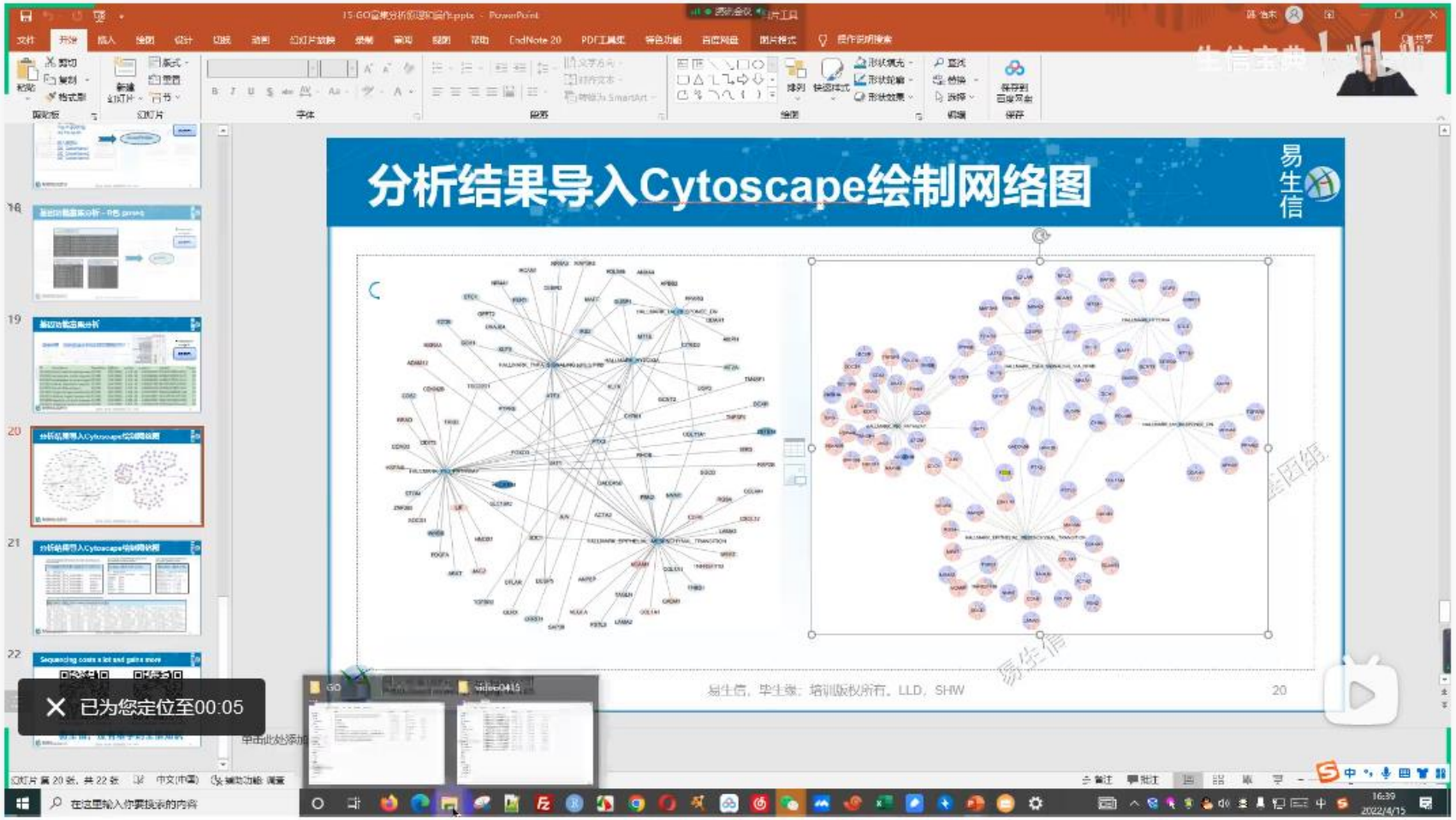
用Cytoscape绘制网络图

易生信

Cytoscape完整视频 链接

Cytoscape最新视频教程 - 一文学会Cytoscape

2396 2 2022-04-21 18:18:15 未经作者授权，禁止转载

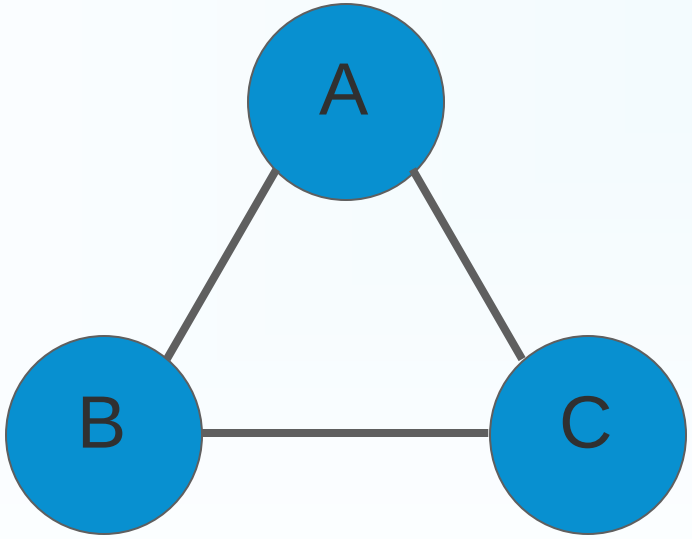


What is Cytoscape?

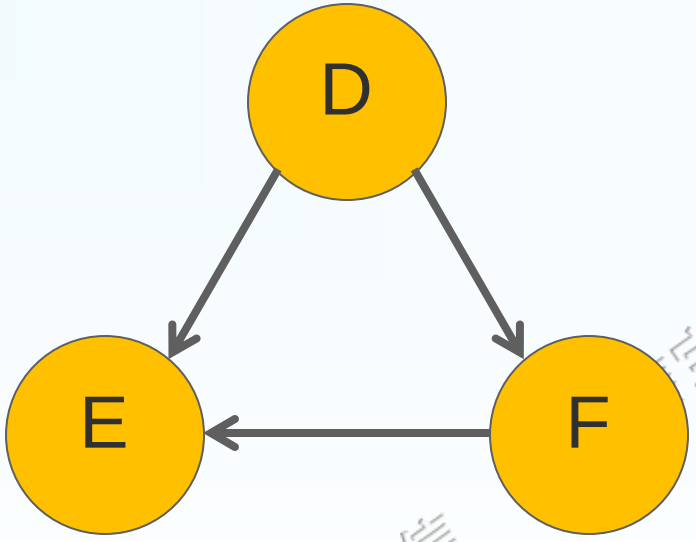
Cytoscape is an open source software platform for ***visualizing*** molecular interaction networks and biological pathways and ***integrating*** these networks with annotations, gene expression profiles and other state data. Although Cytoscape was originally designed for biological research, now it is a general platform for complex network analysis and visualization. Cytoscape *core* distribution provides a basic set of features for data integration, analysis, and visualization. Additional features are available as ***Apps*** (formerly called *Plugins*). Apps are available for network and molecular profiling analyses, new layouts, additional file format support, scripting, and connection with databases. They may be developed by anyone using the Cytoscape open API based on Java™ technology and App community development is encouraged. Most of the Apps are freely available from Cytoscape App Store.

