



Reaxys®

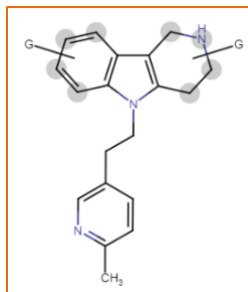
# Workflow example

Exploring synthetic strategies for  
the synthesis of dimebon analogs

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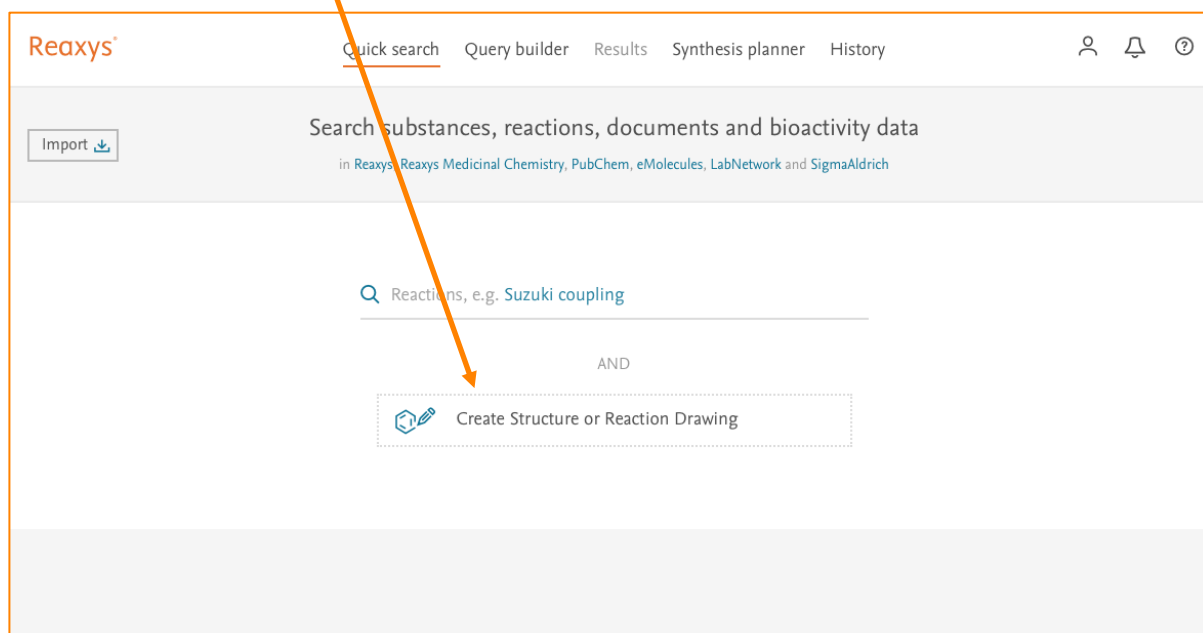
## Workflow concept

Using Reaxys, the scientist wishes to explore the different synthetic strategies available for the synthesis of analogs of the antihistamine dimebon, which has the following structure.

