Agilent G6825AA MassHunter Pathways to PCDL Software

Quick Start Guide

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What is Agilent Pathways to PCDL?

Agilent MassHunter Pathways to PCDL is stand-alone software designed to facilitate the creation of custom Agilent PCDLs from metabolites present in pathway content culled from popular databases such as BioCyc, KEGG, and WikiPathways. Pathways to PCDL is also part of the MassHunter VistaFlux software.

You can create a personal compound database (PCD) or a personal compound database and library (PCDL) from one or more compounds (metabolites/lipids) that participate, or are associated with metabolic reactions, in selected pathway(s). The PCD/PCDL is created by finding compound names and their associated formulas in a reference METLIN database, that is based on a selected pathway(s). You can filter and select pathways based on database, organism, and/or custom text entries.

The pathway metabolites can be filtered based on their relationship with the pathway (member of the pathway or reaction partner) or through custom text entries.
Pathways to PCDL currently supports pathway content from BioCyc, KEGG (with the required license), and WikiPathways. The databases created with Pathways to PCDL can be used to query acquired data in a targeted data mining workflow, the results of which can be mapped onto biological pathway maps.

**Features of Pathways to PCDL**

- Create a custom MassHunter METLIN compound PCD/PCDL from pathway information contained in BioCyc, KEGG, and WikiPathways. The pathways may be selected based on:
  - one or many organisms
  - custom search text entries
  - combinations of organism and text entries
- The list of target compounds that you can extract can be filtered based on the compound being present:
  - in the selected pathway(s)
  - as a reaction partner to compounds involved in the selected pathway(s)
- The pathway PCD/PCDL that you create may be used for identification of metabolites as a source database in other MassHunter software (for example, MassHunter Qualitative Analysis and ID Browser).

**Terminology**

**PCD**
An accurate mass compound database. The database may or may not contain retention time data.

**PCDL**
An accurate mass compound database that also contains an MS/MS accurate mass spectral database (spectral library).

**Compound Name**
Many compounds are commonly known by their salts. The mass spectrometer, however, detects the anion or cation portion of the salt, rather than the neutral salt. PCD/PCDL entries may contain the familiar compound names, but the empirical formulae reflect the detectable cation or anion portion of the molecule rather than the formula of the neutral compound salt. For example, the full name Vecuronium bromide may be used for identification in the PCD/PCDL, even though the mass/formula only includes the Vecuronium cation.
**METLIN database**  
The MassHunter METLIN PCD/PCDL (METLIN database) is one of the best-known and most-comprehensive metabolite and lipid databases in the world today. The METLIN database contains endogenous and exogenous metabolites, as well as lipids, drug metabolites, and di- and tripeptides. Each entry may include mass, chemical formula, and structure information, as well as ID numbers that link to more information about the compound, such as the CAS and ChemSpider IDs.

**Where to Find More Information**

Go to [www.agilent.com](http://www.agilent.com) for the most current information on Agilent products.
Getting Started

How do I get started?

This *Quick Start Guide* helps you launch Pathways to PCDL, become familiar with a typical workflow, and use the software to create a custom PCD/PCDL metabolite database from a reference METLIN Metabolite PCD/PCDL database.

1. Install Pathways to PCDL. Follow the instructions in “Pathways to PCDL Installation” on page 15.

2. Double-click the Pathways to PCDL icon located on your desktop, or click Start > All Programs > Agilent > MassHunter Workstation > Pathways to PCDL > Pathways to PCDL.

3. The first time you run Pathways to PCDL you are prompted to set a reference METLIN database path and filename.
   
   a. Click Select in the Select Reference METLIN PCD/PCDL dialog box (see Figure 1).

   ![Select Reference METLIN PCD/PCDL dialog box](image)

   Figure 1 Select Reference METLIN PCD/PCDL dialog box

   b. Select your METLIN database in the Please specify the reference METLIN PCD or PCDL (.cdb) file dialog box (see Figure 2 on page 5).
4 Study the Pathways to PCDL Workflow shown in Figure 3.
5 Review the rest of this Quick Start Guide and follow the steps using your METLIN database.

**Pathways to PCDL Workflow**

![Pathways to PCDL Workflow](image)

**Figure 3** Typical Pathways to PCDL Workflow
User Interface

The main functional areas of Pathways to PCDL software are shown in Figure 4.

