PRL-3 roles in metastasis: a workflow to extract reduced pathways from signaling maps.

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Background

The pathway analysis was performed using the BiNoM (version 2.5) plugin in cytoscape (version 2.7). The objective was to extract the paths that are between the PRL-3 protein and the different phenotypes that lead to metastasis.

It is recommended to use both versions of the software for this task.
Link to cytoscape: https://cytoscape.org/download.html
Link to BiNoM: https://binom.curie.fr/

Process

1. First, a session in Cytoscape is open and xml file of the map is loaded. Using the import function from the BiNoM plugin. In the menu Plugins>BiNoM 2.5>BiNoM I/O>Import CellDesigner Document from file…

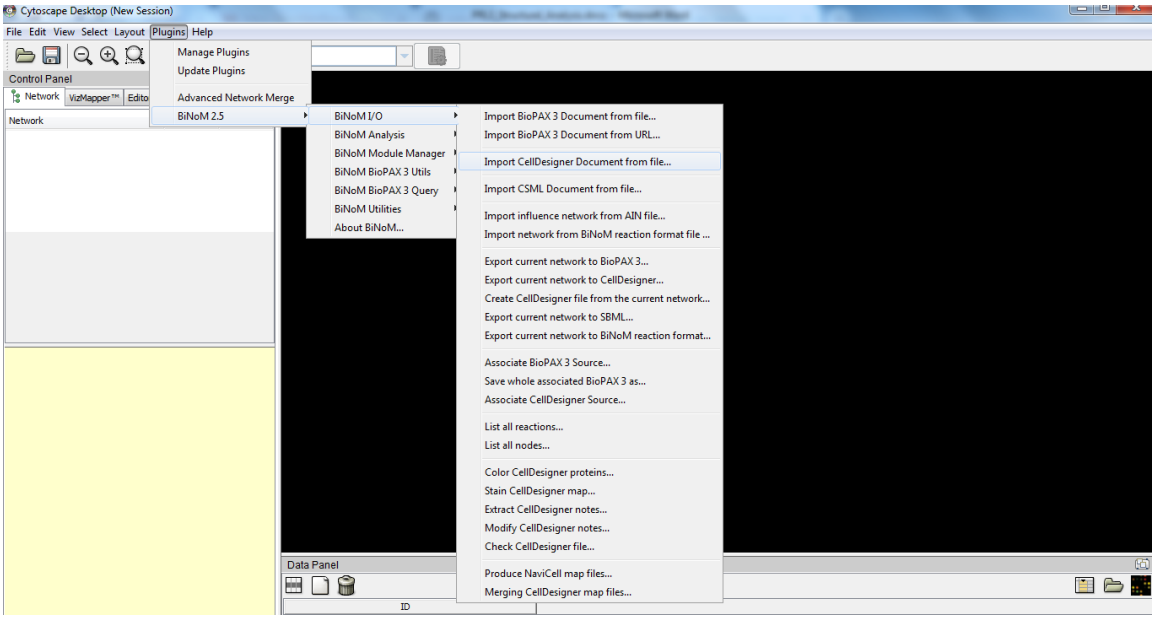

Figure 1 Importing CellDesigner file

2. Once loaded, select the whole network and proceed to do the pathway analysis. In the menu Plugins>BiNoM 2.5>BiNoM Analysis>Path Analysis…

