nitrogen is a ring.



Search Strategy

To find the cyclic compounds described...

Step 1. Draw the structure

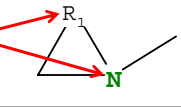
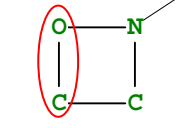
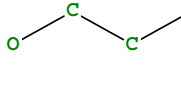

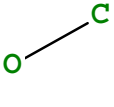
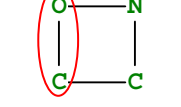
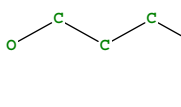
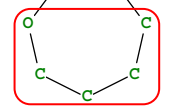
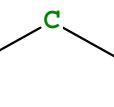
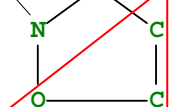
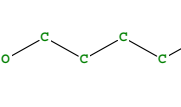
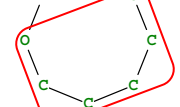
- Draw the smallest ring size desired
- Draw fragments that will account for the larger ring size
- Assign points of attachments to the fragments
- Attach the fragments to the ring via G-group
- Verify the orientation of the fragments

Step 2. Upload the query to STN

Step 3. Run the search in REGISTRY

- Sample search
- Full search

Various fragment lengths result in different ring size

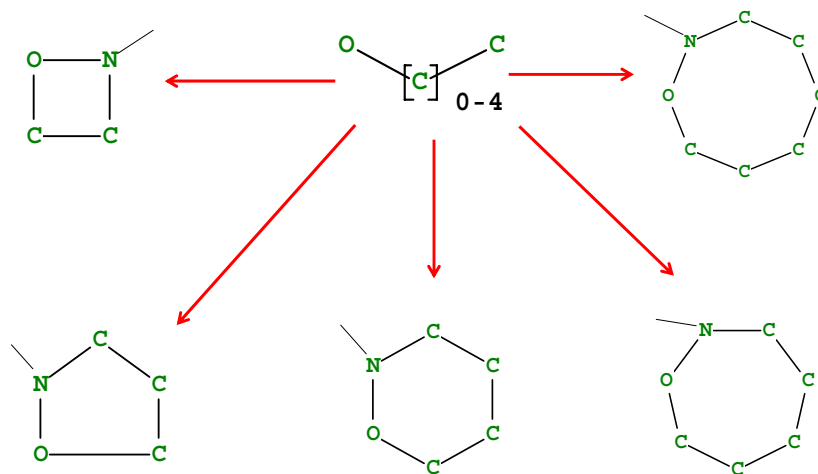
Fragment (R_1)	Resulting Ring	Fragment (R_1)	Resulting Ring
<div style="border: 1px solid blue; padding: 2px; display: inline-block;">Fragment attachment points</div> 			
			
			