The Pathways to PCDL window consists of two parts: the Menu Bar and the Display Pane. The Display Pane is divided into the Pathway List and the Selected Pathways List to help you visualize your progress as you select pathways to create your PCDL. The number of pathways and compounds that meet your criteria are shown above each table in the Display Pane.

You can update the pathway databases from Tools located on the Menu Bar (see Figure 5).

This Quick Start Guide and the software version are available from Help located on the Menu Bar (see Figure 5).
Creating a Custom PCDL

Creating a custom PCD/PCDL from metabolites present in pathway content follows a simple workflow as shown in Figure 3 on page 5.

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<tr>
<th>Steps</th>
<th>Detailed Instructions</th>
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| 1     | Start Pathways to PCDL.  
  a Click the Pathways to PCDL icon on your desktop. | • You can also click Start > All Programs > Agilent > MassHunter Workstation > Pathways to PCDL > Pathways to PCDL. |
| 2     | Select Source under Pathway Data.  
  a Select BioCyc/MetaCyc for the Source under Pathway Data. If you select KEGG, go to step 3c on page 8.  
  b Review the updated list of pathways in the Pathways List, and then go to step 3 to if you are using the BioCyc/MetaCyc pathway database. | • Pathways to PCDL supports pathway content from BioCyc, KEGG, and WikiPathways.  
  • When you select KEGG, you are immediately prompted for your KEGG database license. |
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| KEGG pathway database license: | c Click OK in the Options dialog box.  
d Enter your license information if you select the KEGG pathway database.  
e Click OK. | • If the KEGG Login User name or Password is incorrect a dialog box notifies you. |

3 *Pathway Name*: Select the organism(s) you want to include within the pathway data source.

| a Click Add/Remove under Pathway Data.  
b Click the column heading Name to sort the organisms. For example click the Name column heading.  
c Mark Homo sapiens. Mark a check box in the Choose column and in the row for each organism that you want to include in your Organism/Database selection list.  
d Click OK. | • In the Choose Organisms to Show dialog box, the Pwy Count column is the number of pathways associated with each organism.  
• Each of the organisms that you select in the Choose Organisms to Show dialog box are available in the Organism/Database selection list. The selection is persistent the next time you run Pathways to PCDL. |
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<tr>
<td>e</td>
<td>Select <strong>Homo sapiens</strong> from the <strong>Organism/Database</strong> list.</td>
<td>• Organisms may be removed from the <strong>Organism/Database</strong> selection list. Click <strong>Add/Remove</strong> and clear the organism check boxes.</td>
</tr>
<tr>
<td>f</td>
<td>Review the updated list of pathways in the <strong>Pathways List</strong>.</td>
<td></td>
</tr>
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4 **Fellow Pathway Members**: Select pathways related to compounds when **Fellow Pathway Members** is the **Selection Mode**.

a. Click **Fellow Pathway Members**.

b. Review the updated list of compounds in the Pathway List.

c. Select the first eleven (11) compounds in the **Compounds List**.

d. Click **Select Highlighted**.

Three options are available as the **Selection Mode**:

- **Pathway Name**: Build your personal compound database by selecting pathways individually (as shown in this step) or by clicking **Select All** from the **Pathways List** as shown on the prior page.

- **Fellow Pathway Members**: Build your personal compound database by selecting compounds within a pathway that you select based on the pathways all being related to each other (fellow pathways) to the compound you previously select from the **Compounds List** as shown on this page.

- **Reaction Partners**: Build your personal compound database by selecting compounds associated with pathway reactions involving the compound you select from the **Compounds List** in the **Display Pane**.

f. Select one or more pathways, with or without filtering the pathway list using custom search text. Select the first fifteen (15) pathways.

f. Click **Select Highlighted**.

• Compounds associated with each pathway are added to the **Selected Pathways List** each time you click **Select Highlighted** or **Select All**.
### Steps

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<tr>
<td>g Review the list in the <strong>Selected Pathways List</strong>. Go to step 6 on page 12.</td>
<td></td>
</tr>
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### 5 Reaction Partners: Select pathways related to compounds by reaction when Reaction Partners is the Selection Mode.

- a Click **Clear All** in the **Selected Pathways List** to start a new pathways list.
- b Click **Reaction Partners**.
- c Review the updated list of compounds in the **Compounds List**.
- d Select the first eleven (11) compounds in the **Compounds List**.
- e Click **Select Highlighted**.
- f Review the list of pathways in the **Selected Pathways List**.