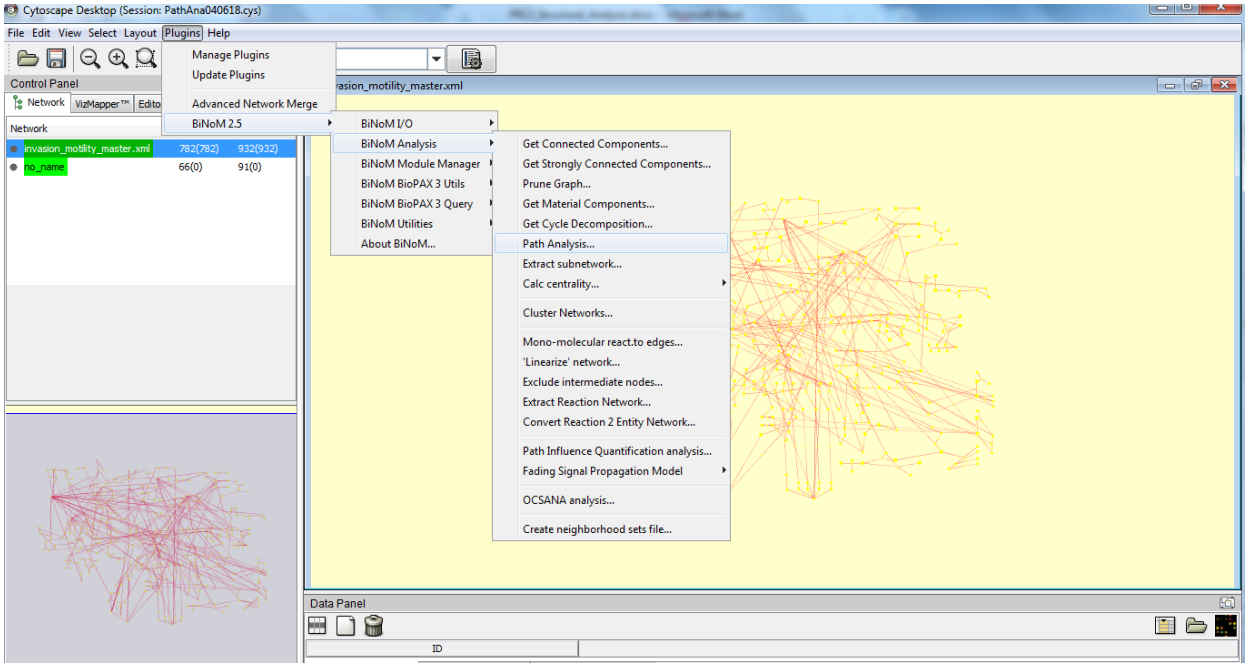

Figure 2 Selecting Path Analysis

3. After selecting path analysis, a dialogue will open; here you can define the source, the target and other parameters for the path analysis. In this example I will use PTP4A3 (PRL-3) as a source and EMT & motility as target.

