Adding Interactions

This presentation gives a quick overview on how to add interactions into Osprey.

Adding Interactions

There are currently 4 different ways in which you can add interactions:

1.) From The GRID (General Repository of Interaction Datasets) database

2.) Directly in Osprey

3.) Custom Interactions files

4.) Gene lists

Note: This presentation assumes that you have successfully downloaded Osprey and are able to run it.

From The GRID Database

The GRID is a database of genetic and physical interactions. For more information visit, http://biodata.mshri.on.ca/grid/.

Any valid yeast ORF/gene name can be queried against The GRID database to see if any published interactions exist involving the query gene. There are three different ways that you can query The GRID from Osprey:

1.) “Gene Info” display area

2.) “Insert All Interactions for Selected” from the right-click pop up menu

3.) “Insert All Interactions for Selected” from the Insert option in the menu bar

From The GRID Database Cont..

1.) The “Gene Info” display area contains various information about a selected gene as well as a button labeled “Get New Interactions” (figure 1). If selected, Osprey will query The GRID with the gene/ORF name and display any results (figure 2). From this window you can choose to “Add All Interactions” or selectively add interaction using the “Add Selected Interactions.” Note: If an interaction already exists in your network then it will no longer be displayed.

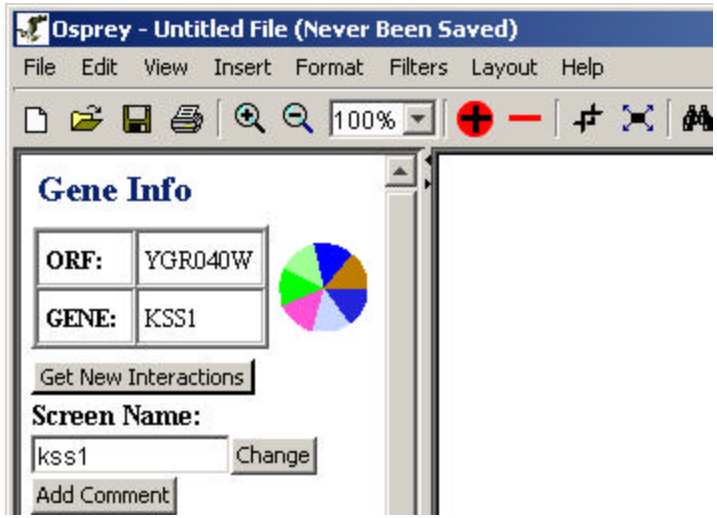


Figure 1: Gene Info display area showing the “Get New Interactions” button.

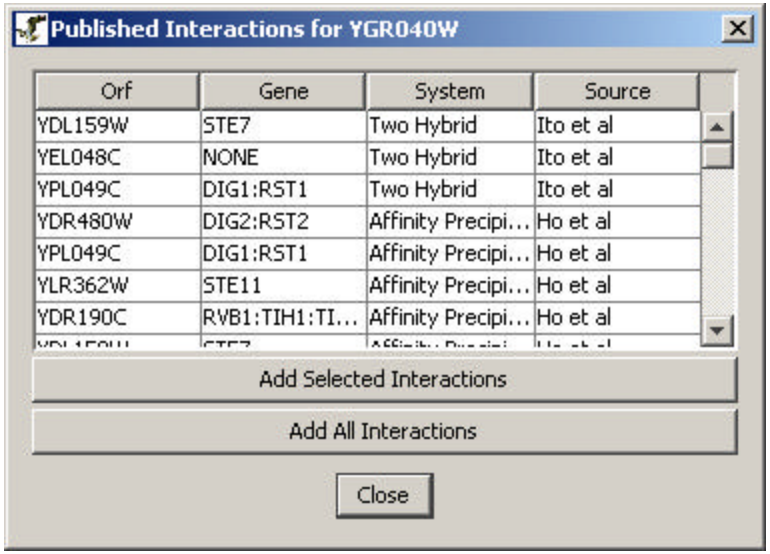


Figure 2: Resulting interaction display window after querying The Grid.

From The GRID Database Cont..

2/3.) The “Add All Interactions” is a convenience that Osprey allows the user to quickly build on a given network by automatically querying The GRID and returning all possible interactions. This option can be used on multiple selected genes/ORFs and can be accessed via the mouse right-click menu (figure 3), or under the “Insert” option in the main menu (figure 4).