网络的要素和类型

- 节点（Node）
  - 网络中的基本单元，基因、蛋白、药物分子等
- 边（Edge）
  - 节点之间的相互作用



无向网络



有向网络

主要内容

- Cytoscape安装
- 界面介绍
- 网络和本地数据的导入与作图
- App的安装和应用

Cytoscape的下载与安装

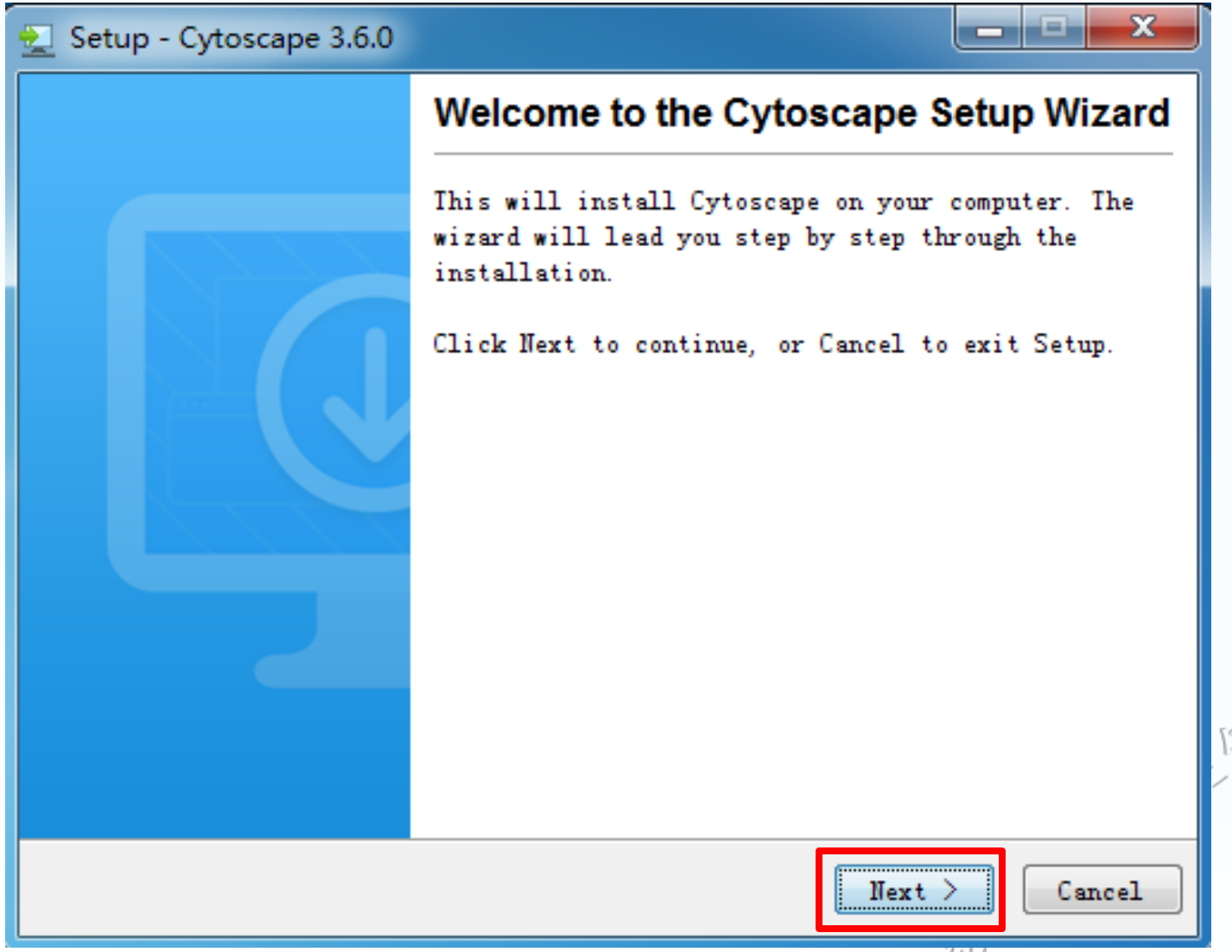
- http://cytoscape.org/

选择合适的版本下载

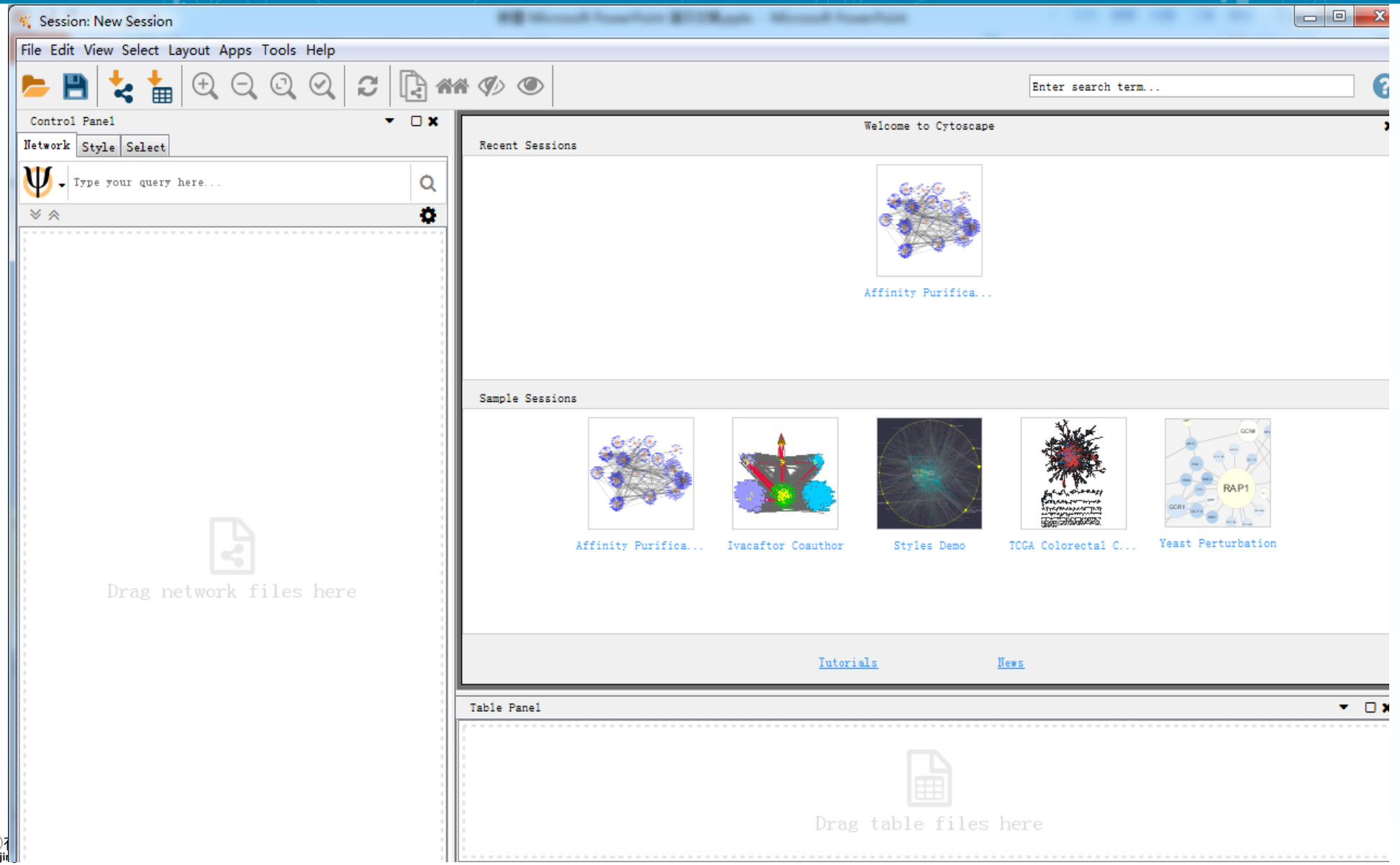
https://www.java.com/en/download/windows-64bit.jsp

http://www.oracle.com/technetwork/java/javase/downloads/jre8-downloads-2133155.html