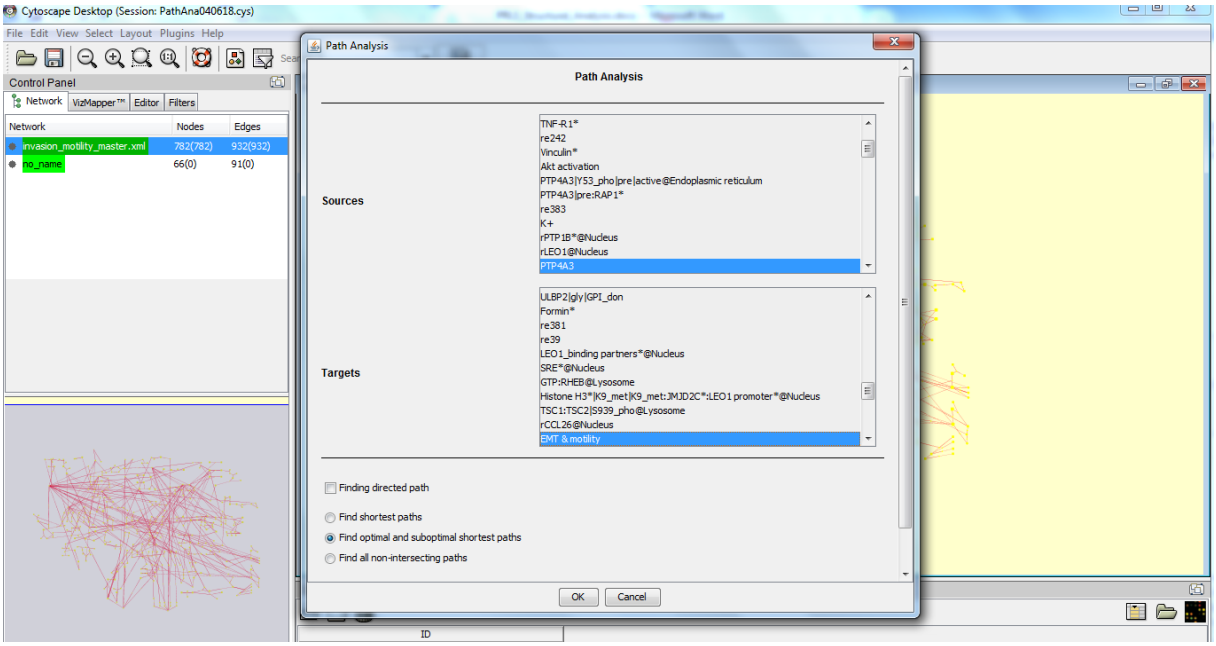

Figure 3 Path Analysis dialogue

4. After the analysis is performed, the nodes that are part of the paths are highlighted. Then select the extract network option in the menu to create a new network using only the participants of the pathway of interest. In the menu Plugins>BiNoM 2.5>BiNoM Analysis>Extract subnetwork… (Figure 5)