STN

CCS
Purdue

27

Specifying repeating groups in a fragment will save a lot of time

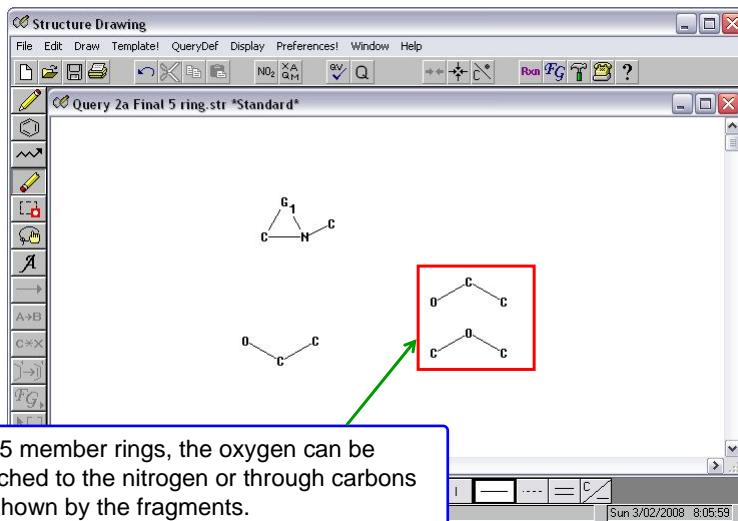


STN

CCS
Purdue

28

Draw the smallest ring structure and fragments

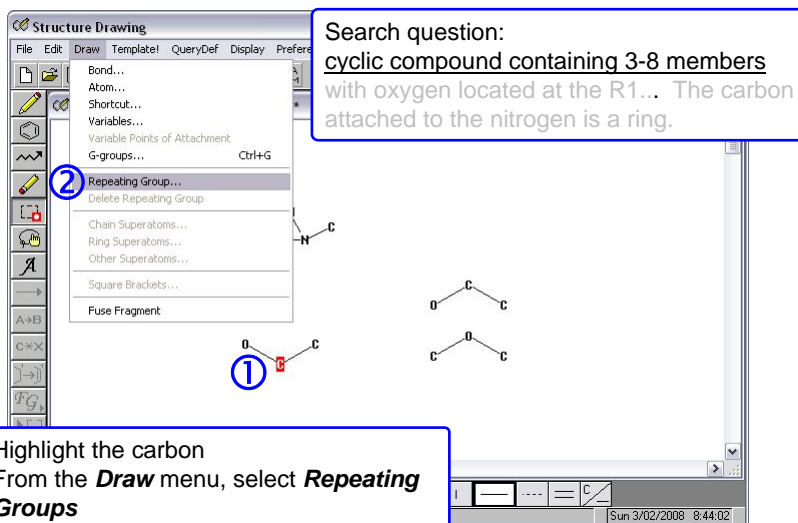


STN

CCS
Chemical Structure System

29

Assign repeating groups to a node



STN

CCS
Chemical Structure System

30

Assign repeating groups to a node

Repeating Group Range

From: 0 To: 4

OK Cancel

Enter the repeating group range and click **OK**.

STN COS

31

Modify Node Characteristics as needed

Search question:
cyclic compound containing 3-8 members
with oxygen located at the R1... The carbon
attached to the nitrogen is a ring.

Markush Attributes...
Node Characteristics...
Hydrogen Attachments...
Non-H Attachments...
Other Attributes...

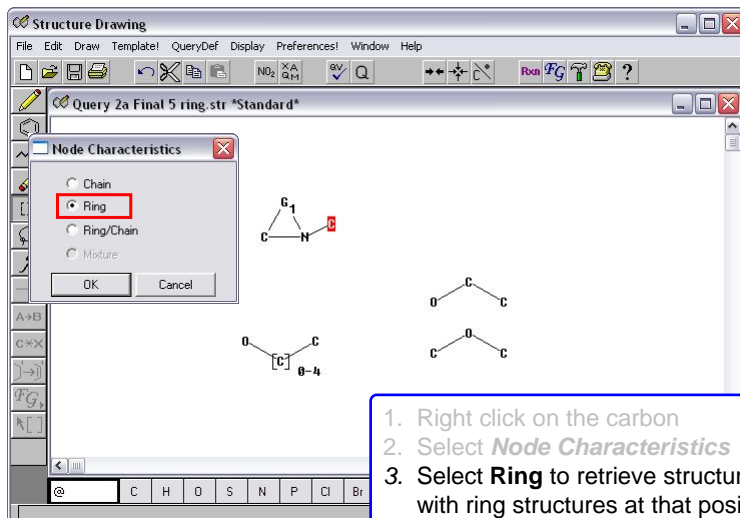
1. Right click on the carbon
2. Select **Node Characteristics**

By default, atoms in a chain will retrieve structures that are part of a chain.

STN COS

32

By default, atoms in a chain will retrieve structures that are part of a chain



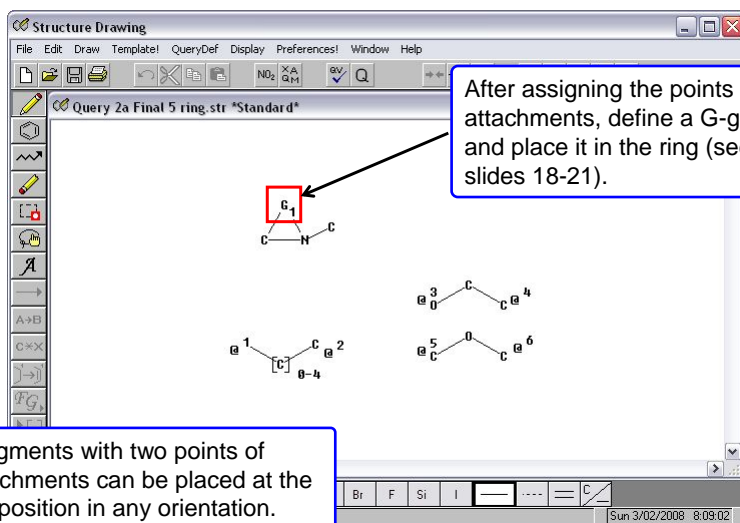
1. Right click on the carbon
2. Select *Node Characteristics*
3. Select **Ring** to retrieve structures with ring structures at that position

STN

CCS

33

Assign TWO points of attachments to the fragment



After assigning the points of attachments, define a G-group and place it in the ring (see slides 18-21).