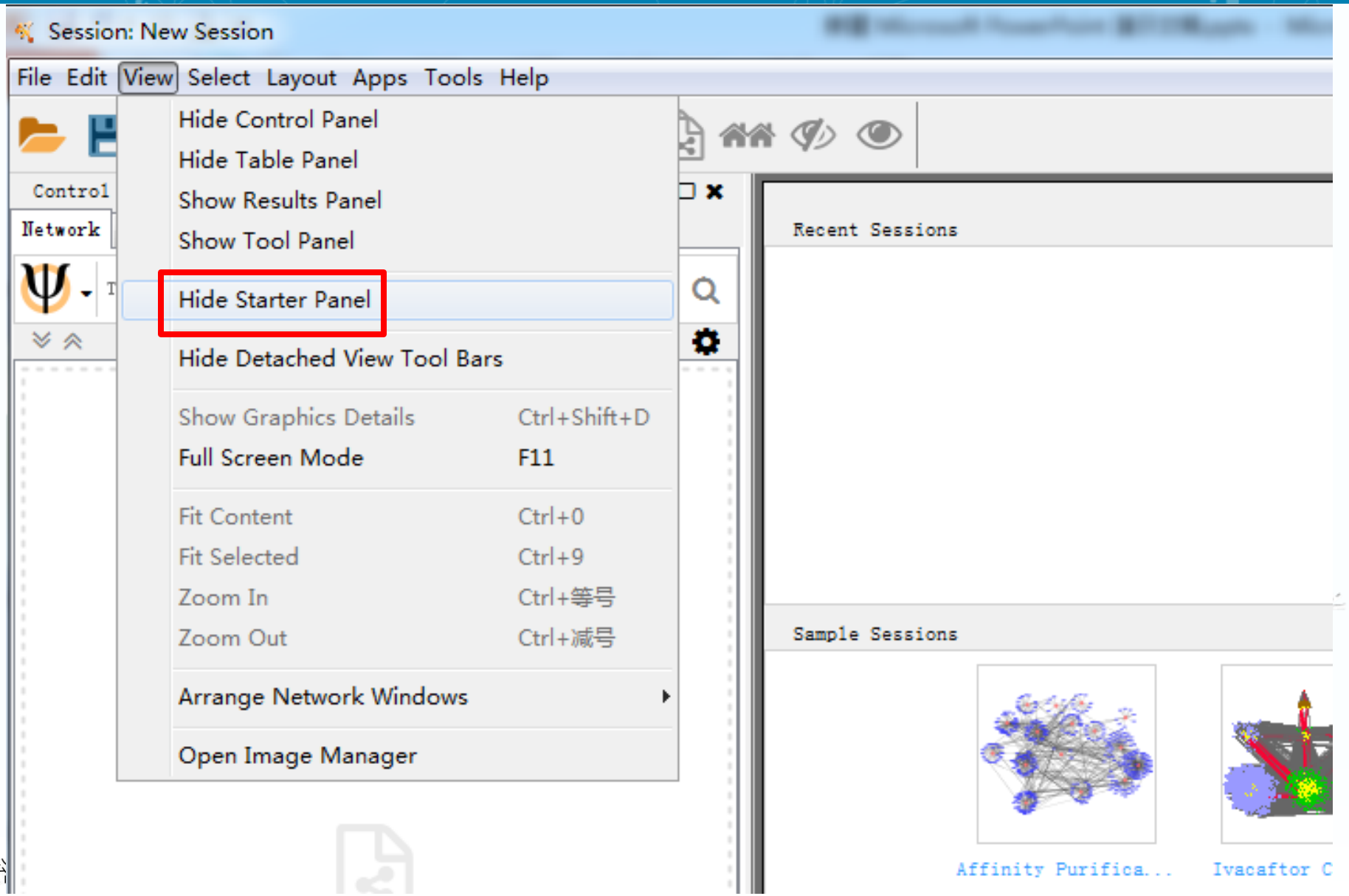
Cytoscape的安装



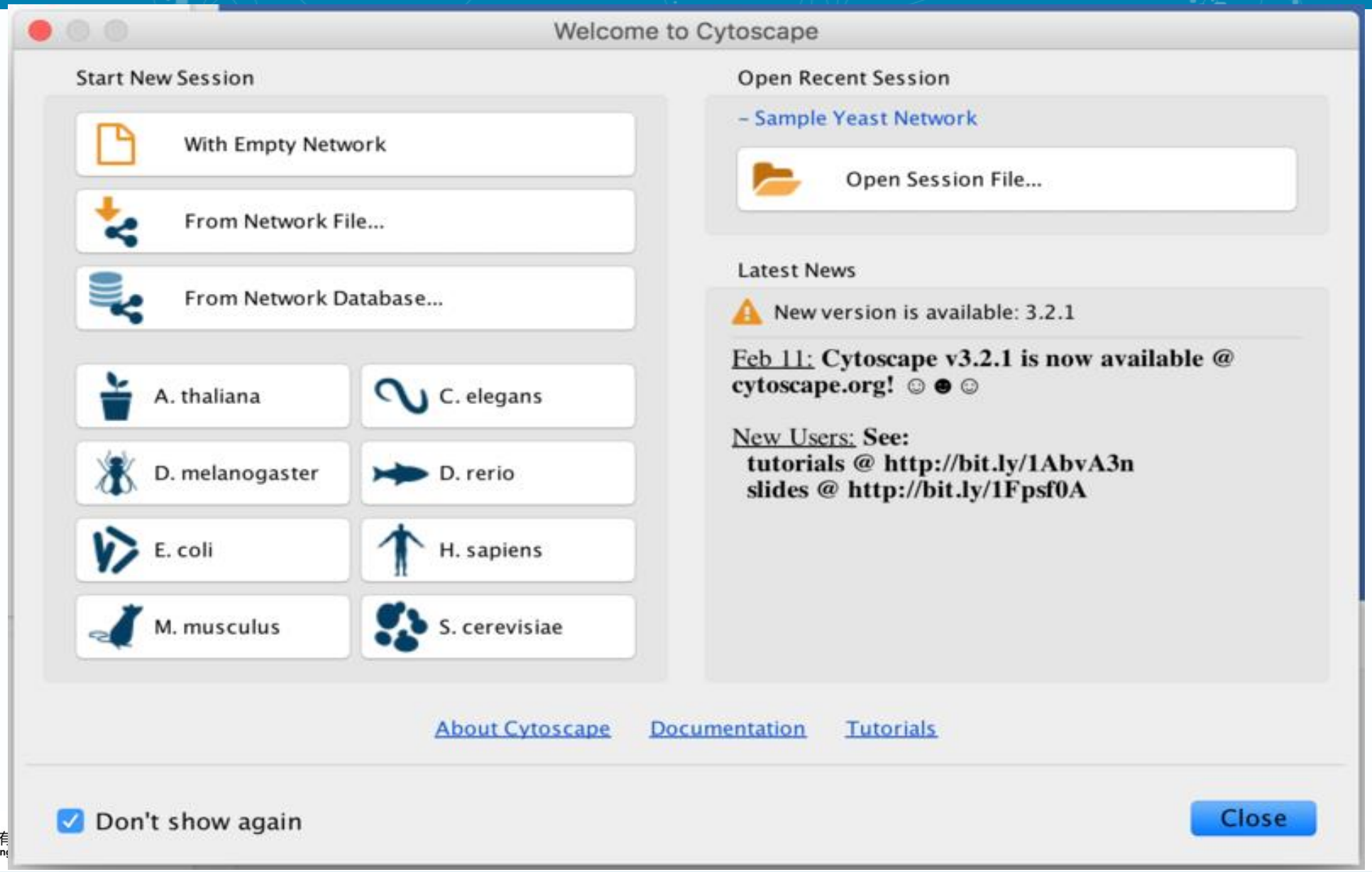
V3.6.0 Starter Panel



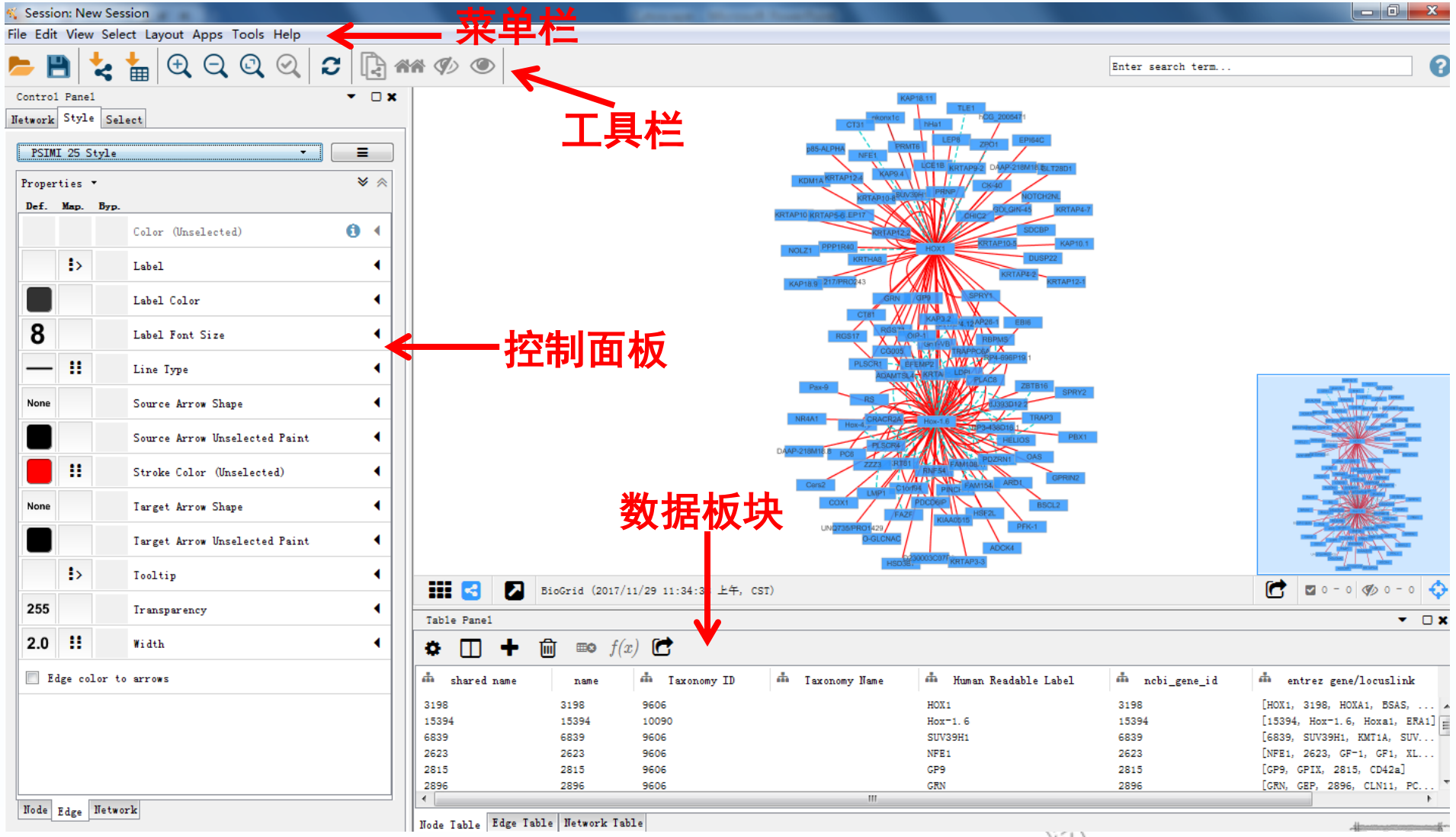
显示Starter Panel



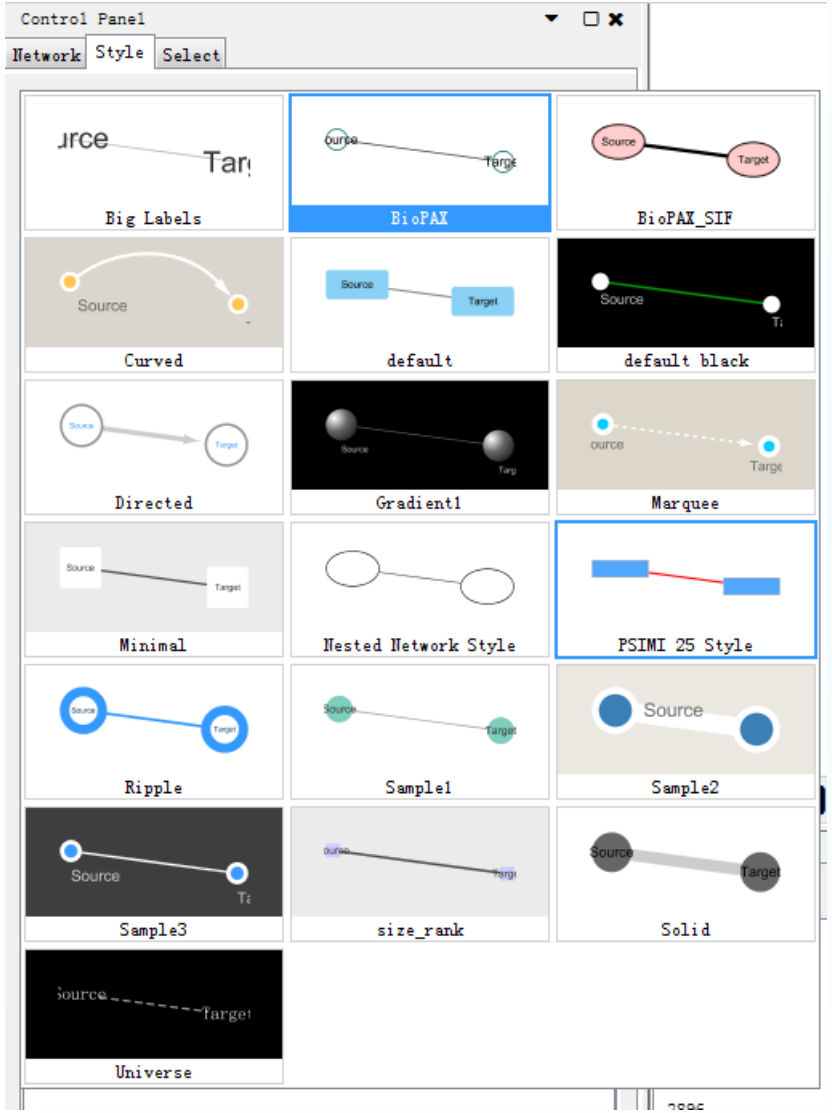
V3.2.1

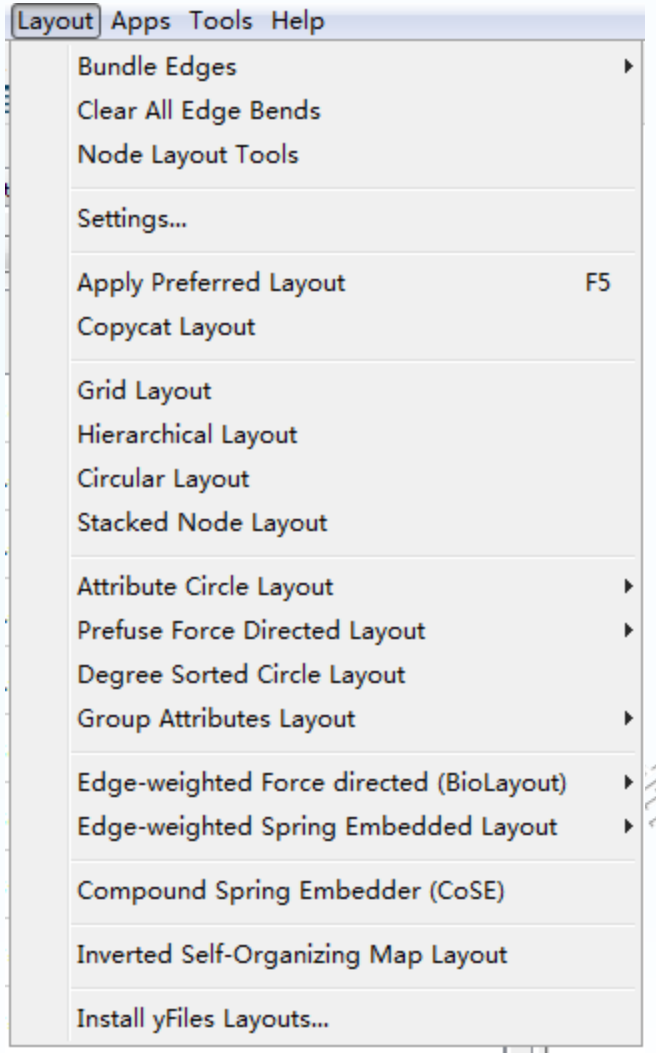

Welcome to Cytoscape
Start New Session
With Empty Network
From Network File...
From Network Database...
A. thaliana
C. elegans
D. melanogaster
D. rerio
E. coli
H. sapiens
M. musculus
S. cerevisiae
Open Recent Session
- Sample Yeast Network
Open Session File...
Latest News
New version is available: 3.2.1
Feb 11: Cytoscape v3.2.1 is now available @ cytoscape.org! ☺ ☻ ☺
New Users: See:
tutorials @ http://bit.ly/1AbvA3n
slides @ http://bit.ly/1Fpsf0A
About Cytoscape
Documentation
Tutorials
Don't show again
Close

界面介绍

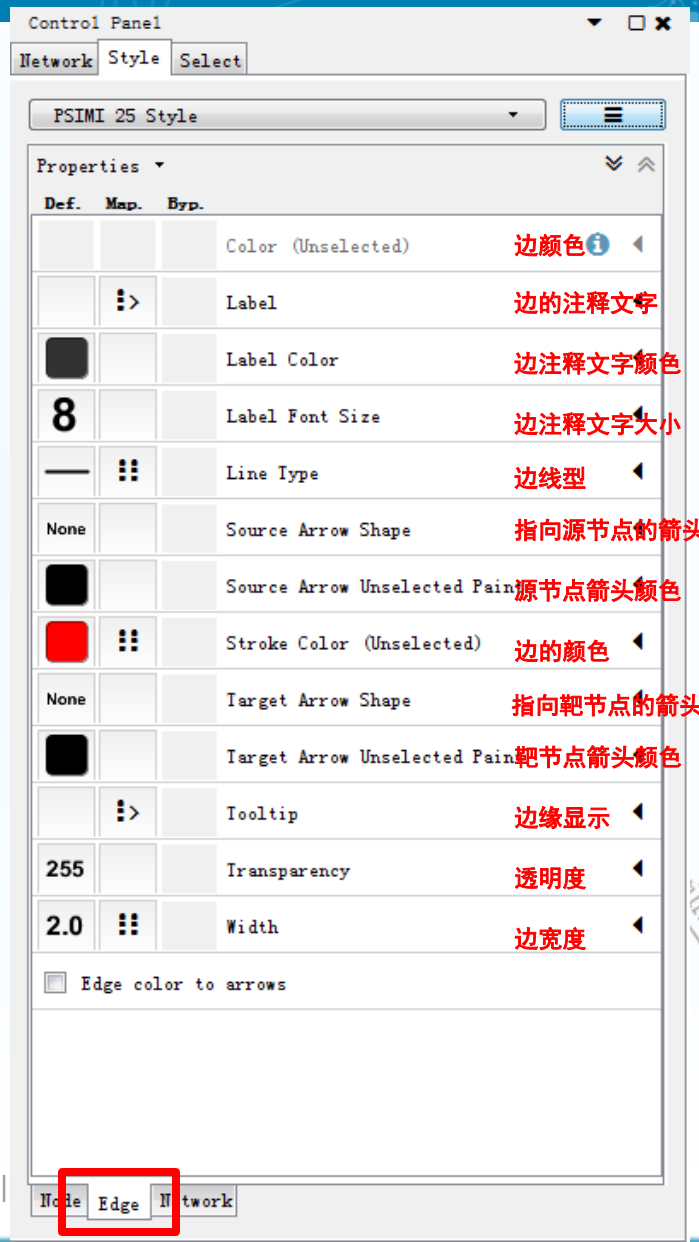

Session: New Session
File Edit View Select Layout Apps Tools Help
菜单栏
工具栏
Enter search term...
Control Panel
Network Style Select
PSIMI 25 Style
控制面板
Properties
Def. Map. Byp.
Color (Unselected)
Label
Label Color
Label Font Size
Line Type
Source Arrow Shape
Source Arrow Unselected Paint
Stroke Color (Unselected)
Target Arrow Shape
Target Arrow Unselected Paint
Tooltip
Transparency
Width
Edge color to arrows
Node Edge Network
数据板块
BioGrid (2017/11/29 11:34:3 上午, CST)
Table Panel
shared name name Taxonomy ID Taxonomy Name Human Readable Label ncbi_gene_id entrez gene/locuslink
3198 3198 9606 HOX1 3198 [HOX1, 3198, HOXA1, BSAS, ...
15394 15394 10090 Hox-1.6 15394 [15394, Hox-1.6, Hoxa1, ERA1]
6839 6839 9606 SUV39H1 6839 [6839, SUV39H1, KMT1A, SUV...
2623 2623 9606 NFE1 2623 [NFE1, 2623, GF-1, GF1, XL...
2815 2815 9606 GP9 2815 [GP9, GPIX, 2815, CD42a]
2896 2896 9606 GRN 2896 [GRN, GEP, 2896, CLN11, PC...
Node Table Edge Table Network Table