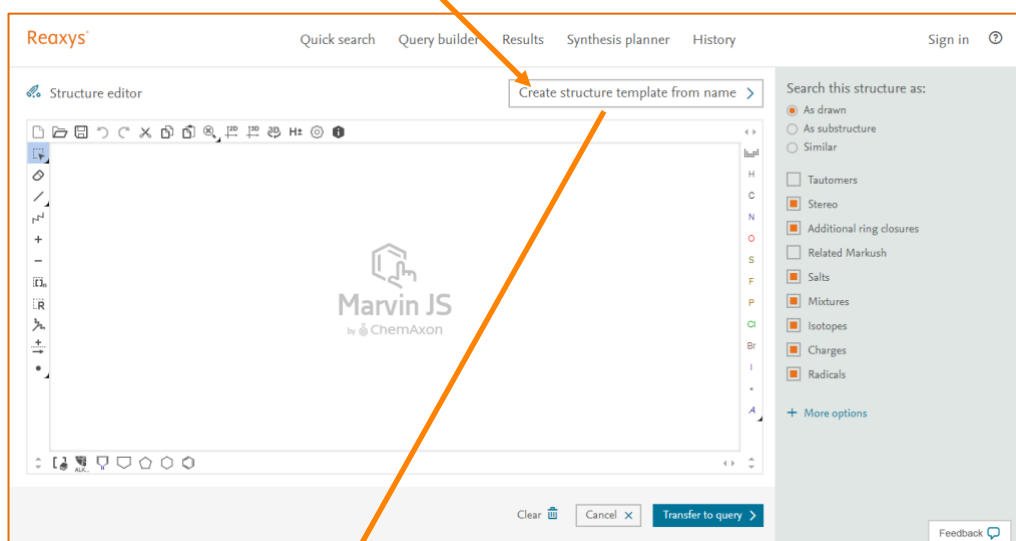


1. Use the drawing tool in Quick Search to create the desired structure

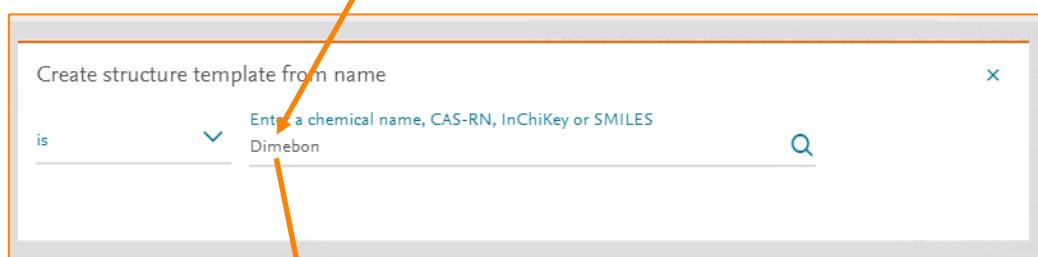
Click on **Create Structure or Reaction Drawing** in Quick Search.



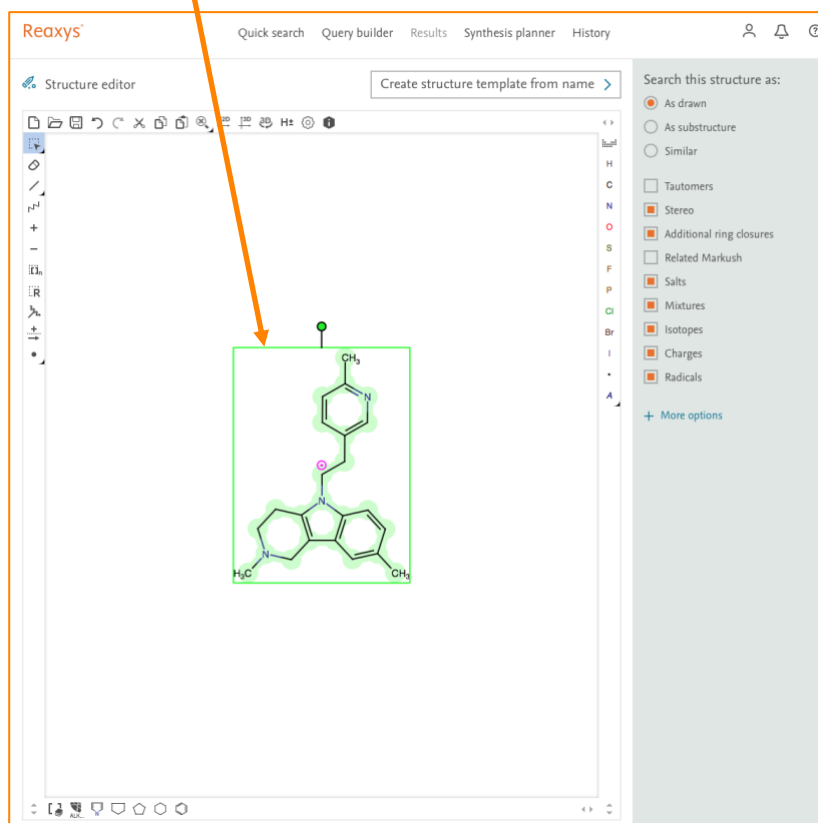
Click **Create structure template from name** and type “Dimebon”. The structure will autopopulate.



The screenshot shows the Reaxys 'Structure editor' interface. At the top, there are navigation tabs: 'Quick search', 'Query builder', 'Results', 'Synthesis planner', and 'History'. A dropdown menu is open under 'Query builder', with 'Create structure template from name' highlighted by an orange arrow. The main workspace is empty, displaying the 'Marvin JS by ChemAxon' logo. On the right, there is a search filter panel with options like 'As drawn', 'Stereo', 'Additional ring closures', etc.