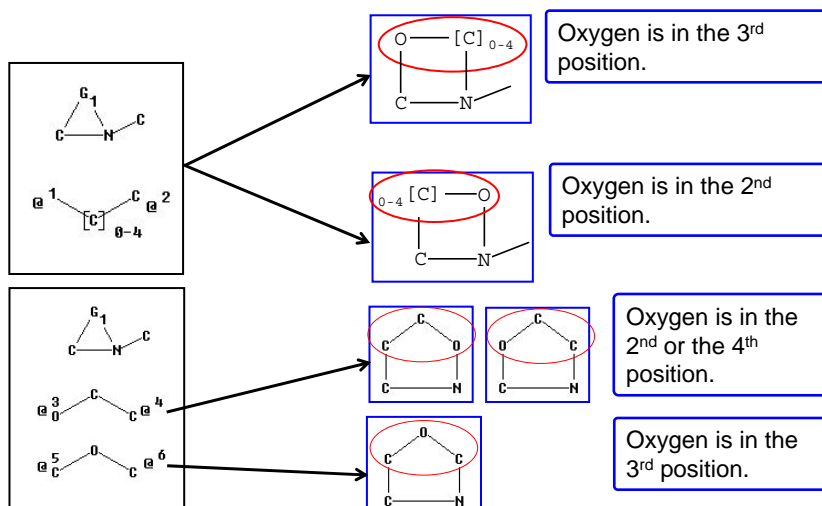
Fragments with two points of attachments can be placed at the G1 position in any orientation.

STN

CCS

34

Fragments with two points of attachments result in two placement orientations



STN

CCS
Chemistry

35

Verify the G-group orientation during a SAVE process

1. Check the **G-group orientation** box

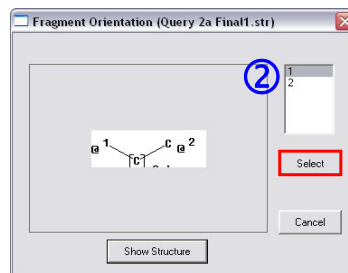
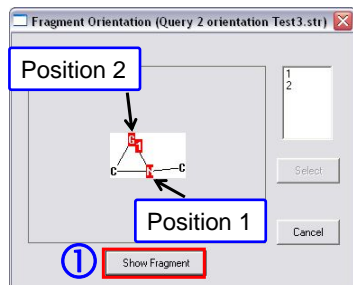
2. Click **Save**

STN

CCS
Chemistry

36

Verify the G-group orientation during a SAVE process



The fragment's points of attachment (@1 and @2) corresponds to the 1 and 2 in the text box.

1. Click **Show Fragment**
2. Highlight 1 to indicate that oxygen (@1) connects to the nitrogen at position 1 and click **Select**
3. Repeat with other fragments

STN

COS
Chemistry

37

Upload the structure in REGISTRY

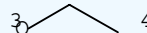
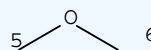
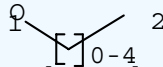
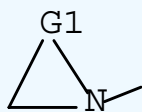
```
=> FIL REG
```

```
=> Uploading C:\CASNC\STN Express 8.3\Queries\Structure  
Drawing E-seminar\Query 2\Final\Query 2a\Query 2a Final  
5 ring.str
```

```
L1 STRUCTURE UPLOADED
```

```
=> D L1 QUERY
```

```
L1 STR
```



```
G1 [@1-@2], [@3-@4], [@5-@6]
```

STN

COS
Chemistry

38

Run the substructure search

=> S L1 SSS SAM

SAMPLE SEARCH INITIATED 22:09:02 FILE 'REGISTRY'
SAMPLE SCREEN SEARCH COMPLETED - 8686 TO ITERATE
FULL FILE PROJECTIONS: ONLINE **COMPLETE**
BATCH **COMPLETE**
PROJECTED ITERATIONS: 168134 TO 179306
PROJECTED ANSWERS: 39038 TO 44520

L2 50 SEA SSS SAM L1

=> S L1 SSS FULL

FULL SEARCH INITIATED 21:59:41 FILE 'REGISTRY'
FULL SCREEN SEARCH COMPLETED - 175293 TO ITERATE
100.0% PROCESSED 175293 ITERATIONS 42751 ANSWERS