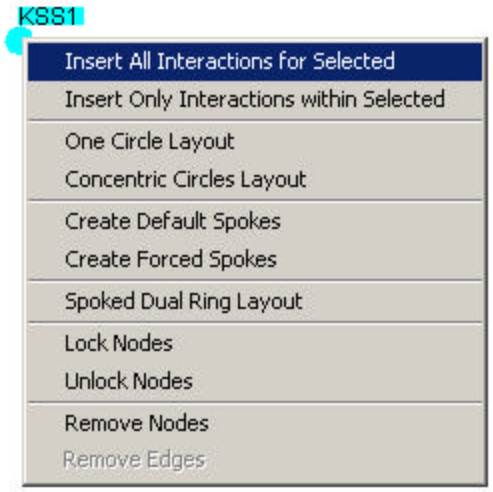


Figure 3: Mouse Right-Click menu displaying the “Insert All Interactions for Selected” option.

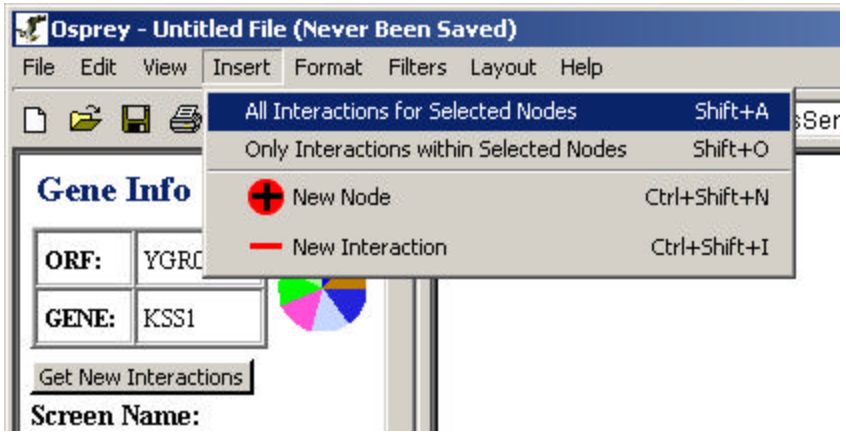
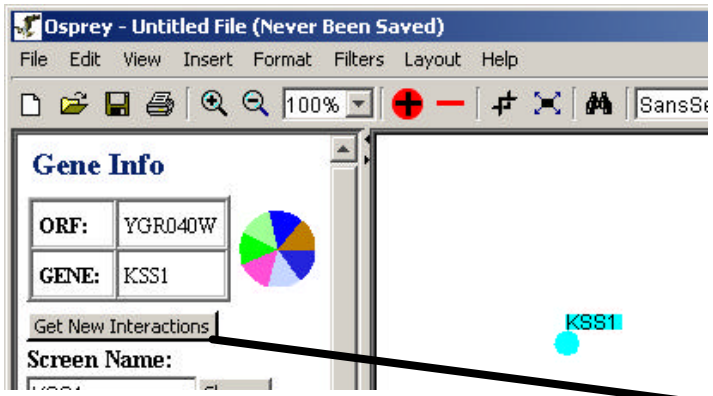


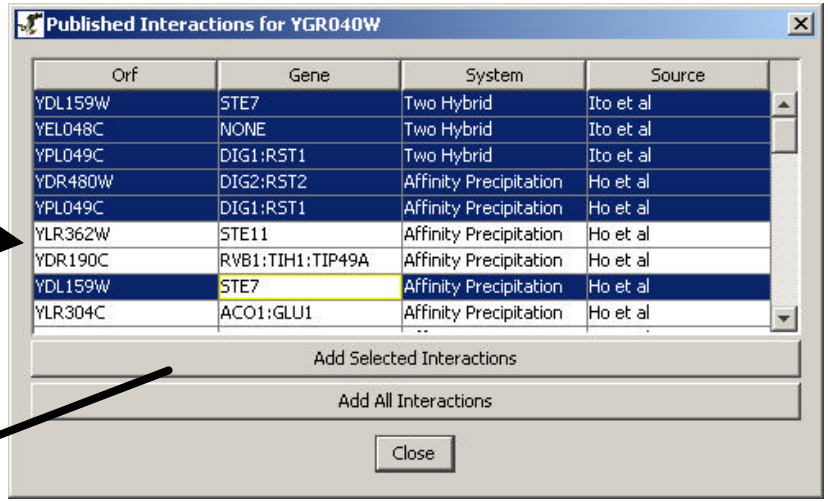
Figure 4: “All Interactions for Selected Nodes” from main menu.