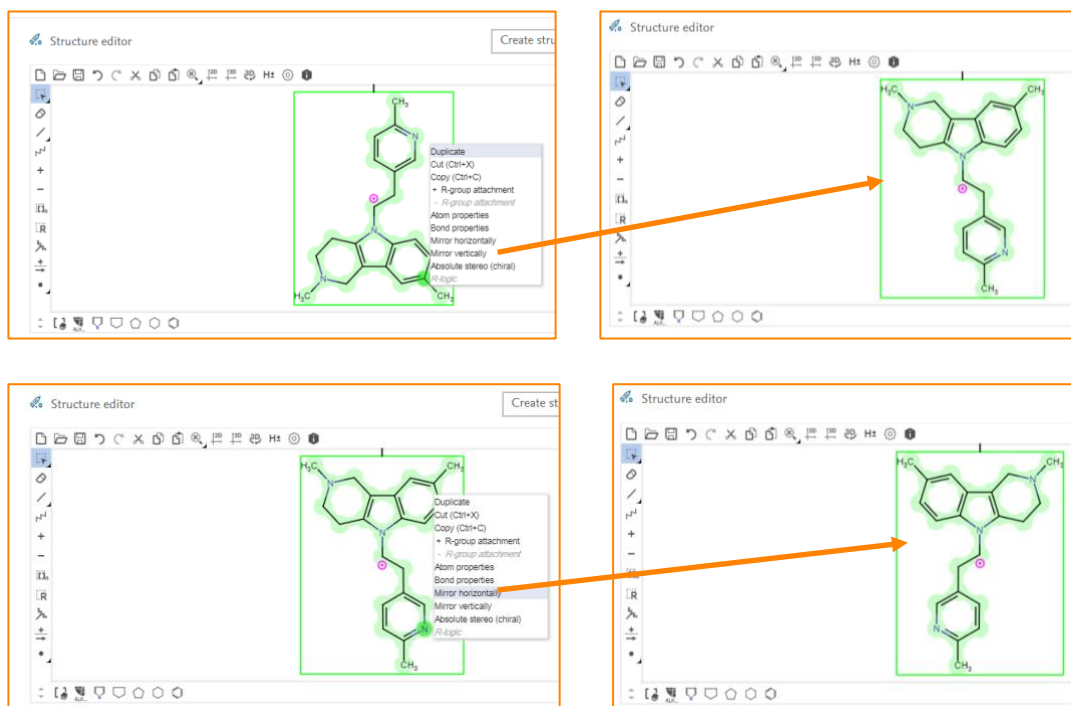


This is a close-up of the 'Create structure template from name' dialog box. It features a search input field with the text 'Dimebon' entered. Above the input field, there is a prompt: 'Enter a chemical name, CAS-RN, InChiKey or SMILES'. A search icon is located to the right of the input field. The dialog box has a close button (X) in the top right corner.

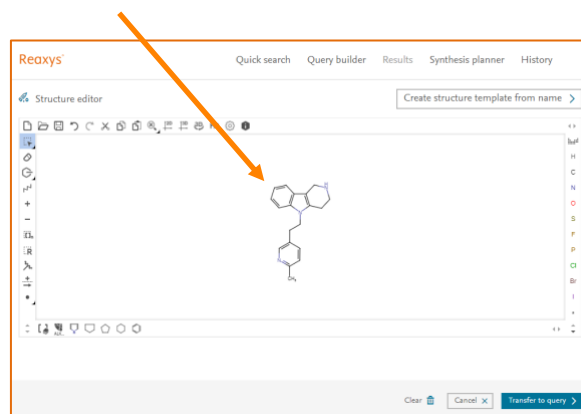


The screenshot shows the Reaxys 'Structure editor' interface after the structure of Dimebon has been generated. The chemical structure is displayed in the main workspace, highlighted with a green selection box. The structure consists of a central benzimidazole ring system with a methyl group (CH<sub>3</sub>) at the 2-position, a methyl group (CH<sub>3</sub>) at the 5-position, and a 4-methylpyridin-2-ylmethyl group attached to the nitrogen atom at the 1-position. The search filter panel on the right remains visible.

To change the orientation of the structure, right click on any atom and select **Mirror Vertically** or **Mirror Horizontally**.

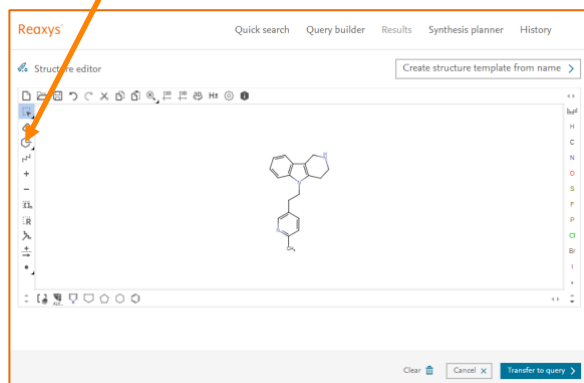


You can adjust the size of the structure by scrolling up or down. Remove the two methyl groups from the upper rings by clicking on the C and hitting Delete on your keyboard.