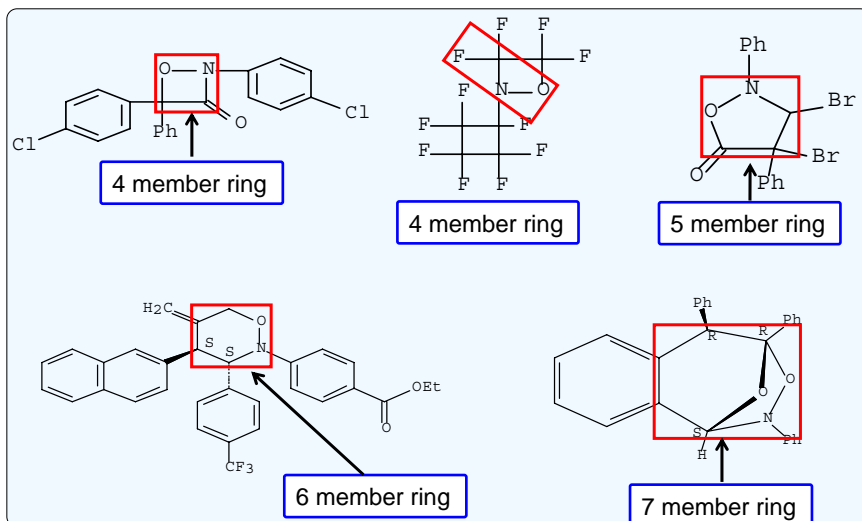
L3 42751 SEA SSS FUL L1

STN

COS
Chemicals

39

Evaluate structures using D SCAN



STN

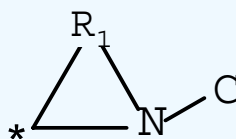
COS
Chemicals

40

Modify the structure and search it as a SUBSET

Extension from Search Question 2:

From the previous answer set, find structures that do not have a carbon or any halogens attached to the carbon indicated by an asterisk.



Search Strategy

To find the cyclic compounds described...

Step 1. Modify the existing structure

- Exclude carbon and halogens as fragments
- Define G2 group

Step 2. Upload the query to STN

Step 3. Run the search in REGISTRY as a subset

- Full search

SUBSET searching is cost effective

- The first structure search resulted in many broad structures
- Uses more specific (narrow) queries that are run against the answers from the broad search
- It is a cost efficient way to add precision to a previously searched query

Modify the existing structure by specifying excluded atom(s)

The screenshot shows the 'Structure Drawing' software interface. A menu is open with 'Atom...' highlighted in a red box. The main window displays several chemical structures. One structure is a triangle with vertices labeled G1, H, and C. Another structure is a chain of atoms labeled 1, C, 2, and H. A third structure is a chain of atoms labeled 3, C, 4, and H. A fourth structure is a chain of atoms labeled 5, C, 6, and H. The software interface includes a menu bar (File, Edit, Draw, Template, QueryDef, Display, Preferences, Window, Help) and a toolbar with various drawing tools.

NOTE: The STN defined variables X (halogens), M (metals), and Id ("Dummy node (polymer)") can be excluded.

NOTE: Atoms can be excluded as substituents attached directly to the core structure or as a fragment in a G-group.

Atoms and certain variables can be excluded from the structure

Atom Selection

① C Ac Ca Er In Na Po Se Tm
 H Ag Cd Eu Ir Nb Pr Sm U
 O Am Ce Fe K Nd Pt Sn V
 S Al Cl Fm Kr Ne Pu Sr W
 N Ar Cm Fr La Ni Ra T Xe
 P As Co Ga Li No Rb Ta Yb
 Si At Cr Ge Lu Np Re Tb Y
 Cl Au Cs Gd Lr Os Rh Tc Zn ③

 Exclude ②

1. Select the carbon atom
2. Check **Exclude**
3. Click **Single Use** to put the excluded atom on the drawing board

STN

COS
Software

45

Modify the existing structure by specifying excluded variable(s)

Structure Drawing

File Edit Draw Template QueryDef Display Preferen

① Variables...
 Atom...
 Shortcut...
 Variable Points of Attachment
 G-groups... Ctrl+G
 Repeating Group...
 Delete Repeating Group
 Chain Superatoms...
 Ring Superatoms...
 Other Superatoms...
 Square Brackets...
 Fuse Fragment

Variable Selection

② "X" Halogens
 "A" Atoms except H
 "Q" Atoms except C,H
 "M" Metals
 "Cb" Carbocyclic ring systems
 "Cy" Ring systems
 "Hy" Heterocyclic ring systems
 "Id" 'Dummy' node (Polymer)
 "Ak" Carbon chain

③ Exclude ④

1. From the **Draw** menu, highlight **Variables**
2. Select **"X" Halogens**
3. Check **Exclude**
4. Click **Single Use**

STN

COS
Software

46

Place excluded atoms/variables as fragment

The screenshot shows the 'Structure Drawing' software window. The main workspace contains several chemical structures. A red arrow points to a fragment consisting of an underlined 'C' and an underlined 'X'. A blue callout box explains: 'Underlined (C, X) atoms/variables mean that they have been marked for exclusion.' Another blue callout box notes: 'Note: By default, hydrogen will also be excluded when any atom(s) are excluded.' The bottom of the window features a toolbar with chemical symbols (C, H, O, S, N, P, Cl, Br, F, Si, I) and logos for 'STN' and 'COS'.

