

Xeno-miRNet tutorial

Network creation

Goal for this tutorial

- Perform data filtering on the interaction table
- Perform nodes management on the original network

Initial interaction table

Perform data filter to keep higher confident results (see more details in next slide)

You can use the **Data Filter** to filter the results based on the **miRanda scores (140-200)** and **TarPmiR probability (0.5-1)**.

Target score by miRanda (140-200) and TarPmiR (0.5-1)

▼ Data Filter ↻ Reset ⌵ Download

Source	Xeno-Species	miRNA	Link	Host gene	Link	Expression	miRanda	TarPmiR	Reference	Action
ELV	S. japonicum (blood fluke)	sja-miR-2b-5p	miRBase	CFH	Entrez	4215	141	0.846	27172881	Delete
ELV	S. japonicum (blood fluke)	sja-miR-10-5p	miRBase	NFYA	Entrez	347581	147	1	27172881	Delete
ELV	S. japonicum (blood fluke)	sja-miR-125b	miRBase	NIPAL3	Entrez	260493	158	0.981	27172881	Delete
ELV	S. japonicum (blood fluke)	sja-miR-125b	miRBase	LASP1	Entrez	260493	144	0.923	27172881	Delete
		sja-miR-2b-5p	miRBase	M6PR	Entrez	4215	167	0.679	27172881	Delete
		sja-miR-125b	miRBase	CYP26B1	Entrez	260493	151	0.769	27172881	Delete
		sja-miR-10-5p	miRBase	ALS2	Entrez	347581	149	1	27172881	Delete
		sja-miR-10-5p	miRBase	CASP10	Entrez	347581	145	0.923	27172881	Delete
ELV	S. japonicum (blood fluke)	sja-miR-2b-5p	miRBase	CFLAR	Entrez	4215	161	1	27172881	Delete
ELV	S. japonicum (blood fluke)	sja-miR-125b	miRBase	CFLAR	Entrez	260493	159	0.923	27172881	Delete
ELV	S. japonicum (blood fluke)	sja-miR-2b-5p	miRBase	RBM5	Entrez	4215	142	0.731	27172881	Delete
ELV	S. japonicum (blood fluke)	sja-miR-10-5p	miRBase	RBM5	Entrez	347581	146	1	27172881	Delete
ELV	S. japonicum (blood fluke)	sja-miR-61	miRBase	MTMR7	Entrez	9634	146	1	27172881	Delete
ELV	S. japonicum (blood fluke)	sja-miR-10-5p	miRBase	SLC7A2	Entrez	347581	151	1	27172881	Delete
ELV	S. japonicum (blood fluke)	sja-miR-125b	miRBase	SARM1	Entrez	260493	159	0.846	27172881	Delete