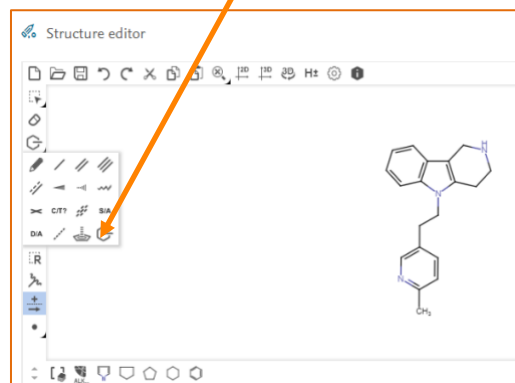


Place position variation bonds as follows:

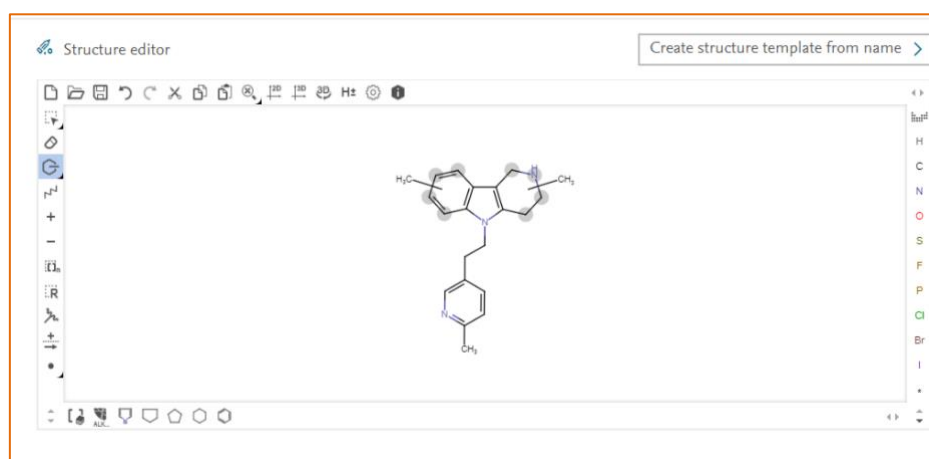
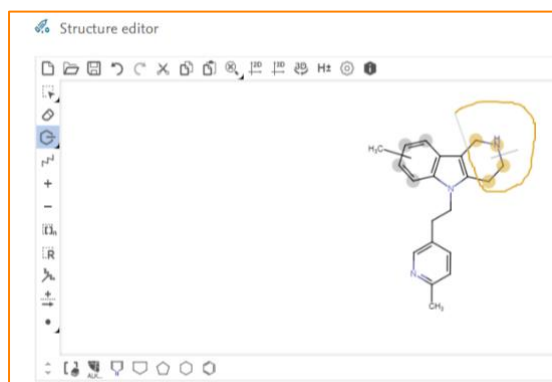
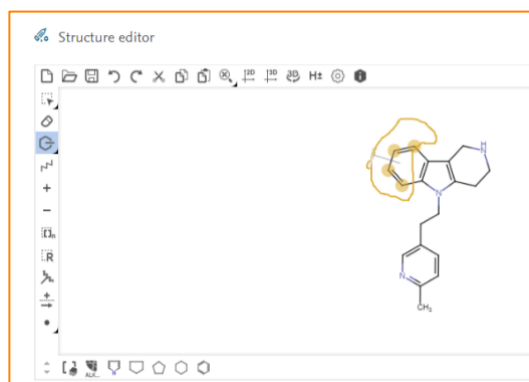
a. Click here to open the tool panel.