图形的风格和整体布局

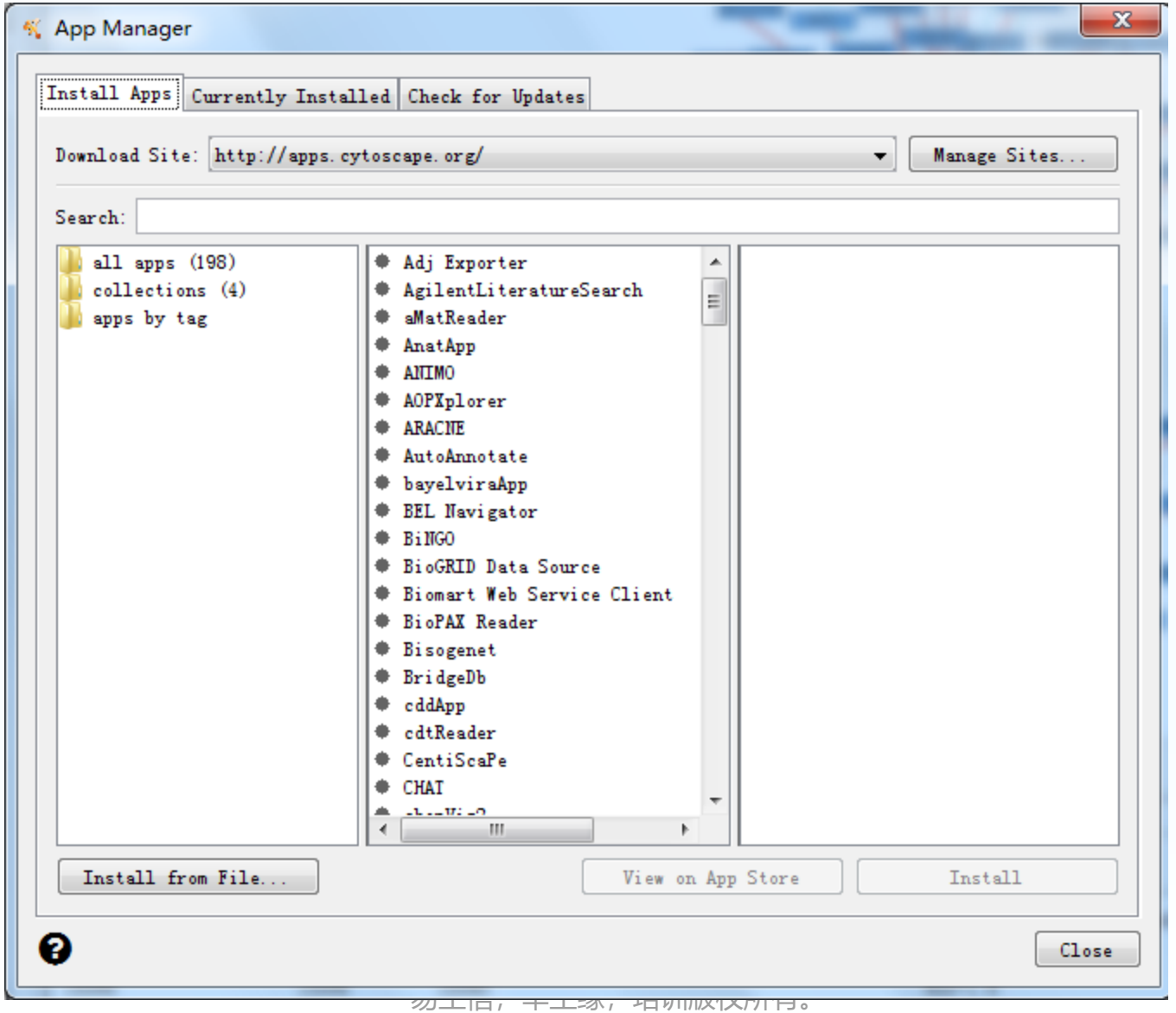




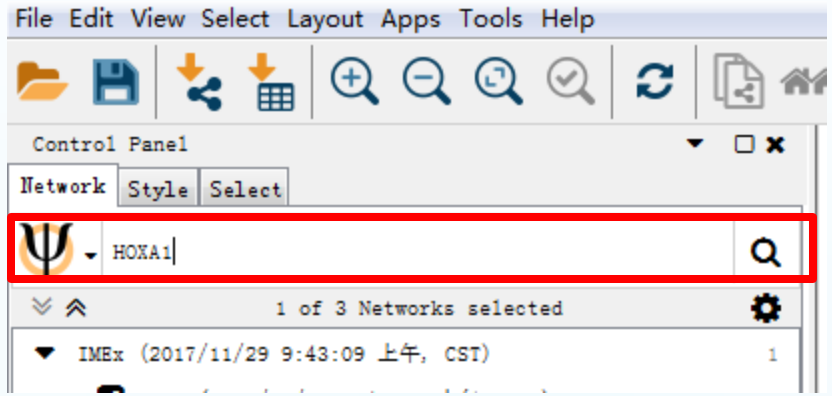
节点和边的参数设置

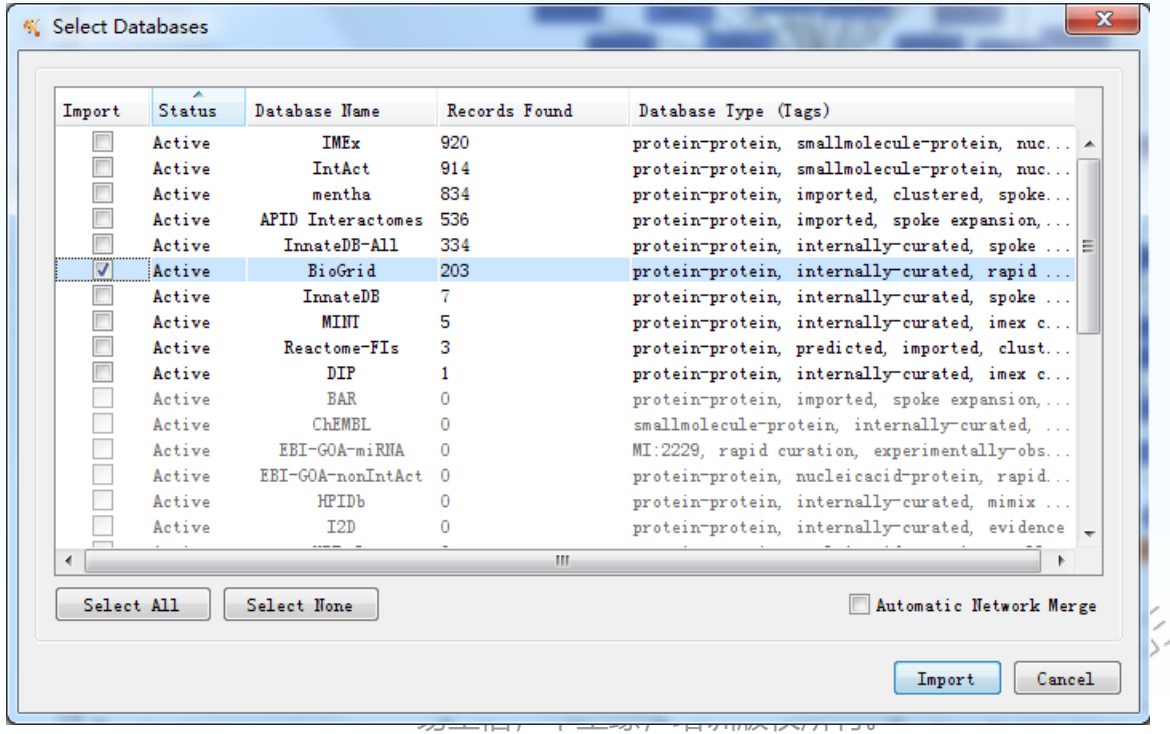


App插件

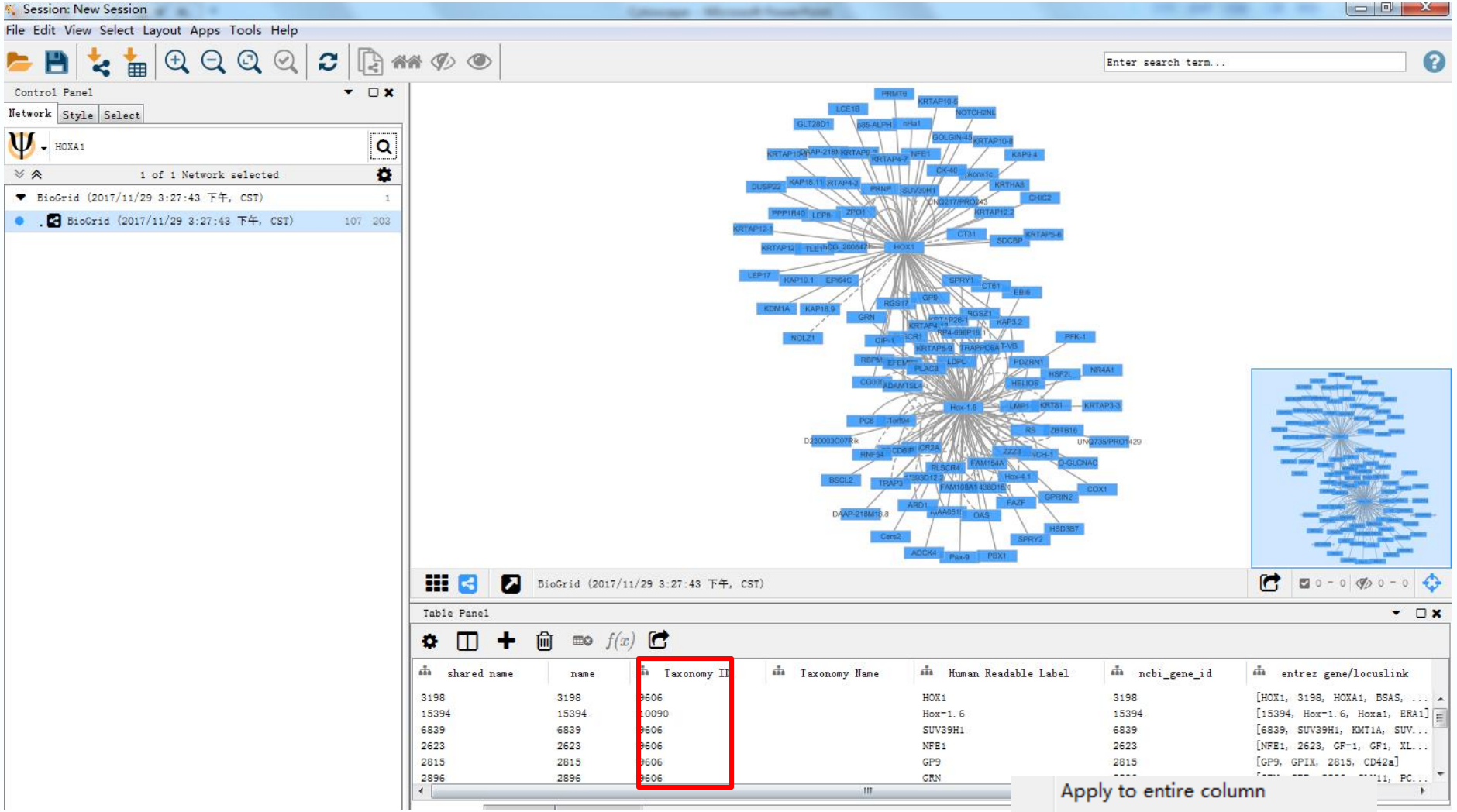


直接从网络数据库导入数据



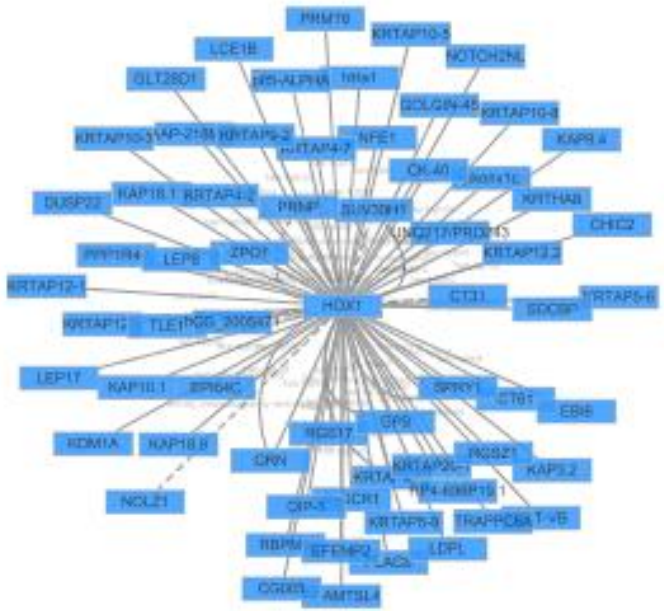


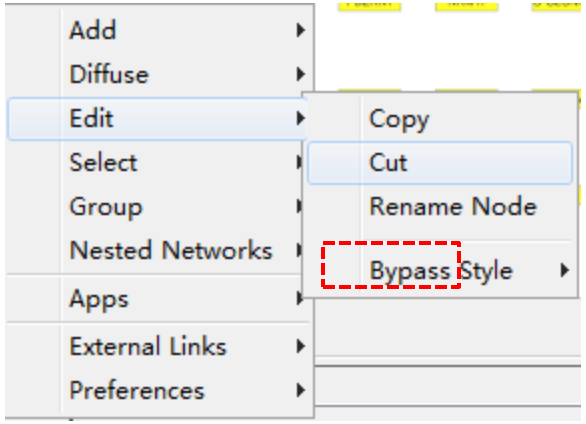
初步形成的网络图



选中非目的基因，点击右键 →

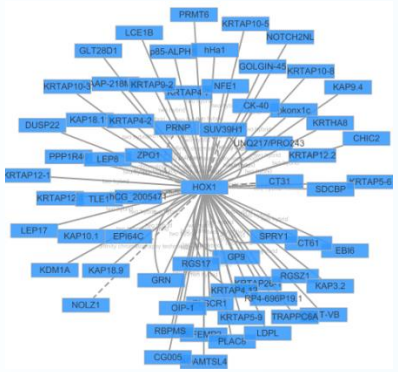
删掉非目的物种的分子

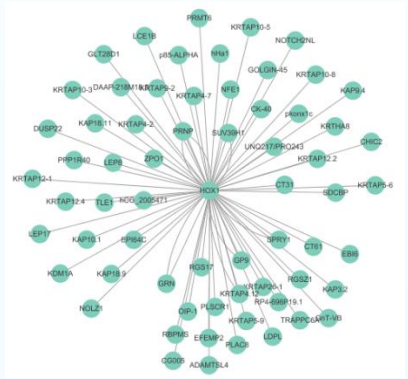




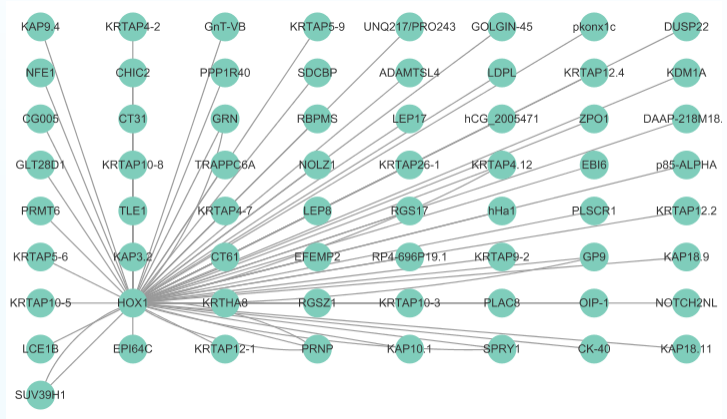
美化加工