Underlined (C, X) atoms/variables mean that they have been marked for exclusion.

Note: By default, hydrogen will also be excluded when any atom(s) are excluded.

47

Define atom and variable fragment as G-group

The screenshot shows the 'Structure Drawing' software window. The main workspace contains several chemical structures. A blue callout box explains: 'See slides 18-21 for defining G-groups.' The bottom of the window features a toolbar with chemical symbols (O, S, N, P, Cl, Br, F, Si, I) and logos for 'STN' and 'COS'. The status bar at the bottom right shows the date and time: 'Sun 3/02/2008 9:57:48'.

See slides 18-21 for defining G-groups.

48

Upload the modified structure in REGISTRY

```
=> S L1 SSS FULL
```

```
L3      42751 SEA SSS FUL L1
```

This search was the initial SSS search from slide 39.

```
=> Uploading C:\CASNC\STN Express 8.3\Queries\Structure  
Drawing E-seminar\Query 2\Final\Query 2b-exclusion\Final  
Final\Query 2b final final exclude C and X.str
```

```
L4      STRUCTURE UPLOADED
```

```
=> S L4 SSS FULL SUBSET=L3
```

```
FULL SUBSET SEARCH INITIATED 22:00:16 FILE 'REGISTRY'  
FULL SUBSET SCREEN SEARCH COMPLETED - 42751 TO ITERATE  
100.0% PROCESSED 42751 ITERATIONS 2926 ANSWERS
```

```
L5      2926 SEA SUB=L4 SSS FUL L3
```

Structures can also be refined using screens/filters. Please see archived CAS e-Seminars on structure screens/filters.

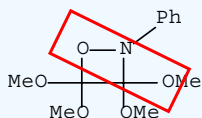
SUBSET searches only in existing answer set.

STN

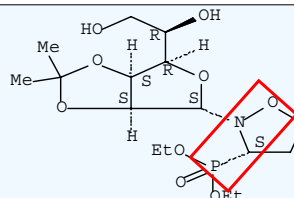
COS
Chemical Online Search

49

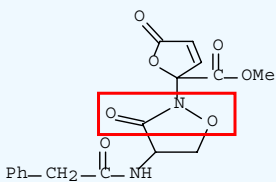
Evaluate structures with D SCAN



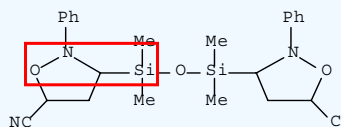
The carbon is attached to oxygen.



The carbon is attached to phosphorous.



The carbon is attached to oxygen.



The carbon is attached to silicon.

STN

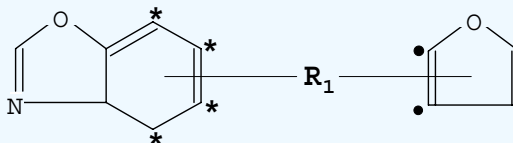
COS
Chemical Online Search

50

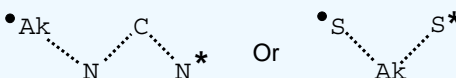
Search Question 3:

What is claimed is:

1. A compound of the formula



Wherein R₁ is



The carbon chain (Ak) can be 1-5 carbons long with various bond types between each node. The fragments are attached by matching the symbols next to the nodes.

Search Strategy

To find the cyclic compounds described...

Step 1. Draw the structures

- Build first structure with Variable Points of Attachment to one ring only
- Build second structure with Variable Points of Attachment to the other ring

Step 2. Upload both structures to STN

Step 3. Search the first structure and the second structure at the same time using the AND operator

Draw the core structures and fragments

The screenshot shows the 'Structure Drawing' software window. The title bar reads 'CYCLOPENTANE WITH OXYGEN AND BENZENE LEFT2.str *Standard*'. The main workspace contains two chemical structures: a fused bicyclic system (indole-like) and a five-membered ring with an oxygen atom. Below these structures is a fragment definition:

$$\begin{array}{l} \text{Ak} \cdots \text{N} \cdots \text{C} \cdots \text{N} \\ \text{S} \cdots \text{Ak} \cdots \text{S} \end{array}$$

Two callout boxes provide instructions:

- A blue box on the left: "Change the Ak element count to 1-5 for carbon (see slides 16-17)." with an arrow pointing to the 'Ak' labels in the fragment definition.
- A blue box on the right: "Change the bonds to Unspecified." with an arrow pointing to the bond lines in the fragment definition.