From The GRID Database Example#1

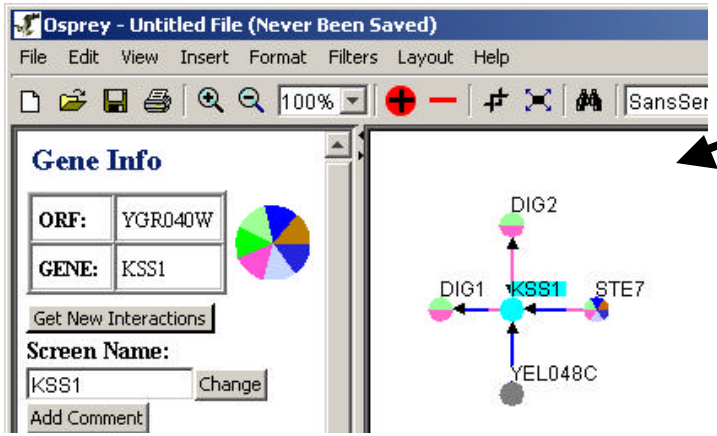
1.) Original network with KSS1 selected.



2.) After selecting the “Get New Interactions” button in the gene info display area.



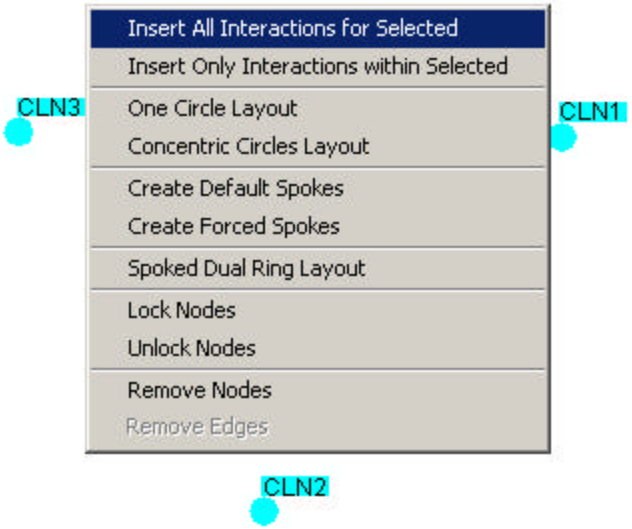
3.) After the selected interactions from The Grid were added.



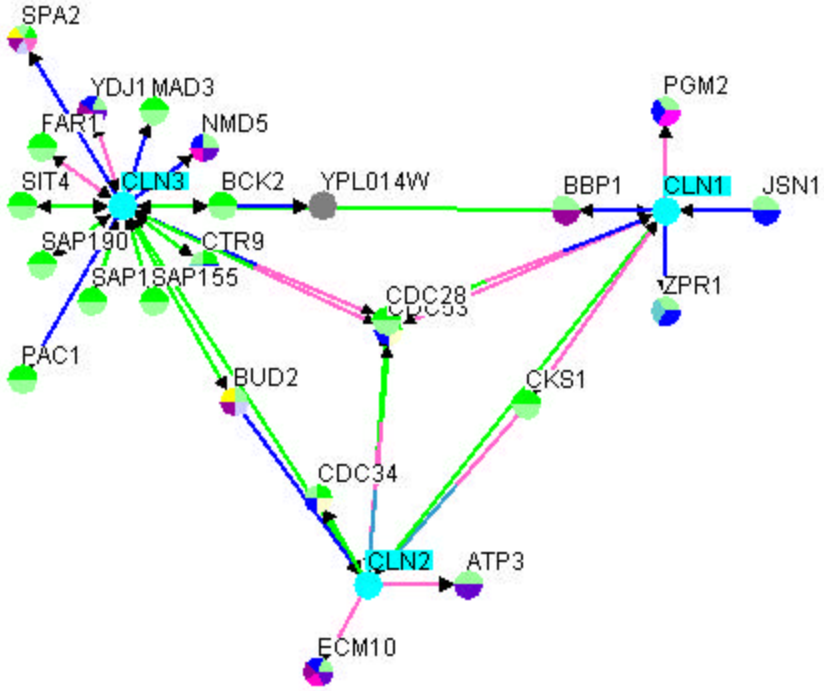
Osprey

From The GRID Database Example#2

1.) Network with CLN1, CLN2, CLN3 selected and Mouse Right-Click menu accessed.