- Style和layout整体布局



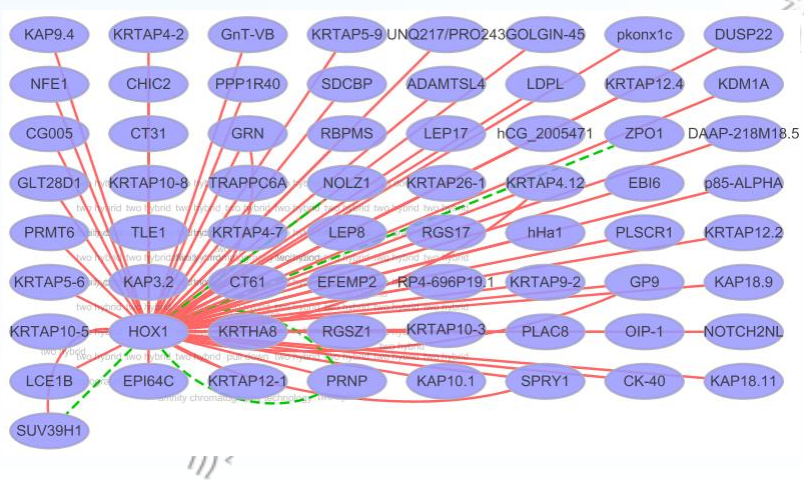


Sample1 style



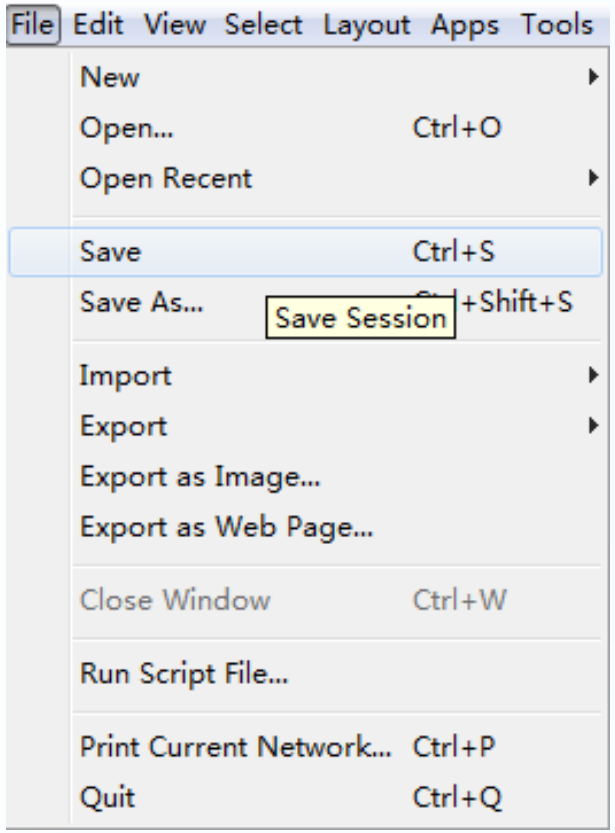
Grid layout

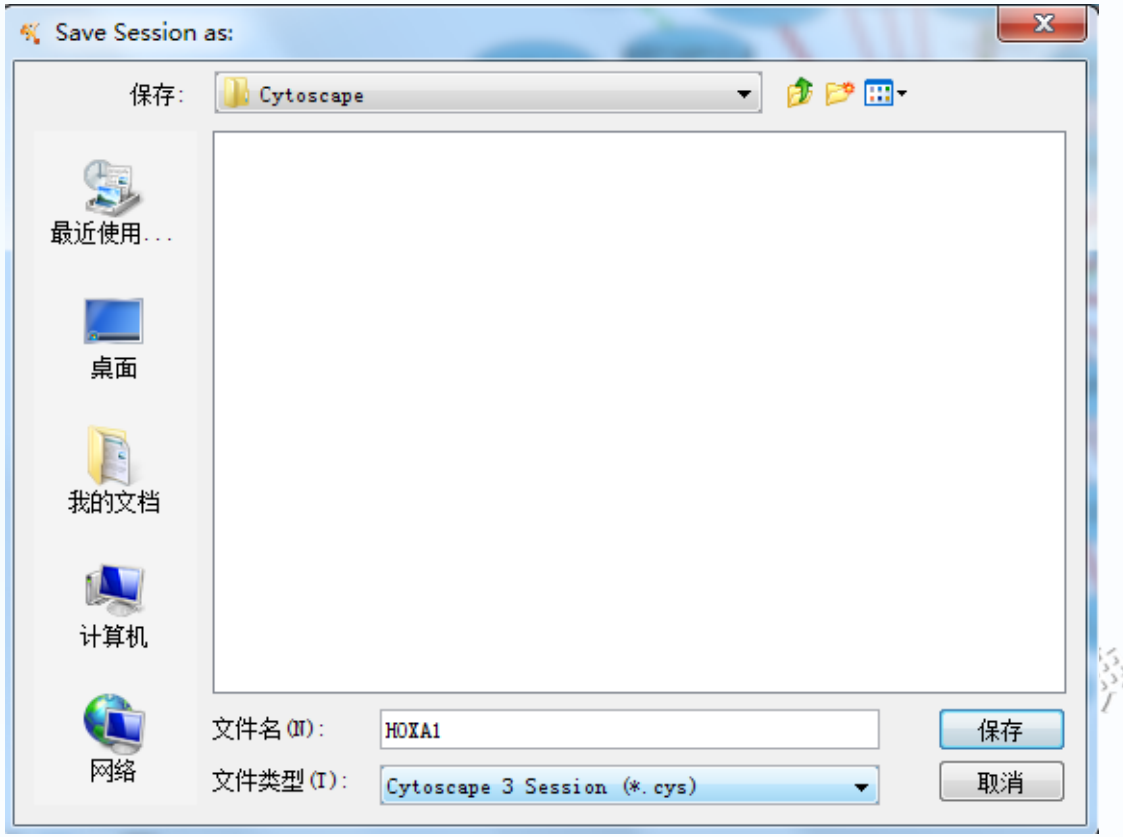
- 节点和边的参数设置



数据和网络互作图的保存

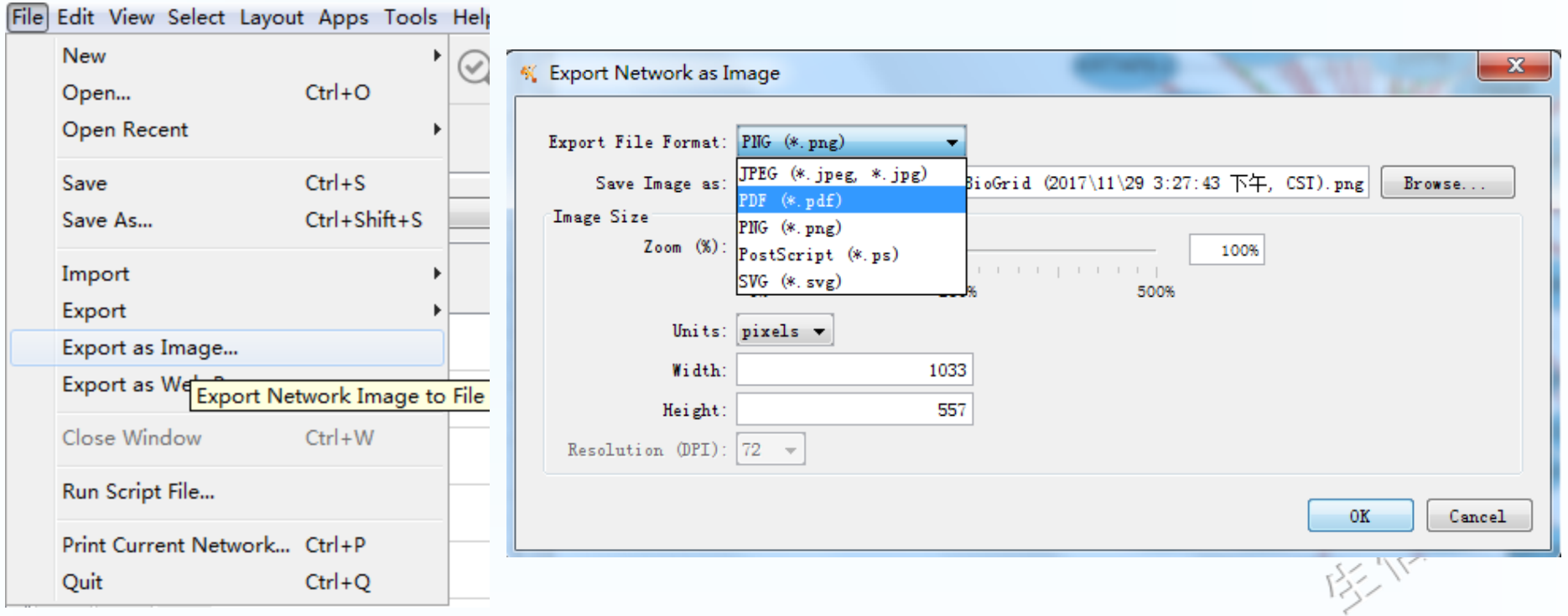
- Save session





数据和网络互作图的保存

- Save picture



本地数据导入作图-数据格式

- Cytoscape支持并识别多种格式的文件：txt、excel
- 互作网络数据文件中至少包括两列：源节点和靶节点。建议加上互作关系的类型（边的类型）

souce	target
miRNA1	gene1
miRNA1	gene2
miRNA1	gene3
miRNA2	gene2
miRNA3	gene3
TF1	miRNA1