The software interface includes a menu bar (File, Edit, Draw, Template, QueryDef, Display, Preferences, Window, Help), a toolbar with various drawing tools, and a bottom toolbar with element selection buttons (O, S, N, P, Cl, Br, F, Si, I, ...). The status bar at the bottom shows the date and time: "Fri 2/15/2008 5:58:30".

STN **CCS** **Standard**

53

Identify the fragment sides that will attach to the first core structure

This screenshot shows the same software interface as slide 53, but with red arrows pointing to the attachment points in the fragment definition:

$$\begin{array}{l} \text{Ak} \cdots \text{N} \cdots \text{C} \cdots \text{N} @ \\ \text{S} \cdots \text{Ak} \cdots \text{S} @ \end{array}$$

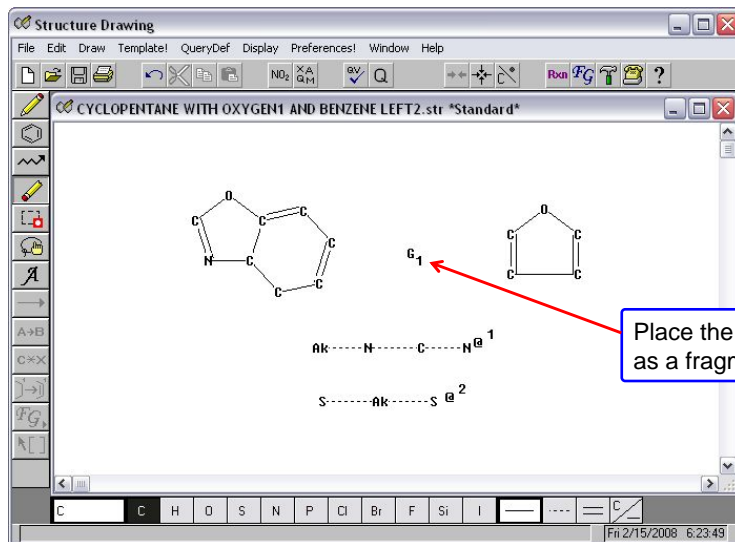
A blue callout box at the bottom right explains: "@ is placed on the nitrogen and sulfur of the fragment." with arrows pointing to the '@' symbols in the fragment definition.

The software interface and logos are identical to slide 53.

STN **CCS** **Standard**

54

Define the G-group for the first core structure



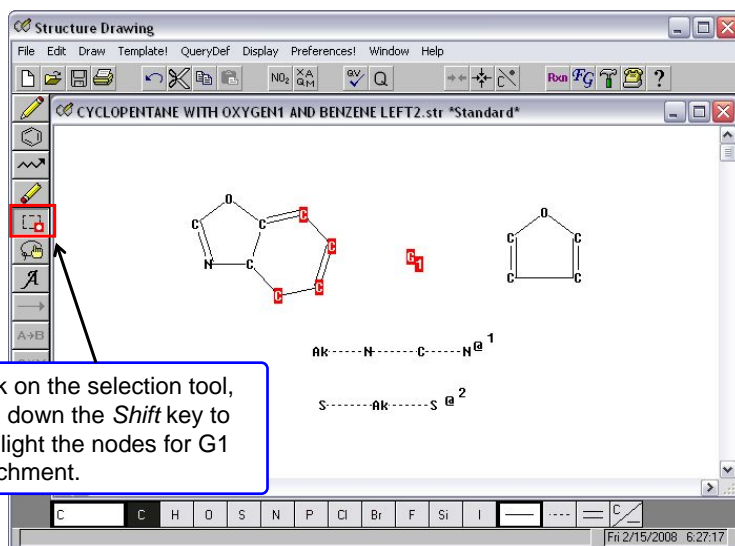
Place the G1 as a fragment.

STN

CCS
Chemical Computing System

55

Select the nodes for the Variable Points of Attachment



STN

CCS
Chemical Computing System

56

Attach G-group to the highlighted nodes

From the *Draw* pull down menu, select *Variable Points of Attachment*.

Structure Drawing
File Edit Draw Template! QueryDef Display Preferences! Window Help
Bond...
Atom...
Shortcut...
Variables...
Variable Points of Attachment
G-groups... Ctrl+G
Repeating Group...
Delete Repeating Group
Chain Superatoms...
Ring Superatoms...
Other Superatoms...
Square Brackets...
Fuse Fragment

BENZENE LEFT2.str *Standard*

AK.....N.....C.....N@¹
S.....AK.....S @²

STN COS

57

Variable Points of Attachment are illustrated with multiple bonds connect to the G-group

Repeat the same process for attaching the fragments to the core structure 2, but with @ on Ak and S, then save it as a different structure file.