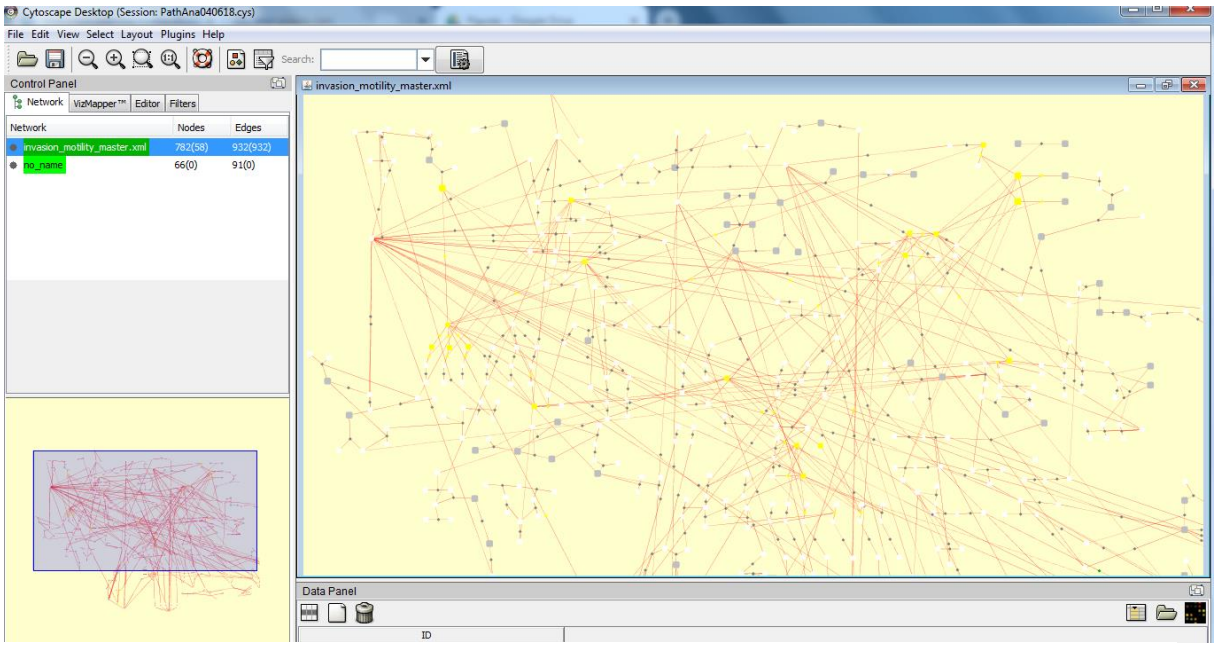

Figure 4 Path Analysis output

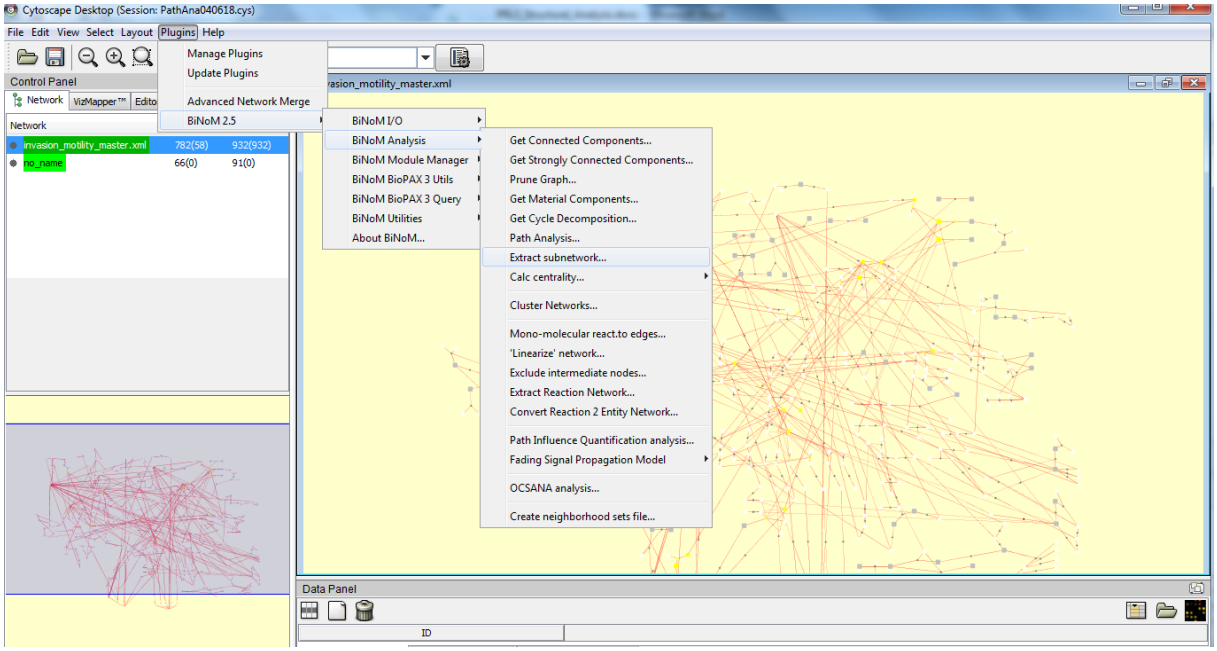

Figure 5 Selecting extract subnetwork

5. Then a dialogue appears with the different options and parameters to extract the subnetwork.

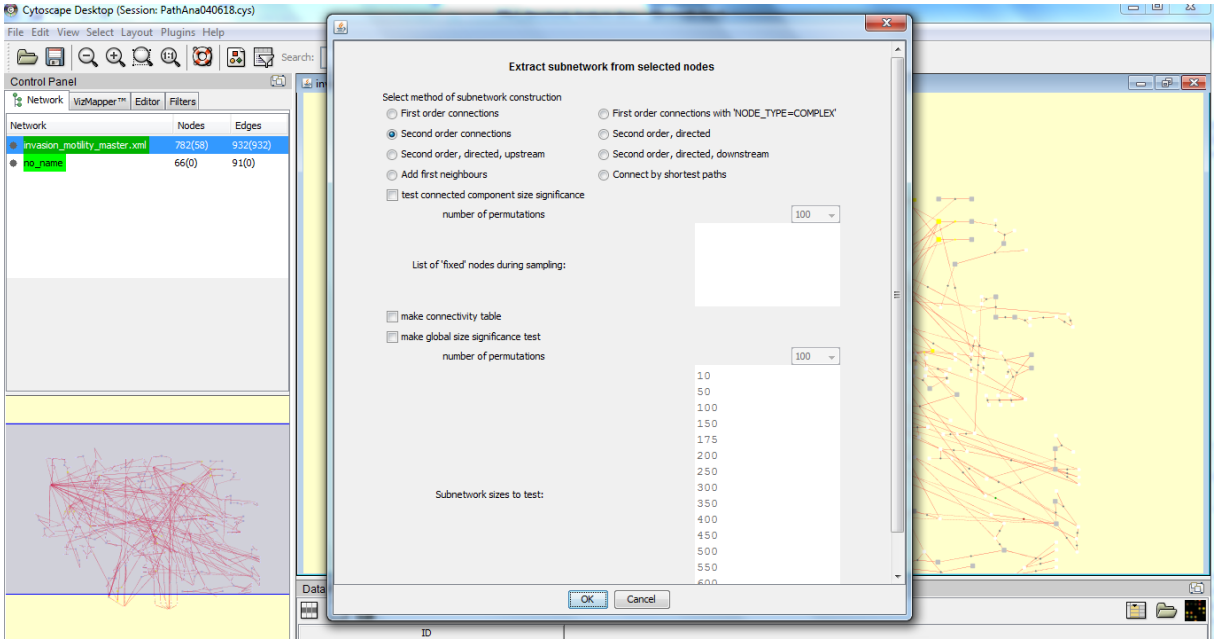