2.) Resulting network after the “Insert All Interactions for Selected” option has been selected.



Directly in Osprey

Interactions can be added directly from within Osprey by using the add interaction function that can be accessed in one of two ways:

1.) Via the main menu item “New Interaction” located in the Insert option, shown in figure 5.

2.) Via the add interaction icon located on the toolbar, shown in figure 6.

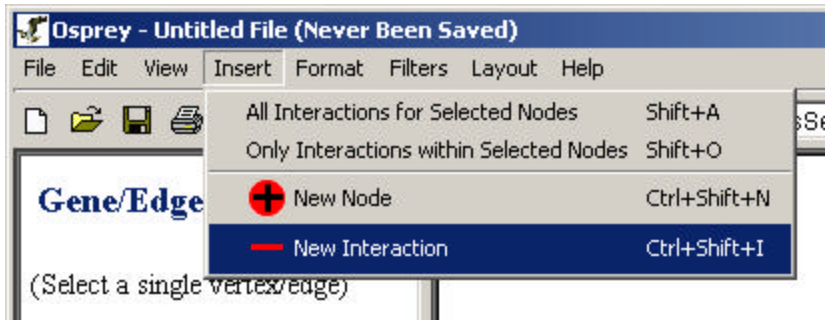


Figure 5: “New Interaction” option from the main menu.

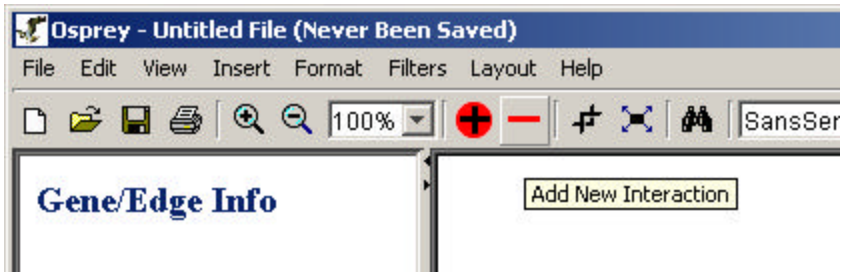


Figure 6: “New Interaction” option from the tool bar.

Directly in Osprey Cont…

After selecting the “Add New Interaction” option you will be presented with the screen shown in figure 7. From this screen you are provided with all the genes currently available in the network. You can now fill in all the information so that Osprey can add the new interaction. Direction goes from “Bait Gene” to “Target Gene”.

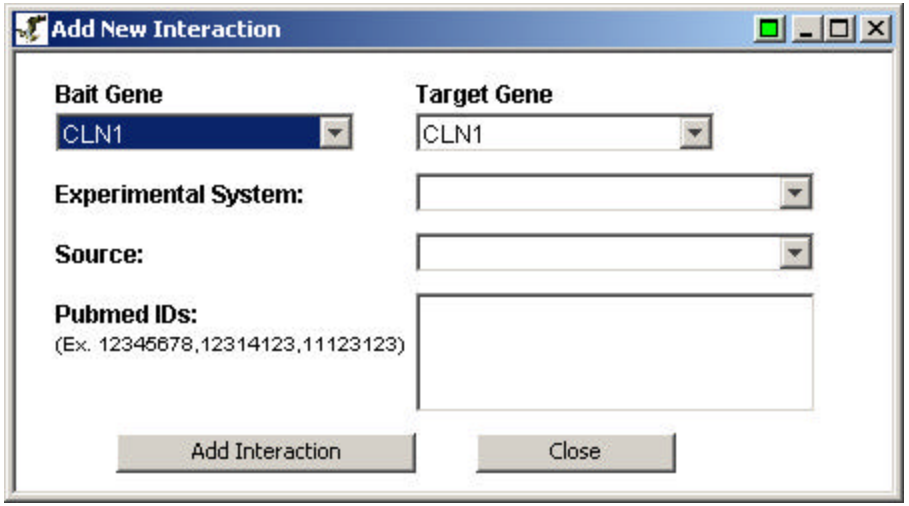


Figure 7: “Add New Interaction” window.