(1 of 349) 1 2 3 4 5 6 7 8 9 10 15 ▼

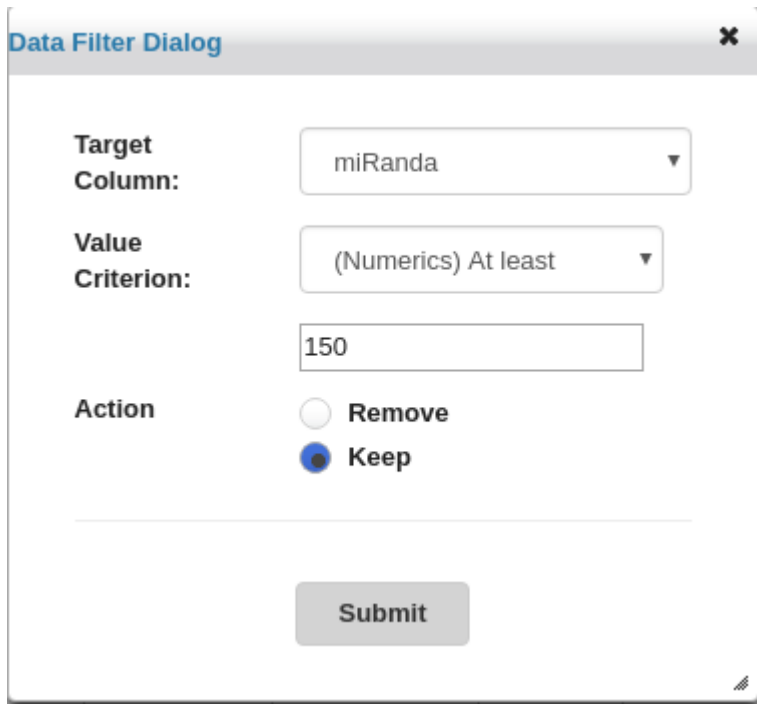
Search corresponding column by keywords

◀ Previous

Proceed ▶

Click "proceed" to the network builder

Perform data filtering



The screenshot shows a 'Data Filter Dialog' window with the following configuration:

- Target Column:** miRanda
- Value Criterion:** (Numerics) At least
- Value:** 150
- Action:** Keep, Remove

A 'Submit' button is located at the bottom of the dialog.

- **Step 1** : Choose a “target column” which you want to perform the filter.
- **Step 2** : Choose the filter option, “Matching” is filtering by the exact words, “Containing” is filtering by keywords, “At least” is filtering by expression level or predicted score.
- **Step 3** : Input the keywords and perform the filtering to keep or remove.

Optimizing network data

🏠 ▶ Search view ▶ Interaction Table ▶ Network Builder

Network Overview:

Number of queries:	5
Number of nodes:	1852 (miRNAs: 5, Targets: 1847)
Number of edges:	2008

In some cases, multiple isolated networks will be generated, with a big 'continent' containing most of queries, and several small 'islands' containing one or a few queries. These networks will be available for visual analysis in the next step.

Networks	Nodes	Edges	Queries	
xeno-mirnet1	1852	2008	5	⬇️ Download

Network Tools: ⓘ

- Degree Filter
- Betweenness Filter
- Shortest Path Filter
- Manual Batch Filter
- Update Network
- Reset Network

⬅️ Previous

➡️ Proceed

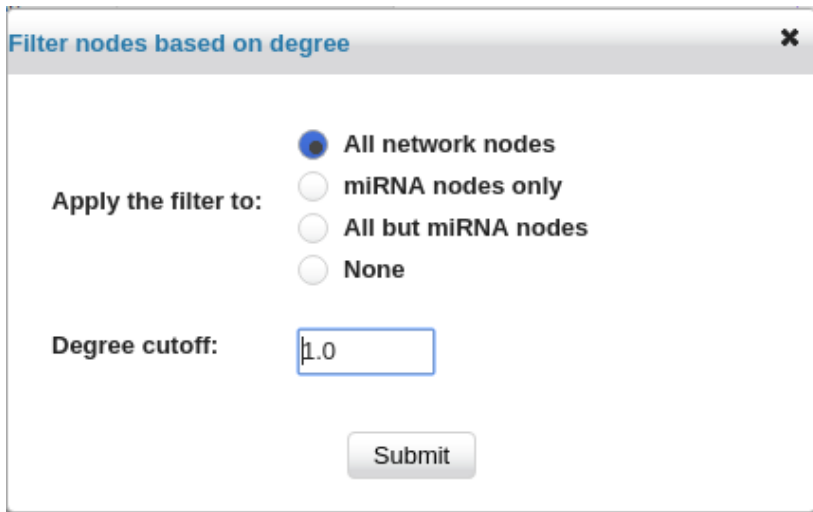
Summary for the nodes of the network

The details for each network (if there are more than one network)

Optimizing network by using network tools (see the next slide for more details)

Click to the network viewer page

Network tools – degree filter



Filter nodes based on degree

Apply the filter to:

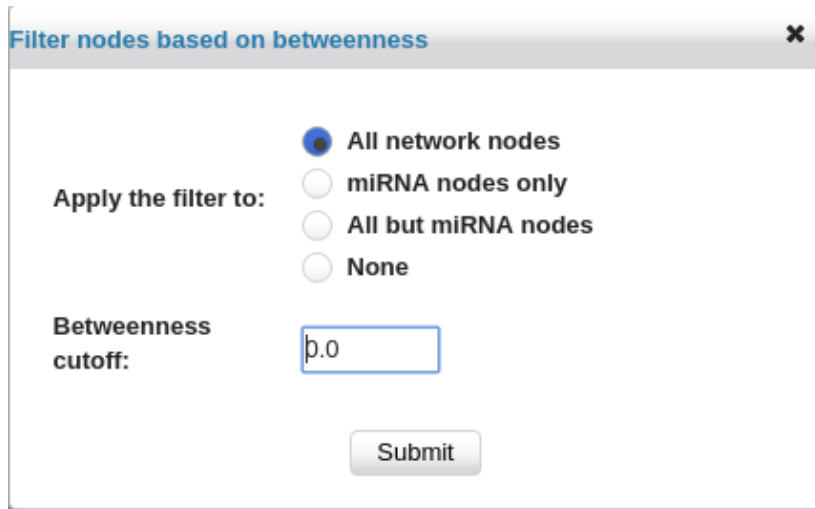
- All network nodes
- miRNA nodes only
- All but miRNA nodes
- None

Degree cutoff:

Submit

- The degree of a node is the number of connections it has to other nodes. Nodes with higher node degree act as hubs in a network.
- **Degree cutoff:** default 1.0, the minimal degree you want to choose.
- **All network nodes** : default option, choose all nodes in the network.
- **miRNA nodes only:** the degree filter will only perform in miRNA nodes.
- **All but miRNA nodes** : the degree filter will perform to other nodes except miRNA.
- **None:** Do not perform the filter.

Network tools – betweenness filter



Filter nodes based on betweenness

Apply the filter to:

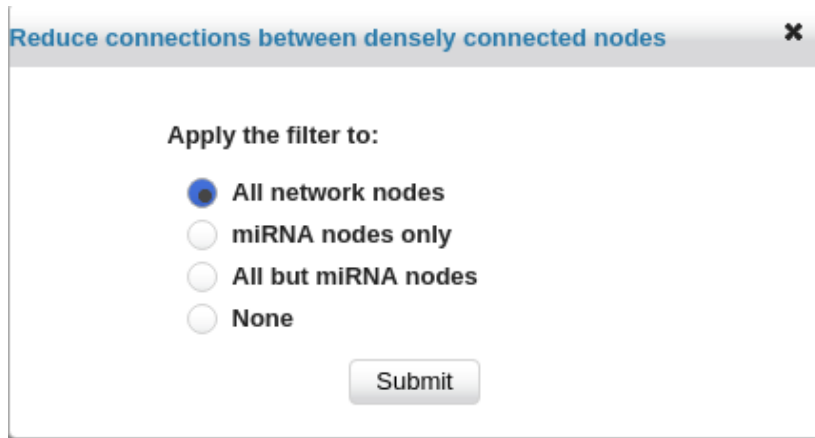
- All network nodes
- miRNA nodes only
- All but miRNA nodes
- None

Betweenness cutoff:

Submit

- The **betweenness centrality** measures the number of shortest paths going through the node. It takes into consideration the global network structure. For example, nodes that occur between two dense clusters will have a high betweenness centrality even if their degree centrality values are not high.
- **Degree cutoff:** default 0.0 (all nodes), the minimal betweenness you want to choose.
 - **All network nodes** : default option, choose all nodes in the network.
 - **miRNA nodes only:** the betweenness filter will only perform in miRNA nodes.
 - **All but miRNA nodes** : the betweenness filter will perform to other nodes except miRNA.
 - **None:** Do not perform the filter.

Network tools – shortest path filter



Reduce connections between densely connected nodes x

Apply the filter to:

- All network nodes
- miRNA nodes only
- All but miRNA nodes
- None

Submit

- **Shortest Path Filter** : If there are multiple paths that can link two nodes together, only one shortest path will be chosen to reduce dense networks.
- **All network nodes** : default option, choose all nodes in the network.
- **miRNA nodes only**: the filter will only perform in miRNA nodes.
- **All but miRNA nodes** : the filter will perform to other nodes except miRNA.
- **None**: Do not perform the filter.

==END==