- **Reaction Partners** is not an option when KEGG or WikiPathways is the **Pathway Data, Source**.
- After you click **Select Highlighted** or **Select All** the original selection in the **Pathways List** is no longer highlighted.
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| 6     | Select compounds using custom Search Text entry when any Selection Mode is selected. | a Click **Clear All** in the *Selected Pathways List* to start a new pathways list.  
|       |                       | b Type **tryptophan** for the **Search Text**.  
<p>|       |                       | c Review the list of pathways in the <em>Pathways List</em>. The number of pathways is smaller than when viewed in step 3 on page 8. | Pathways can be filtered by several text searches. |</p>
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| 7     | Add one or more pathways to your compound database. | a Click the pathway you want to add to your compound database.  
|       |                       | b Click **Select Highlighted** to move the pathway to the **Selected Pathways List**.  
|       |                       | c Repeat steps a and b to continue adding pathways to your compound database.  
|       |                       | • Click **Select Highlighted** or **Select All** after each search to build your custom compound database based on the selected pathways.  
|       | ![Pathways to PCDL](image) |  |
| 8     | Review unresolved compounds in your **Selected Pathways List**. | a Click **View Unresolved**.  
|       |                       | b Review the list of unresolved compounds in the **Unresolved Compound Viewer** dialog box.  
|       |                       | c Click **OK**.  
|       |                       | d Review the list of compounds in the Compound List.  
|       |                       | e Remove unresolved compounds from your Compound List. Mark compounds to delete under the **Del.** column.  
|       |                       | • Pathways to PCDL provides you with an opportunity to manually review the compounds in your **Selected Pathways List** that may not have a strong correlation with the pathway(s) you have selected (unresolved compounds).  
|       |                       | • The **View Unresolved** button is available when you have unresolved compounds in your Compound List.  
|       |                       | • After reviewing the unresolved compounds, you may retain the related pathways in your **Selected Pathways List** or remove them from the **Selected Pathways List** by clicking the compound row under the **Del.** column. When you click the compound under the **Del.** column it is immediately removed.  
|       | ![Unresolved Compound viewer](image) |  
|       | ![Unresolved Compound viewer](image) |  |
### Steps

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<tr>
<td>9</td>
<td>Select the preferred source of the final database compound names.</td>
<td>a Click MetaCyc as the <strong>Prefer Compound Names from</strong> source.</td>
</tr>
</tbody>
</table>
| 10    | Create your custom PCD/PCDL. | a Click **Create PCD/PCDL**.  
b Select the folder to save your PCD/PCDL database.  
c Type the name for your PCD/PCDL database in **File name**.  
d Click **Save**. | e Click **OK** after you have reviewed the summary information describing your custom PCD/PCDL. |
|       |                        |          |
| 11    | Create another PCD/PCDL or exit Pathways to PCDL. | a Create another PCD by returning to "**Select Source under Pathway Data**." on page 7.  
b Click the Close button to exit Pathways to PCDL if you are done creating your custom PCD/PCDL database. | You have completed creating your first custom PCD/PCDL database. You can create another database or exit the software. |

![Image of software interface](image.png)
Pathways to PCDL Installation

Pathways to PCDL is installed from a Setup Wizard, which you run from the main installation program.

Double-click *Pathways to PCDL.msi*, or right-click the file and then click *Install*. 
Acknowledgments and Citations

BioCyc Pathway/Genome Databases

Includes BioCyc Pathway/Genome databases from the Bioinformatics Research Group at SRI International®, used under license.

http://www.biocyc.org/

Citation based on use of BioCyc databases or the Pathway Tools software

If you use BioCyc databases or the Pathway Tools software in your research, cite relevant publications as described on the BioCyc website:

http://biocyc.org/publications.shtml

For example, users who publish research results in scientific journals based on use of data from the EcoCyc Pathway/Genome database should cite:


Users who publish research results in scientific journals based on use of data from most other BioCyc Pathway/Genome databases should cite:


KEGG Database

Includes KEGG (Kyoto Encyclopedia of Genes and Genomes) databases developed by Kanehisa Laboratories.

http://www.genome.jp/kegg/

Citation based on use of KEGG Database

If you use the KEGG database in your research, cite relevant publications as described on the KEGG website:

http://www.genome.jp/kegg/kegg1.html
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In this book

The *MassHunter Pathways to PCDL Software Quick Start Guide* presents the first steps to use the MassHunter Pathways to PCDL Software.

This Quick Start Guide applies to MassHunter Pathways to PCDL B.07.00 and later until superseded.

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