Directly in Osprey Example

If you want to add an interaction between the two genes “CLN1” and “CLN3” shown in figure 8. You would need to select the “Add New Interaction” option and select “CLN1” as your bait gene and “CLN3” as the target gene. You then can choose to fill in the experimental system, source and PubMed Ids if you want to provide Osprey with this information for grouping and filtering later. Finally you select the “Add Interaction” button found in the bottom left corner of the “Add New Interaction” window to add the interaction, see figure 9. The resulting network would then look like figure 10 with a new edge representing the recently added interaction.

Figure 8: Original network containing genes “CLN1” and “CLN3”.

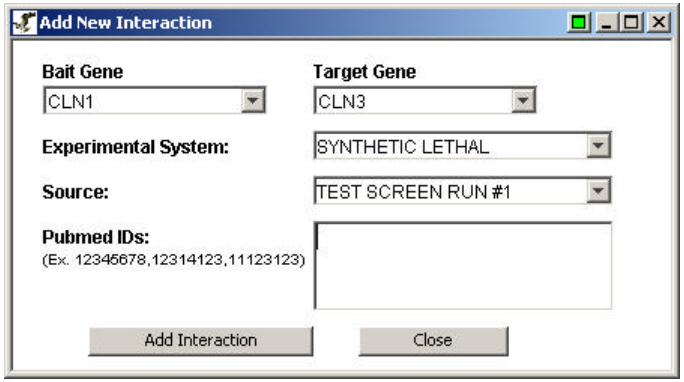


Figure 9: “Add New Interaction” window.

Figure 10: Resulting network with edge connecting genes “CLN1” and “CLN3”.

Custom Interactions files

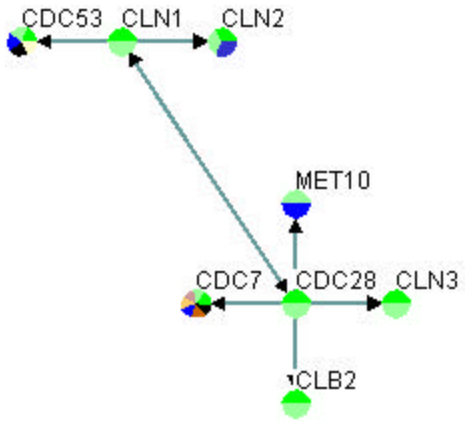
The Custom file format is a tab delimited text file that allows the user to load personal interaction data into Osprey. There are 4 variations to this file:

Custom File Variation #1: Simple custom file format designed to allow the user to quickly visualize their data. The two columns represent the different interaction pairs that will be displayed.

Custom File Variation #1

GeneA	GeneB
CDC28	CLN1
CDC28	CLN3
CDC28	CLB2
CDC28	CDC7
CDC28	MET10
CLN1	CDC28
CLN1	CLN2
CLN1	CDC53

Resulting Osprey Network



Note: The rows and columns in red are necessary where as the rows and columns in gray are optional.

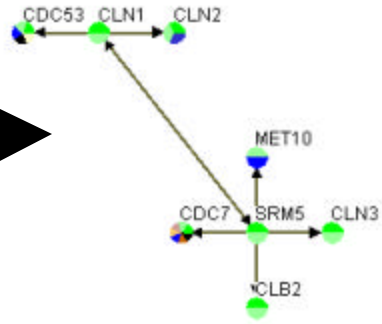
Custom Interactions files Cont…

Custom File Variation #2: This variation of the custom interaction file allows the user to provide a different screen name that will be displayed in the network while still providing Osprey with the correct gene/ORF name so that the proper annotation can be retrieved from The Grid. This is useful for displaying allele information.

Custom File Variation #2

GeneA	GeneB	GeneA Screen Name	GeneB Screen Name
CDC28	YMR199W	SRM5	CLN1
CDC28	CLN3	SRM5	CLN3
CDC28	CLB2	SRM5	CLB2
CDC28	CDC7	SRM5	CDC7
CDC28	MET10	SRM5	MET10
YMR199	CDC28	CLN1	SRM5
YMR199	CLN2	CLN1	CLN2
YMR199	CDC53	CLN1	CDC53

Resulting Osprey Network



Note: The rows and columns in red are necessary where as the rows and columns in gray are optional.