Figure 6 Menu to extract the subnetwork

6. Then the extracted network appeared as a new network.

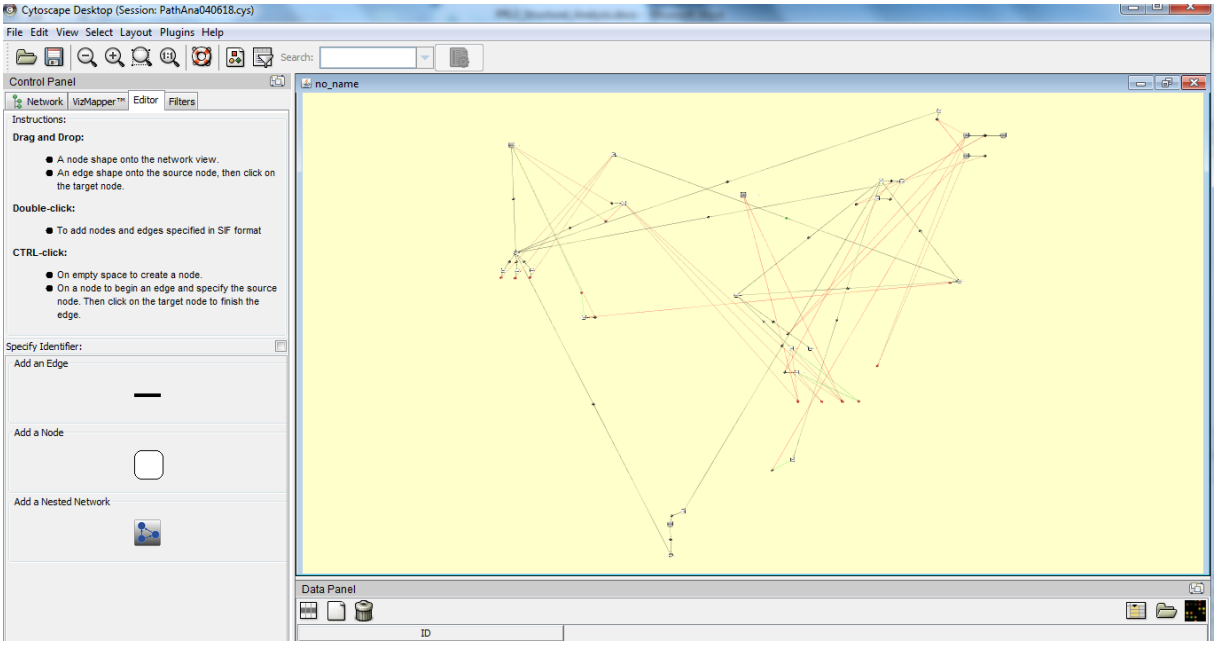

Figure 7 Extracted subnetwork

7. After ordering the nodes in the network, a more organized view can be achieved.

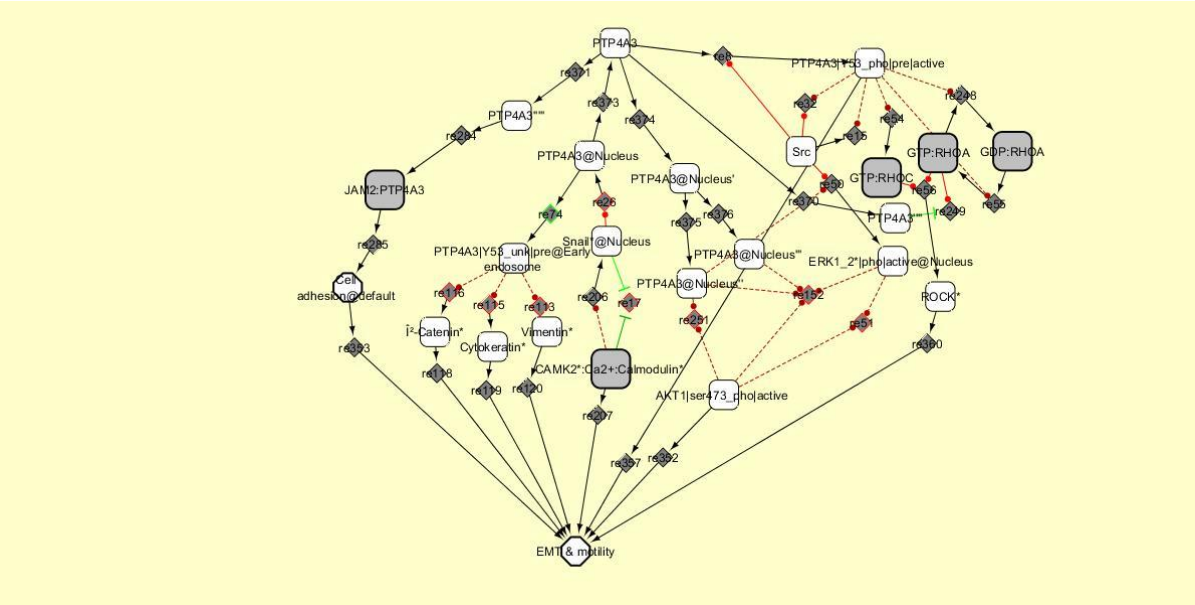