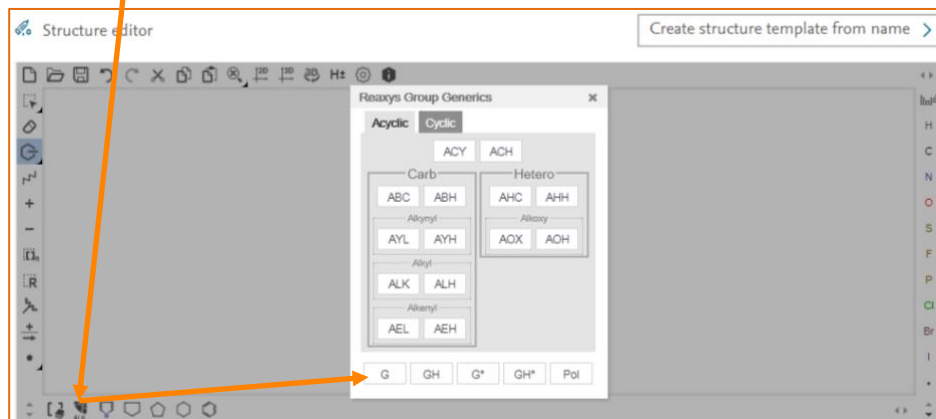
b. Select the position variation bond.



c. Select the atoms to be included by drawing a line around them.

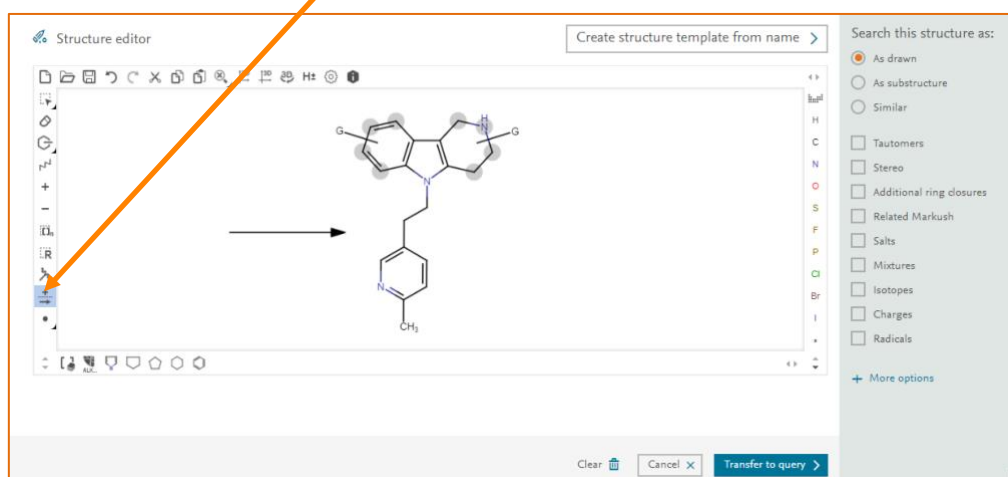


Open the **Group Generics** dialog box with the button in the bottom panel. Select **G**.

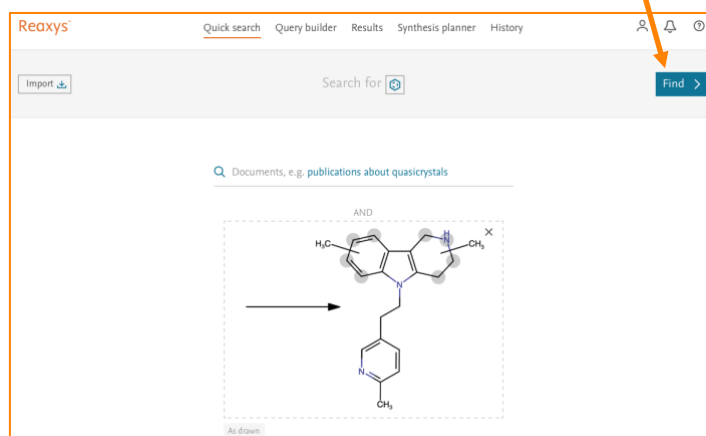


This allows the addition of any group as a query at the position variation bond.

Add the reaction arrow from the left panel to ensure that the query structure is searched as a product.

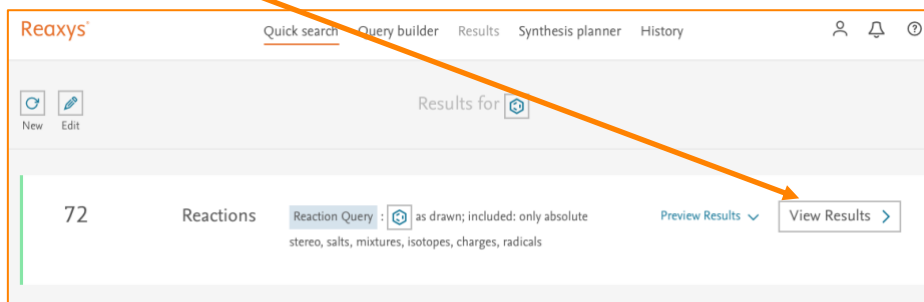


Click **Transfer to query** and then **Find**.