Structure Drawing
File Edit Draw Template! QueryDef Display Preferences! Window Help
NO₂ XA QM Q

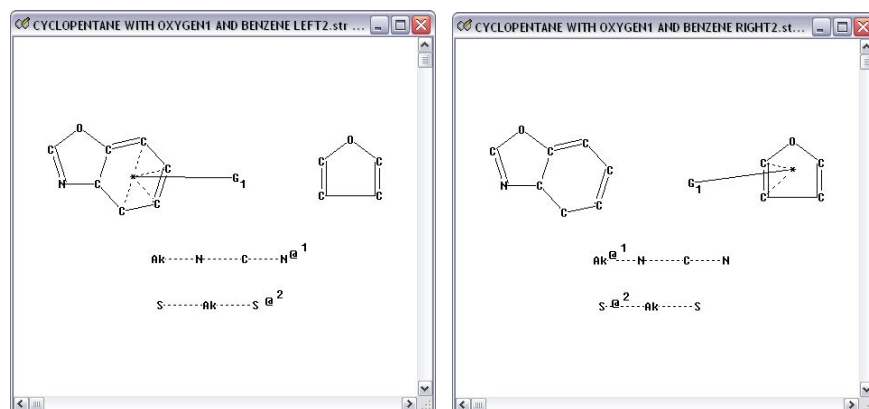
CYCLOPENTANE WITH OXYGEN AND BENZENE LEFT2.str *Standard*

AK.....N.....C.....N@¹
S.....AK.....S @²

STN COS

58

Two files of the same structures but with different fragment orientation attachment



STN

CCS
Chemicals

59

Load each structure separately in
REGISTRY

```
=> FIL REG
=> Uploading C:\CASNC\STN Express 8.3\Queries\CYCLOPENTANE
WITH OXYGEN1 AND BENZENE LEFT2.str
L1      STRUCTURE UPLOADED
=> D L1 QUERY
L1      STR

G1  [@1] , [@2]
```

STN

CCS
Chemicals

60

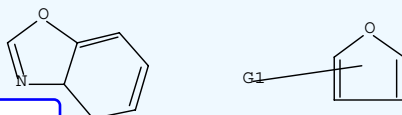
Upload the 2nd structure with G-group to REGISTRY

```
=> Uploading C:\CASNC\STN Express 8.3\Queries\CYCLOPENTANE  
WITH OXYGEN1 AND BENZENE RIGHT2.str
```

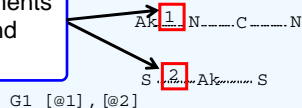
```
L2 STRUCTURE UPLOADED
```

```
=> D L2 QUERY
```

```
L2 STR
```



1 and 2 indicates
the G1 fragments
on the second
structure.



STN

COS
SOFTWARE

61

Use the AND operator to combine both substructure searches

```
=> S L1 AND L2 SSS FULL
```

```
FULL SEARCH INITIATED 15:43:27 FILE 'REGISTRY'
```

```
FULL SCREEN SEARCH COMPLETED - 7318 TO ITERATE
```

```
100.0% PROCESSED 7318 ITERATIONS 432 ANSWERS
```

```
L3 432 SEA SSS FUL L1 AND L2
```

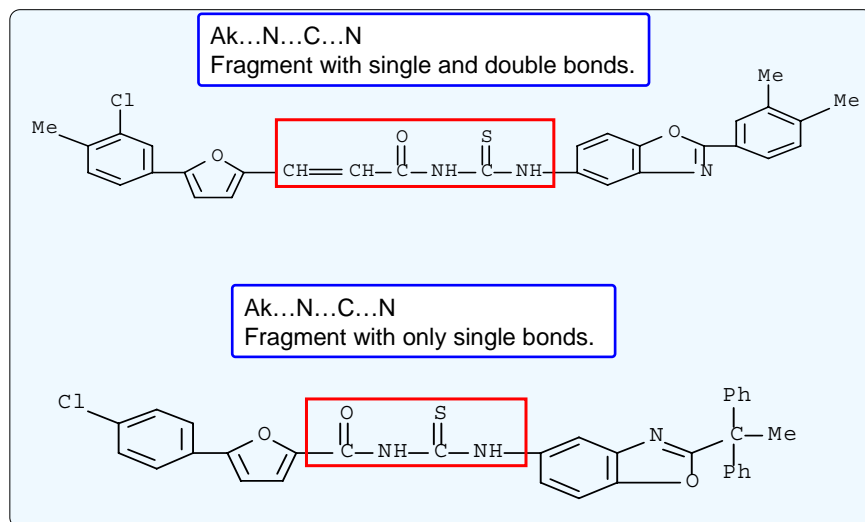
Combining L1 and L2 SSS
FULL search results in 1
search cost.