Figure 8 Organized view of the extracted subnetwork

8. Then using an image editor, a schematic representation of the key mechanisms was done.

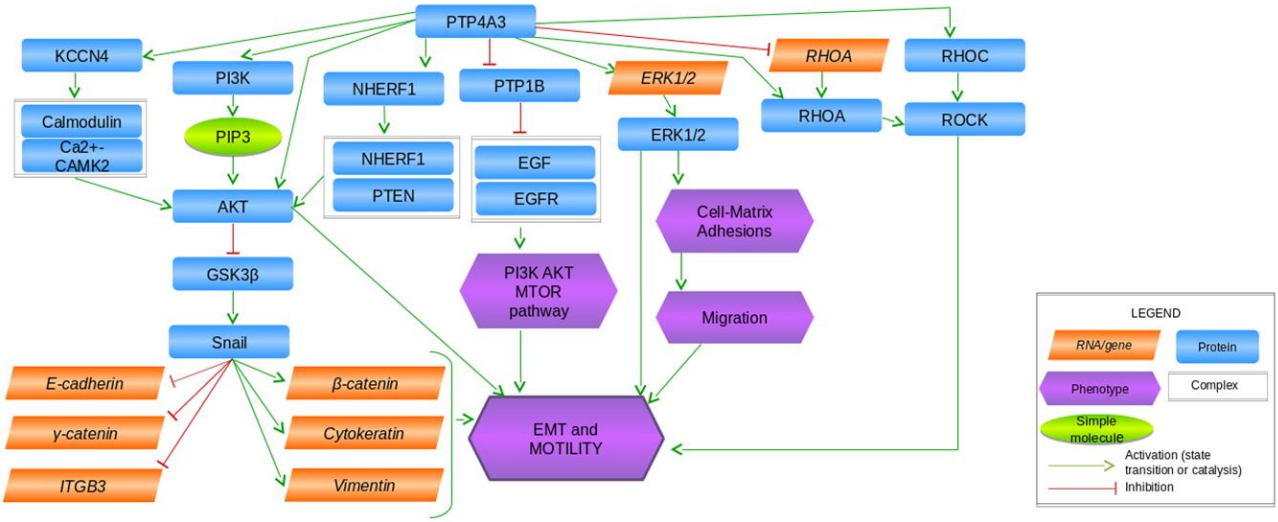

Figure 9 Schematic representation of the key players between PTP4A3 (PRL-3) and EMT and motility