## 2. View results

In this search, Reaxys finds 72 reactions with the dimebon structure with position variation bonds as a product. Click on **View Results** to explore the details of the reactions.



Reaxys Quick search Query builder Results Synthesis planner History

72 Reactions 19 Documents 55 Substances, 125 Targets

Filters and Analysis

- By Structure
- Yield
- Reagent/Catalyst
- Solvent
- Catalyst Classes
- Solvent Classes
- Product Availability
- Reactant Availability
- Reaction Classes
- Document Type
- Publication Year
- Single step reactions only

Reaction ID: 29410289

Yield: 84% Conditions: With hydrogenchloride In acetone at 45 - 65°C; for 0.666667h; Inert atmosphere; Experimental Procedure Show Reference

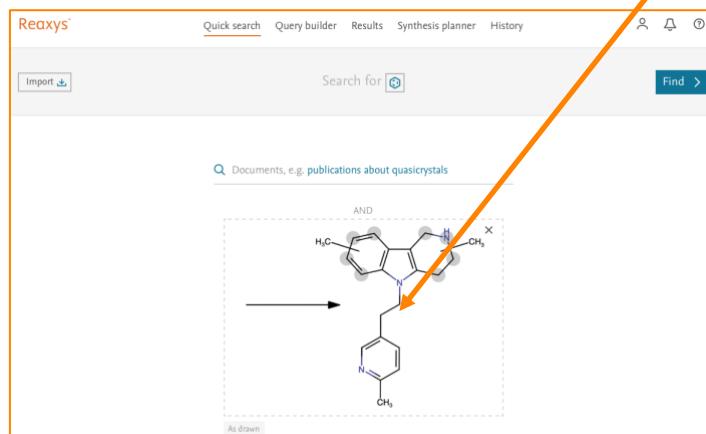
Reaction ID: 29081541

Yield: 80% Conditions: With potassium phosphate In isobutyramide at 100°C; for 24h; Inert atmosphere; Experimental Procedure Show Reference

55% With potassium hydroxide In 1-methyl-pyrrolidin-2-one at 100°C; Feedback

### 3. Explore reactions around specific bonds

Click **Quick Search**. The query will still display, as before. Click on the drawing to re-open the editor.



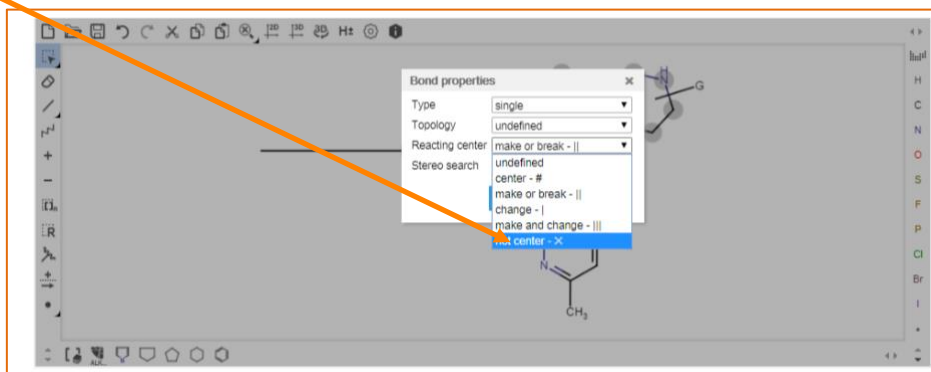
Right click on the bond and click **Bond properties**. Click the dropdown menu for **Reacting center** and define it as **make or break**. This will enable a search of those reactions where this bond is either making or breaking. As before, transfer this to your query and click **Find**.



The relevant reactions can be explored in more detail in the results.