TF1	miRNA2
TF2	miRNA3

souce	interaction	target
miRNA1	indirect	gene1
miRNA1	direct	gene2
miRNA1	direct	gene3
miRNA2	direct	gene2
miRNA3	direct	gene3
TF1	direct	miRNA1
TF1	direct	miRNA2
TF2	direct	miRNA3

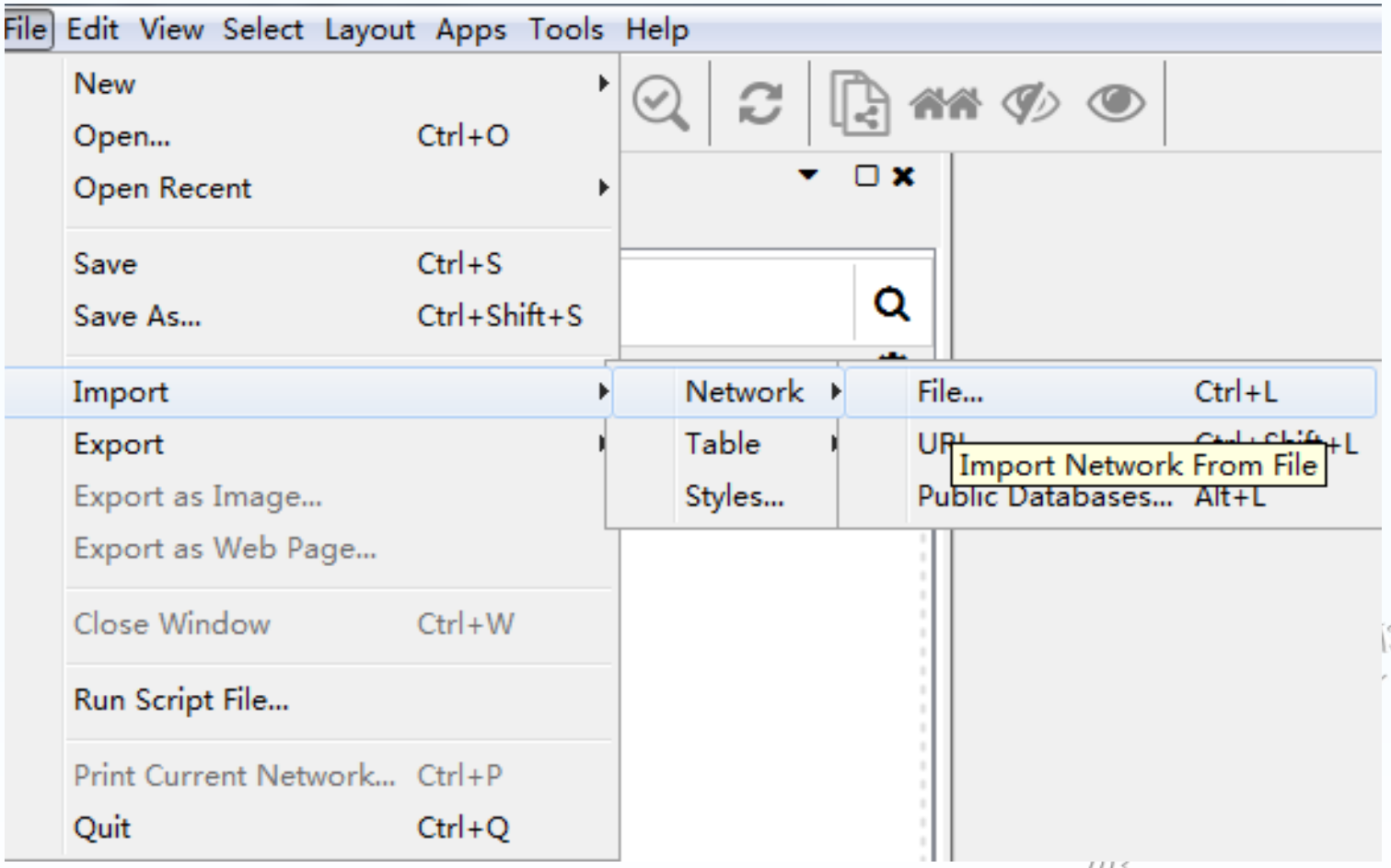
本地数据导入作图-数据格式

- 属性数据文件，用来设置节点的显示方式。
  - 节点名称要和构建网络数据中的一致

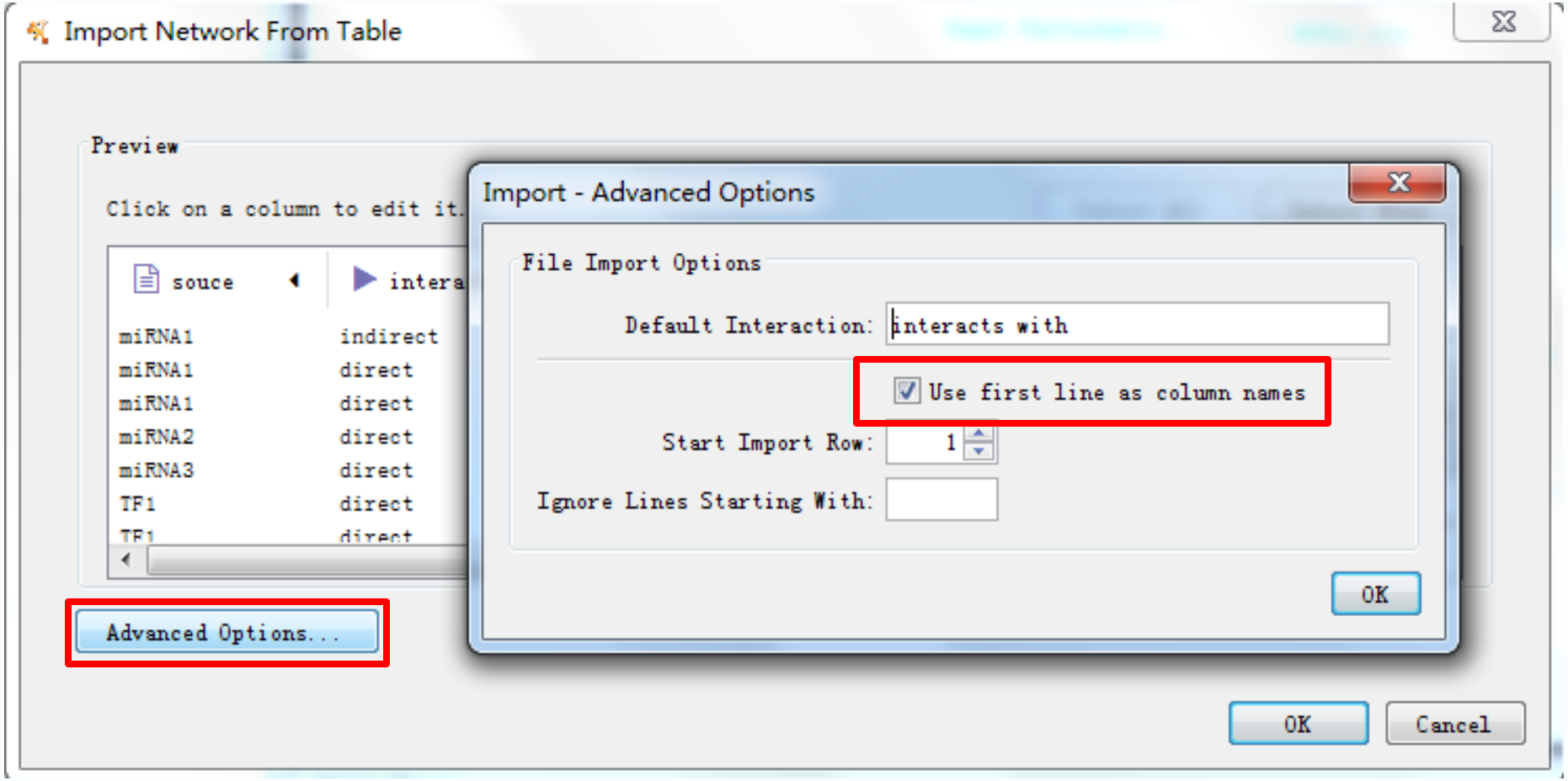
gene	type	expression
miRNA1	miRNA	3
miRNA2	miRNA	2
miRNA3	miRNA	5
gene1	gene	1
gene2	gene	1.2
gene3	gene	2
TF1	TF	1.5
TF2	TF	1.8