STN

COS
SOFTWARE

62

Retrieved structures in REGISTRY



STN

CCS
Chemicals

63

Summary

- Structure drawing and searching on STN offers several easy and flexible tools
- Users can modify some of the existing STN defined variables
- User can define specific fragments via G-groups
 - A query may contain up to 20 G-groups
 - A G-group may contain up to 20 substituents

STN

CCS
Chemicals

64

Summary

- Usage of repeating groups allow users to retrieve structures of more than one ring size without having to draw them
- Variable points of attachment makes it easy to indicate fragment attachment on several positions within a ring or multiple rings
- Use subset search to refine a set of broad answers in a cost effective manner

Additional resources

- Short one hour e-Seminars
 - CAS e-Seminars (<http://casevents.webex.com>)
 - FIZ Karlsruhe e-Seminars
(http://www.stninternational.de/training_center/seminars.html)
- STN Virtual Workshops **NEW!!!**
 - Live training via WebEx
 - Users can practice searching using STN login ID in a virtual setting
- Instructor-led STN workshops


The screenshot shows the CAS STN website. At the top, there is a search bar and navigation links: Home, About CAS, Our Expertise, Solutions, Products & Services, Support & Training, and News & Events. The main content area is titled "STN e-Seminars and Training" and lists various resources for new and experienced users, including e-Seminars, Instructor-Led Training, and Self-Directed Learning. A sidebar on the left provides links to STN Support Home, e-Seminars and Training, STNews, Database Summary Sheets, User Documentation, and Technical Support. A blue callout box at the bottom left contains the text: "Please visit www.cas.org for more CAS training information." The STN and CAS logos are visible at the bottom.

67

The screenshot shows the STN International website. The main heading is "Your Connection to Science and Technology". The page is divided into several sections: "Get Connected!" (introductory text), "From Your Desktop" (listing search capabilities), "Be Confident" (highlighting the system's reliability), and "STN Service Centers" (listing regional offices). A sidebar on the left lists "STN Self Services", "STN Interfaces", "STN Databases", and "Service/Support". A sidebar on the right lists "What's new" and "Training Center" (highlighted with a red box). A blue callout box at the bottom center contains the text: "Please visit <http://www.stn-international.com> for more FIZ Karlsruhe training information." The STN and CAS logos are visible at the bottom.

68

Questions and answers...



Home | About CAS | Our Expertise | Solutions | Products & Services | Support | News & Events

Meeting Center | Training Center | Support Center | **Event Center** | More Services ▾ | My WebEx

Month	Date	Time	Topic	Category	Action
March 2008					
March 13, 2008	9:00 - 10:00 EST		STN: Creating Superior Document Sets for STN® AnaVist™, Version 2.0	Search Techniques	Enroll
March 25, 2008	13:00 - 14:00 EST		STN: Structure Drawing in STN®	Structure Techniques	Enroll
April 2008					
April 7, 2008	12:30 - 14:00 EST		STN: User Update - What's New on STN?	Search Techniques	Enroll
April 8, 2008	12:30 - 14:00 EST		STN: User Update - New Developments in Patent Analysis and Visualization from STN	Search Techniques	Enroll
April 10, 2008	9:00 - 10:00 EST		STN: Structure Drawing in STN®	Structure Techniques	Enroll
April 29, 2008	13:00 - 14:00 EST		STN: Multitile Searching for Scientific Information	Search Techniques	Enroll
May 2008					
May 8, 2008	9:00 - 10:00 EST		STN: Multitile Searching for Scientific Information	Search Techniques	Enroll
May 27, 2008	13:00 - 14:00 EST		STN: Searching Formulations on STN®	Search Techniques	Enroll
June 2008					
June 12, 2008	9:00 - 10:00 EST		STN: Searching Formulations on STN®	Search Techniques	Enroll
June 24, 2008	13:00 - 14:00 EST		STN: Highlights from the 2008 STN Patent Forum	Patent Searching	Enroll
July 2008					
July 10, 2008	9:00 - 10:00 EST		STN: Highlights from the 2008 STN Patent Forum	Patent Searching	Enroll
July 29, 2008	13:00 - 14:00 EST		STN: Revealing the Mysteries of MARPAT®	MARPAT Searching	Enroll
August 2008					
August 14, 2008	9:00 - 10:00 EST		STN: Revealing the Mysteries of MARPAT®	MARPAT Searching	Enroll
August 26, 2008	13:00 - 14:00 EST		STN: Finding Literature	Search Techniques	Enroll

<http://casevents.webex.com>