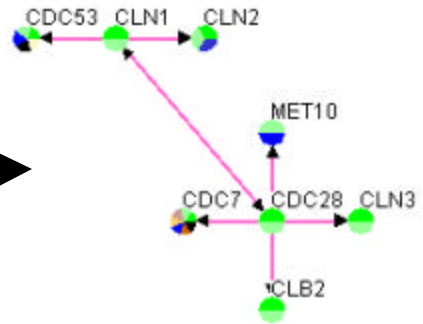
Custom Interactions files Cont…

Custom File Variation #3: Allows the user to provide Osprey with some details about the experimental system, source and any PubMed Ids that may contain information on this interaction. This additional information allows the user to take advantage of the experimental filters provided by Osprey. Multiple PubMed Ids can be added by separating them with semicolons with no blanks, i.e. 11805826:12765409

Custom File Variation #3

GeneA	GeneB	Experimental System	Source	PubMed ID
CDC28	CLN1	Affinity Precipitation	Gavin et al	11805826
CDC28	CLN3	Affinity Precipitation	Gavin et al	11805826
CDC28	CLB2	Affinity Precipitation	Gavin et al	11805826
CDC28	CDC7	Affinity Precipitation	Gavin et al	11805826
CDC28	MET10	Affinity Precipitation	Gavin et al	11805826
CLN1	CDC28	Affinity Precipitation	Gavin et al	11805826
CLN1	CLN2	Affinity Precipitation	Gavin et al	11805826
CLN1	CDC53	Affinity Precipitation	Gavin et al	11805826

Resulting Osprey Network



Note: The rows and columns in red are necessary where as the rows and columns in gray are optional.

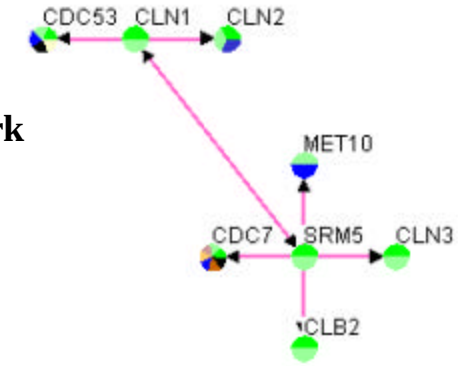
Custom Interactions files Cont…

Custom File Variation #4: This variation is a combination of the previous three, which allows the user to take full advantage of Osprey.

Custom File Variation #4

GeneA	GeneB	GeneA Screen Name	GeneB Screen Name	Experimental System	Source	PubMed ID
CDC28	YMR199W	SRM5	CLN1	Affinity Precipitation	Gavin et al	11805826
CDC28	CLN3	SRM5	CLN3	Affinity Precipitation	Gavin et al	11805826
CDC28	CLB2	SRM5	CLB2	Affinity Precipitation	Gavin et al	11805826
CDC28	CDC7	SRM5	CDC7	Affinity Precipitation	Gavin et al	11805826
CDC28	MET10	SRM5	MET10	Affinity Precipitation	Gavin et al	11805826
YMR199W	CDC28	CLN1	SRM5	Affinity Precipitation	Gavin et al	11805826
YMR199W	CLN2	CLN1	CLN2	Affinity Precipitation	Gavin et al	11805826
YMR199W	CDC53	CLN1	CDC53	Affinity Precipitation	Gavin et al	11805826

Resulting Osprey Network



Note: The rows and columns in red are necessary where as the rows and columns in gray are optional.

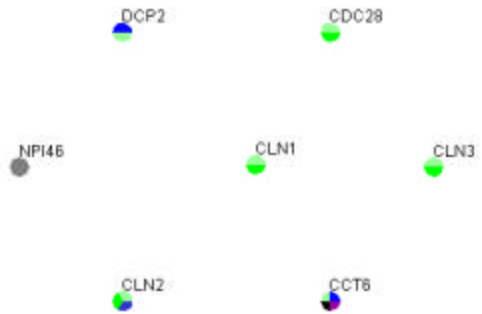
Gene lists

The Gene lists file format is a tab delimited text file that allows the user to load a list of genes into Osprey. There are 2 variations to this file:

Gene list Variation #1:
List of gene/ORF names

Gene
CDC28
CLN1
CLN2
CLN3
CCT6
DCP2
NPI46

Resulting Osprey Network



Gene list Variation #2: Additional column provided for changing the screen name displayed in Osprey while maintaining proper annotation for the given gene (useful for displaying allele information).