本地数据导入

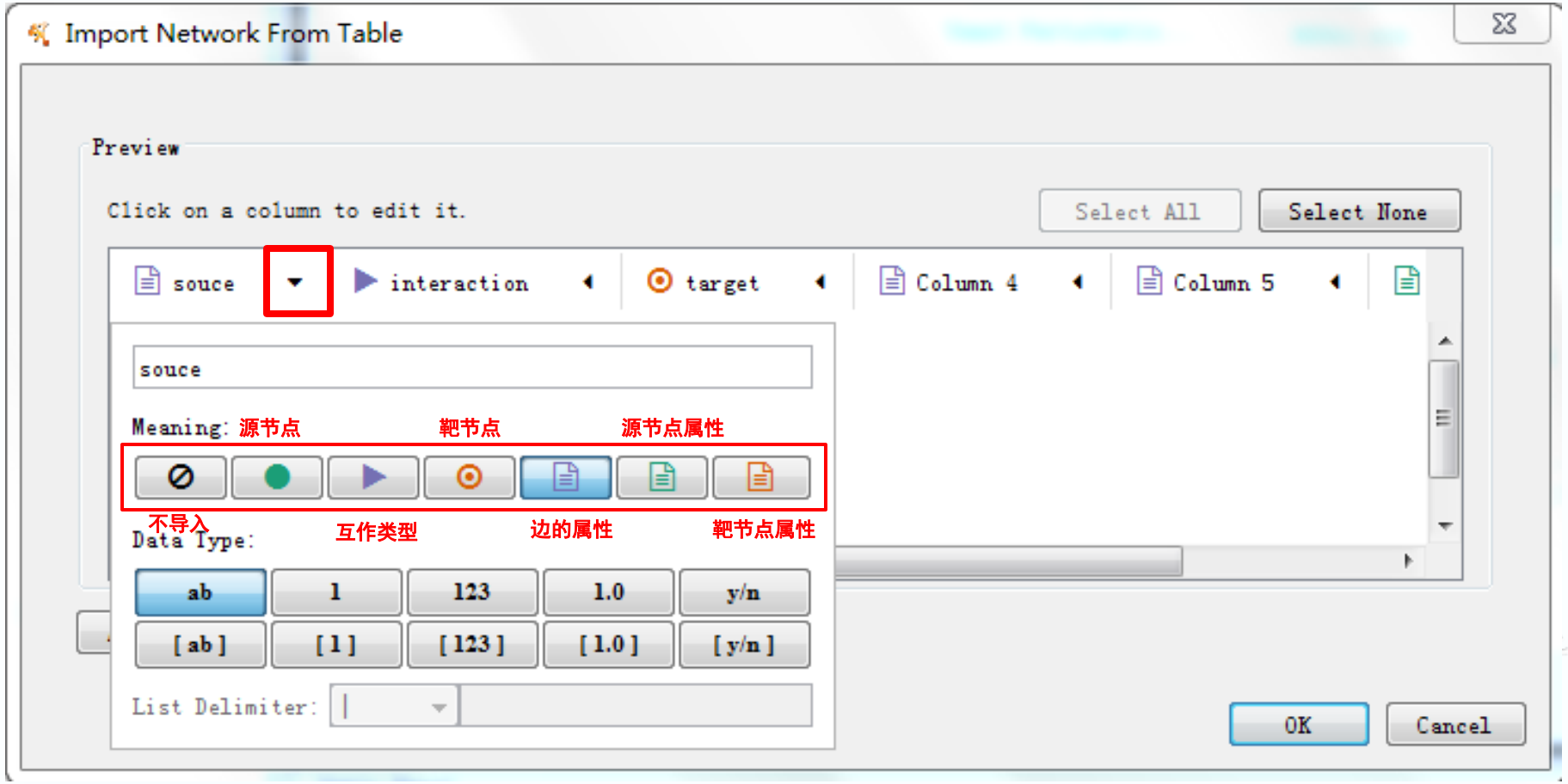
- 用于构建网络的分子互作数据导入



本地数据导入

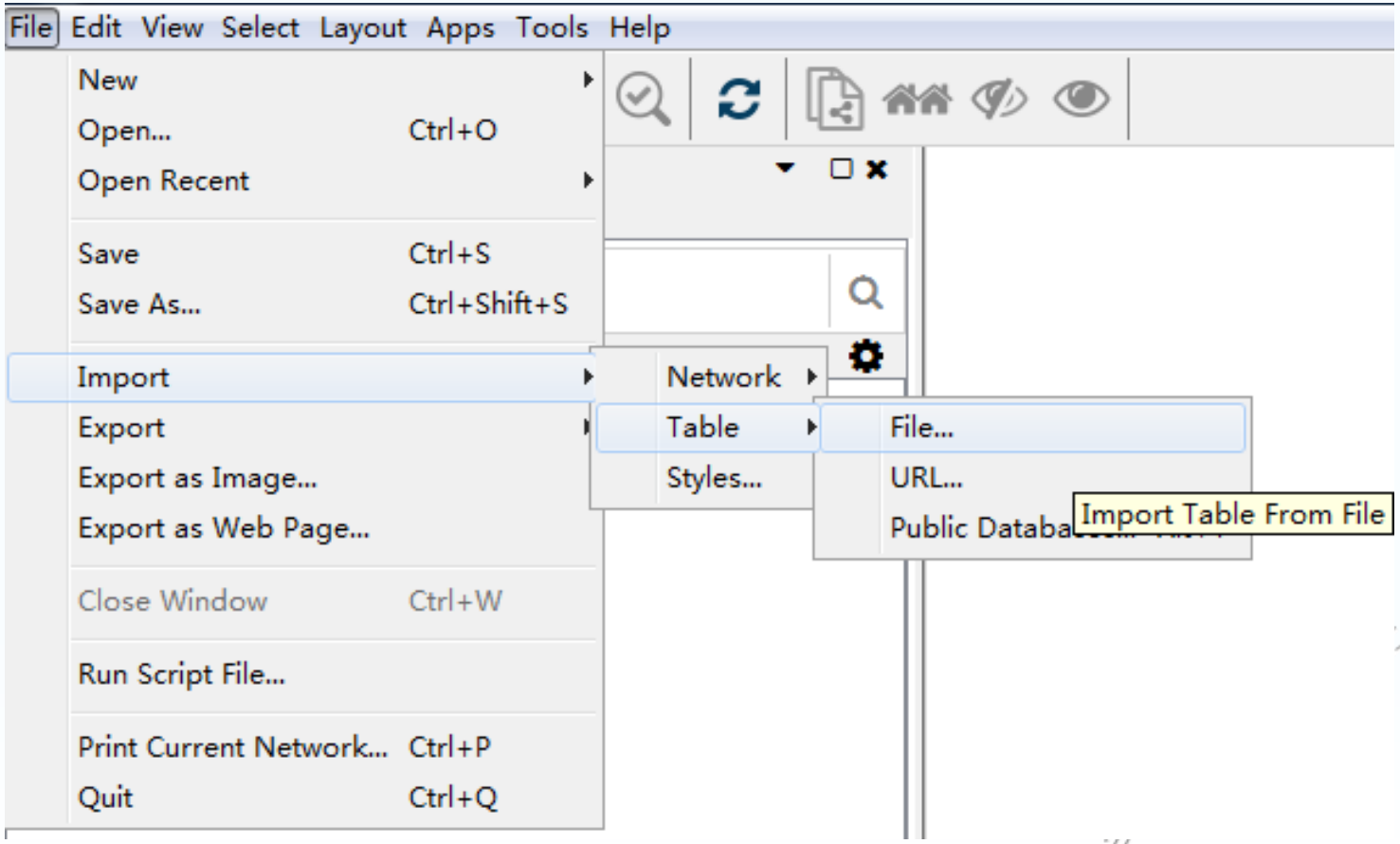


本地数据导入

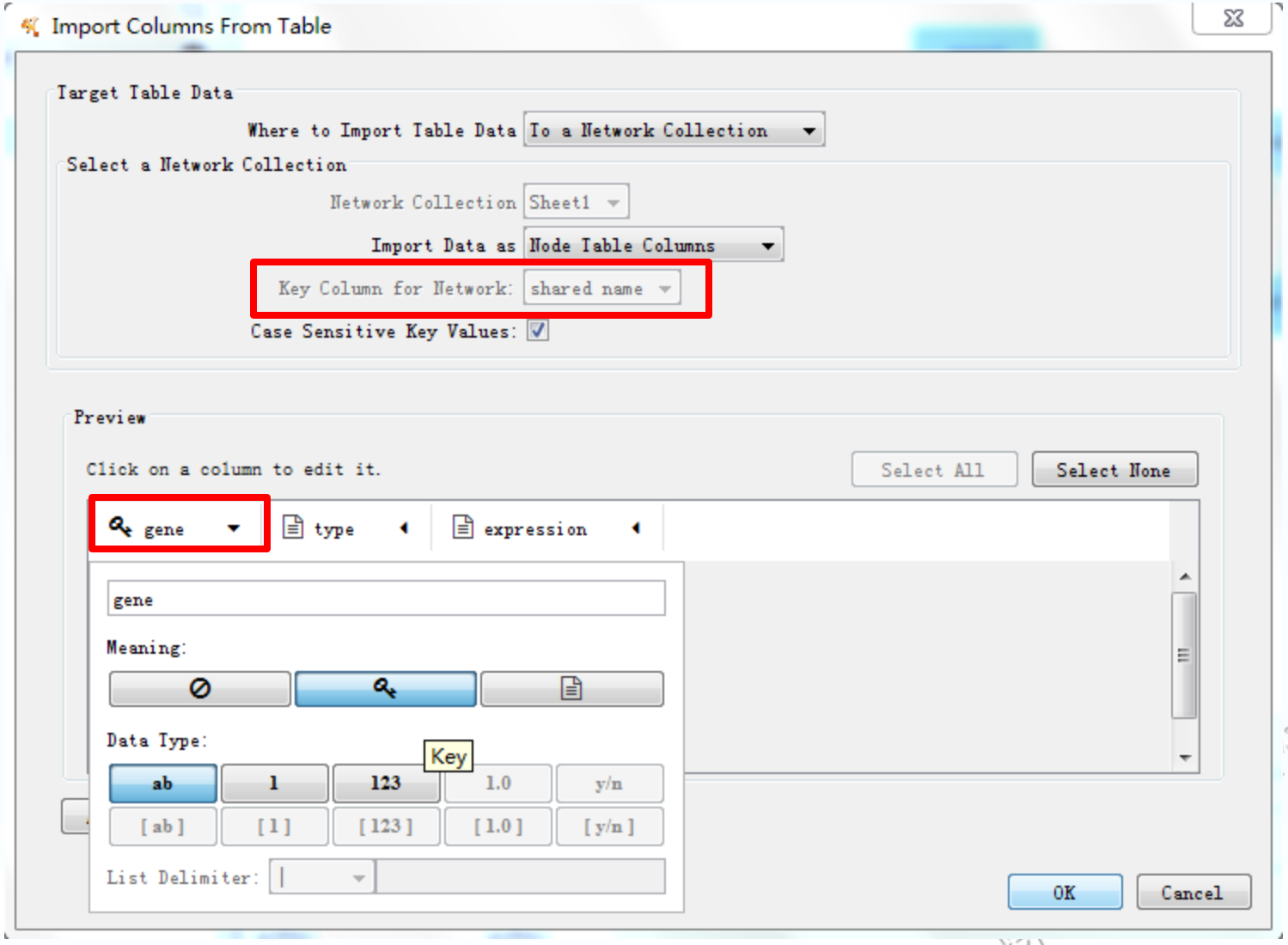


本地数据导入

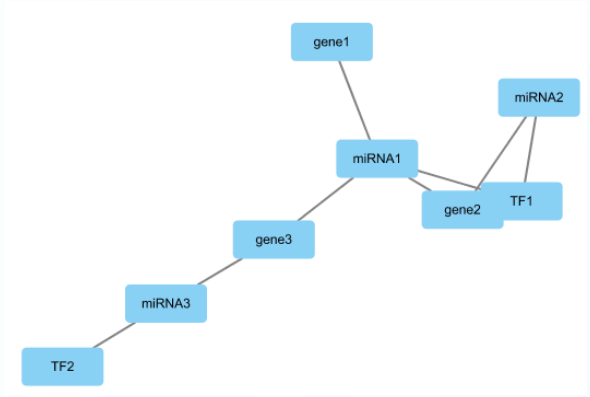
- 用于设置节点属性的数据导入，如基因类型、基因表达量…

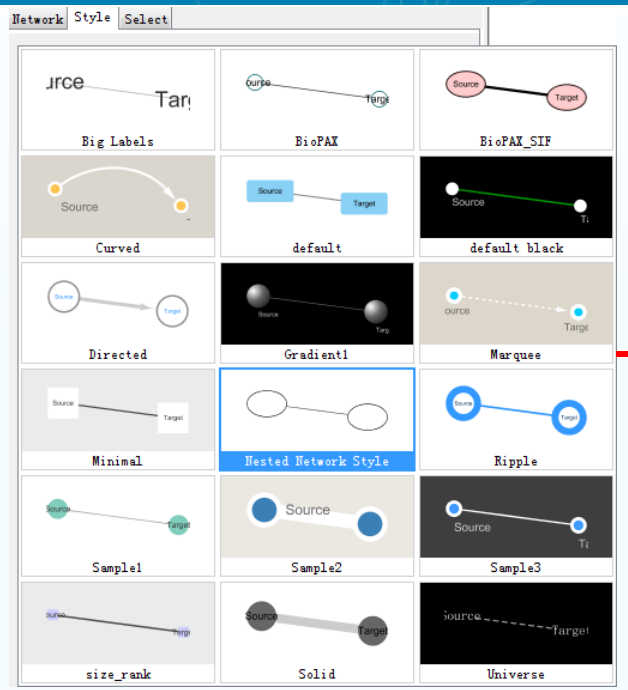


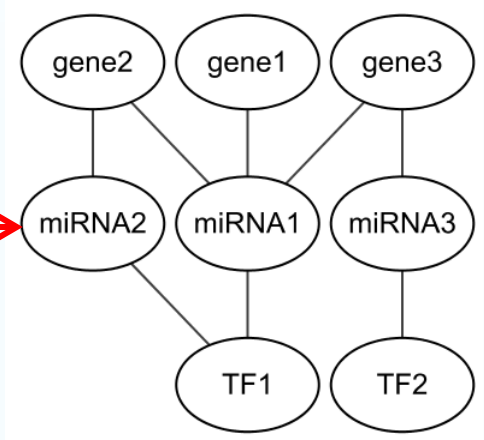
选择匹配的Key column



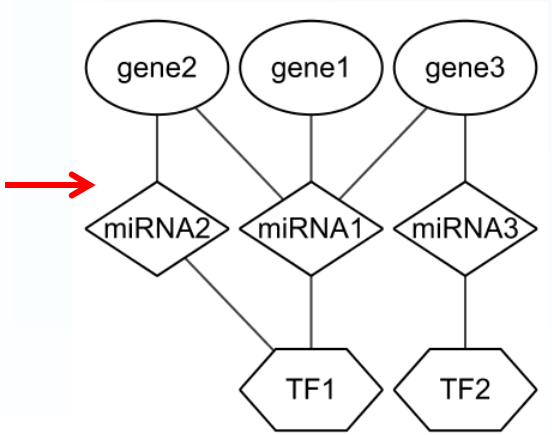