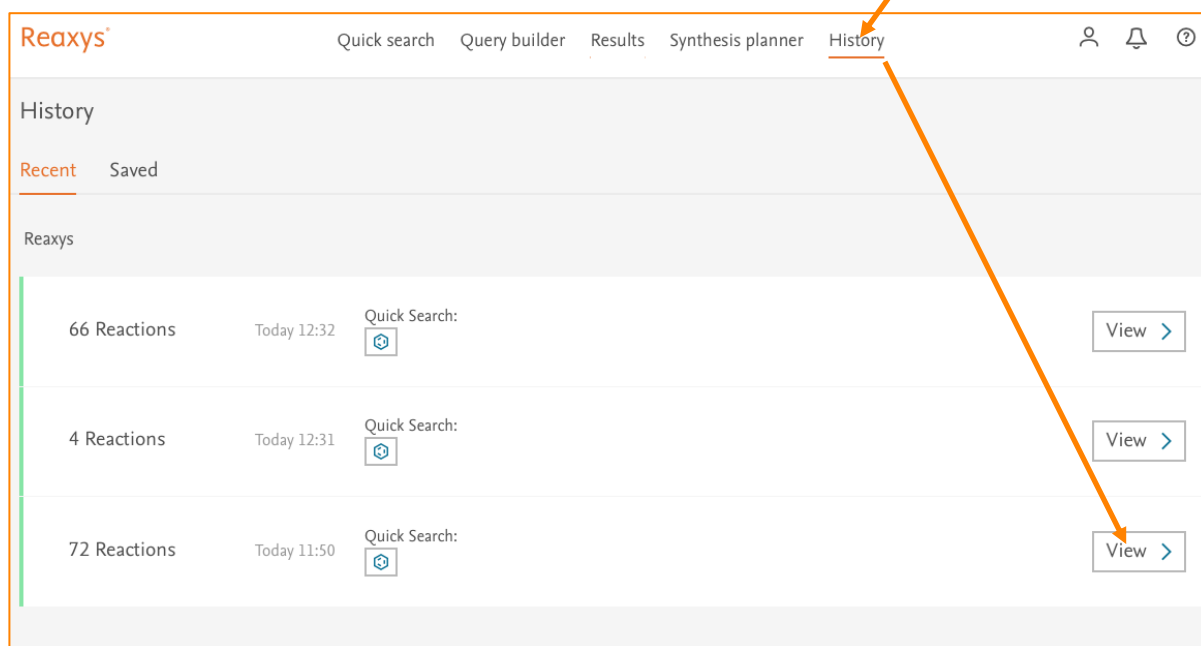


To search for reactions where the bond is not involved, open the query structure and select **Not center** from the **Reacting center** dropdown menu.

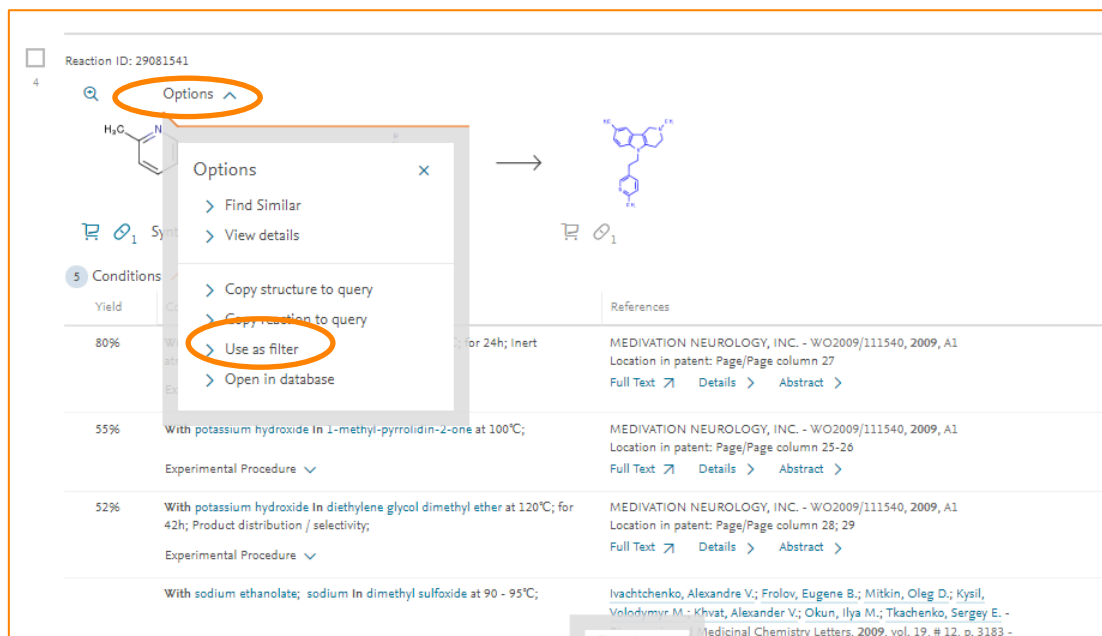


#### 4. Filtering results for specific intermediates or reactants

To look through the main results, filtering for intermediates and reactants, click **History** and then click **View** for the first set of results.