Gene	Screen Name
CDC28	CDC28
CLN1	CLN1
CLN2	CLN2
CLN3	CLN3
CCT6	CCT6
DCP2	DCP2
NPI46	NPI46

Note: The rows and columns in red are necessary where as the rows and columns in gray are optional.

Osprey

Opening files

To access the open file dialog in Osprey select the file option from the main menu and select the Open -> Standard option, shown in figure 11, or select the file open icon from the toolbar, shown in figure 12. This will then bring up the file dialog box where you can then choose both the location and type of file you are opening, shown in figure 13.

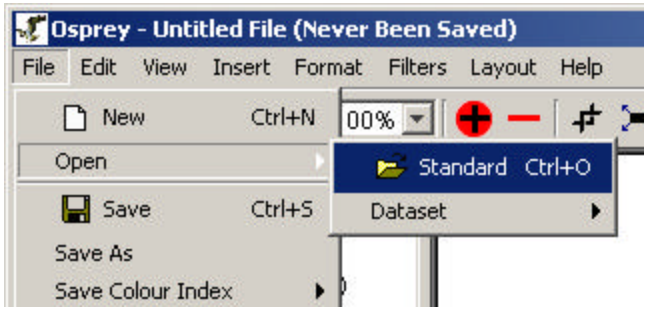


Figure 11: "All Interactions for Selected Nodes" from main menu.

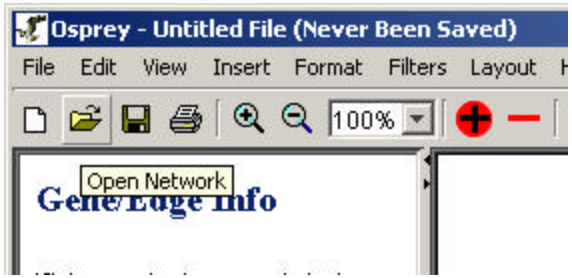


Figure 12: "All Interactions for Selected Nodes" from main menu.

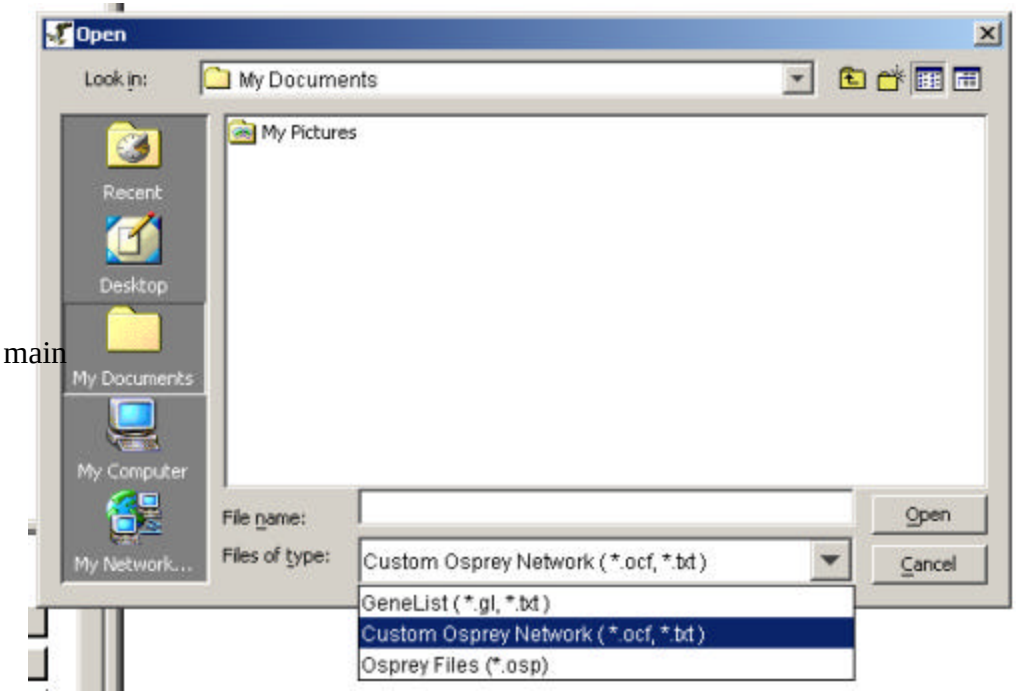


Figure 13: Open file dialog

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Breitkreutz, BJ., Stark, C., Tyers M. "Osprey: A Network Visualization System." Genome Biology 2003 4(3):R22