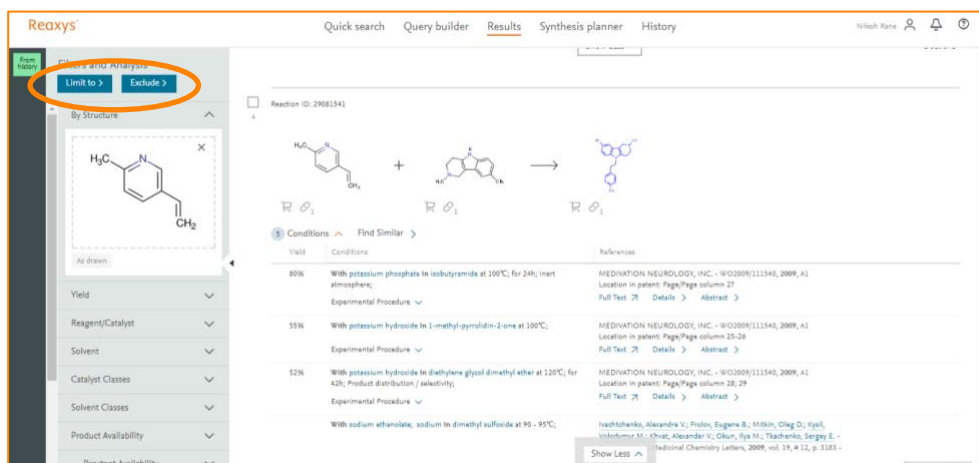


Open the **Options** menu for a given reactant and select **Use as filter**. It will automatically add to the filter **By structure**.



The screenshot shows the Reaxys interface for reaction ID 29081541. The 'Options' menu is open for the reactant, with 'Use as filter' selected. The 'By structure' filter is applied to the search results, which are displayed in a table format. The table includes columns for Yield, Conditions, and References. The first row shows a yield of 80% with conditions: 'With potassium phosphate in isobutyramide at 100°C; for 24h; Inert'. The second row shows a yield of 55% with conditions: 'With potassium hydroxide in 1-methyl-pyrrolidin-2-one at 100°C; Experimental Procedure'. The third row shows a yield of 52% with conditions: 'With potassium hydroxide in diethylene glycol dimethyl ether at 120°C; for 42h; Product distribution / selectivity; Experimental Procedure'. The fourth row shows conditions: 'With sodium ethanolate; sodium in dimethyl sulfoxide at 90 - 95°C;'. The references column lists 'MEDIVATION NEUROLOGY, INC. - WO2009/111540, 2009, A1' and 'Ivachtchenko, Alexandre V.; Frolov, Eugene B.; Mitkin, Oleg D.; Kysil, Volodymyr M.; Khvat, Alexander V.; Okun, Ilya M.; Tkachenko, Sergey E. - Medicinal Chemistry Letters, 2009, vol. 19, # 12, p. 3183 -'. The 'Show Less' button is visible at the bottom of the table.

Select **Exclude** to view all the reactions that do not involve the selected structure as a reactant. Select **Limit to** to view all the reactions that do involve the selected structure as a reactant.



The screenshot shows the Reaxys interface with the 'By Structure' filter panel open. The 'Limit to' button is highlighted. The 'By Structure' filter is applied to the search results, which are displayed in a table format. The table includes columns for Yield, Conditions, and References. The first row shows a yield of 80% with conditions: 'With potassium phosphate in isobutyramide at 100°C; for 24h; inert atmosphere; Experimental Procedure'. The second row shows a yield of 55% with conditions: 'With potassium hydroxide in 1-methyl-pyrrolidin-2-one at 100°C; Experimental Procedure'. The third row shows a yield of 52% with conditions: 'With potassium hydroxide in diethylene glycol dimethyl ether at 120°C; for 42h; Product distribution / selectivity; Experimental Procedure'. The fourth row shows conditions: 'With sodium ethanolate; sodium in dimethyl sulfoxide at 90 - 95°C;'. The references column lists 'MEDIVATION NEUROLOGY, INC. - WO2009/111540, 2009, A1' and 'Ivachtchenko, Alexandre V.; Frolov, Eugene B.; Mitkin, Oleg D.; Kysil, Volodymyr M.; Khvat, Alexander V.; Okun, Ilya M.; Tkachenko, Sergey E. - Medicinal Chemistry Letters, 2009, vol. 19, # 12, p. 3183 -'. The 'Show Less' button is visible at the bottom of the table.

Further reactions or synthetic strategies can be searched using various options from the **Filters and Analysis** panel.

Further information on using Reaxys can be found in the user guide in the [Reaxys Support Center](#).