美化加工



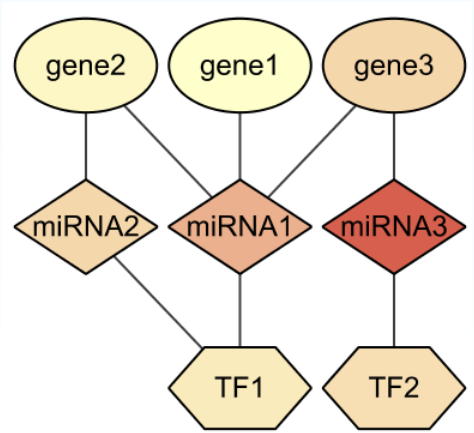




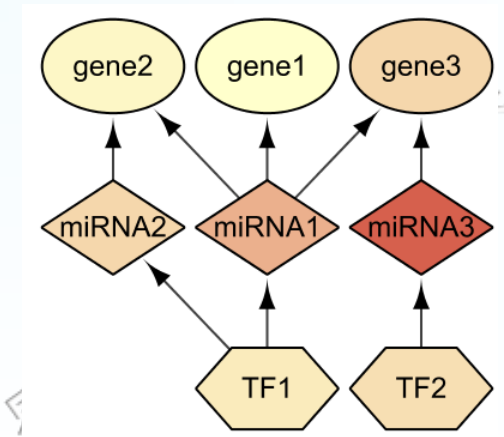
Hierarchical layout



shape

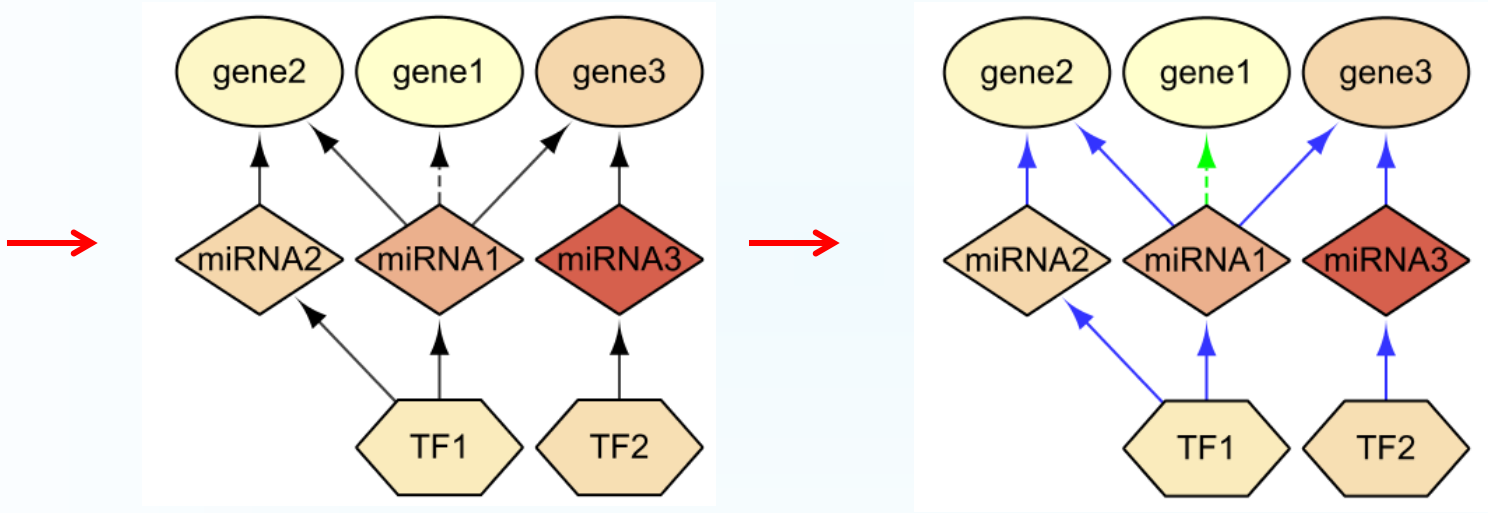


Fill color



Target arrow shape

美化加工

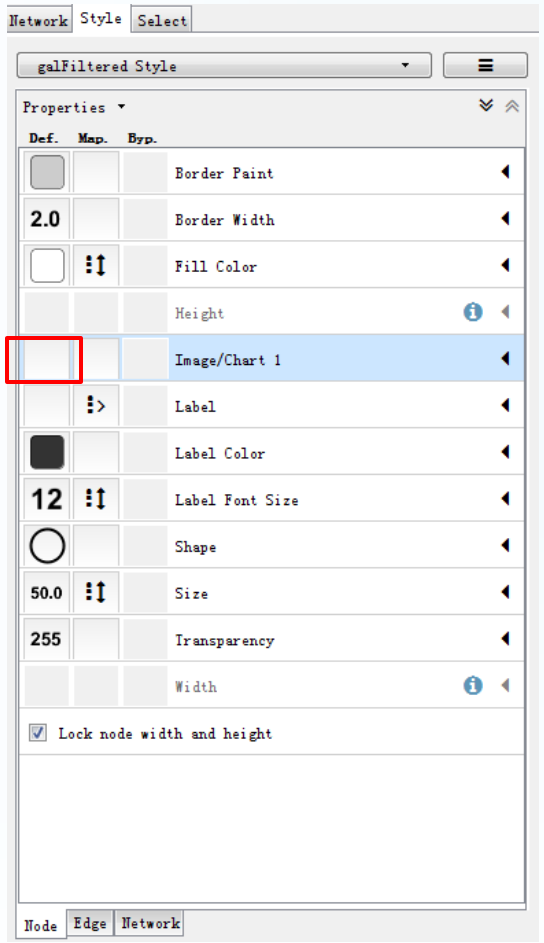


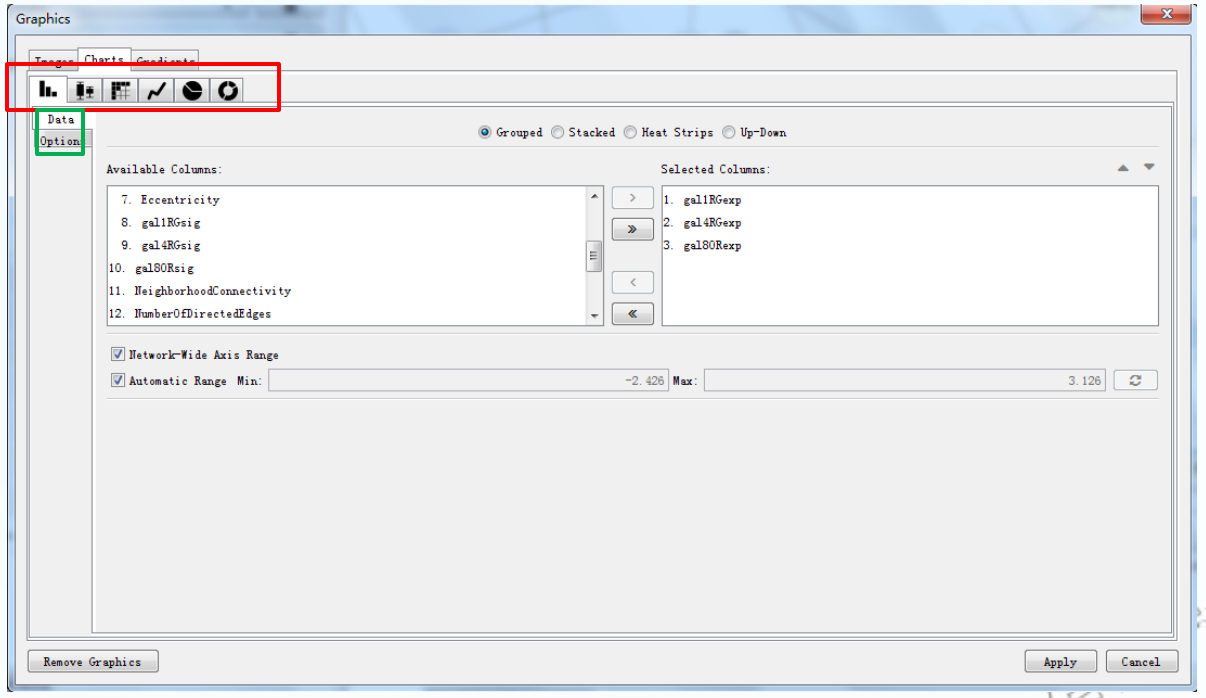
Line type

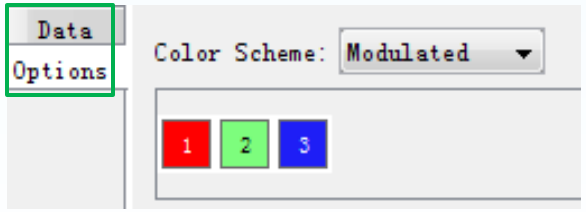
Stroke color and target arrow unselected paint

时间序列的表达数据

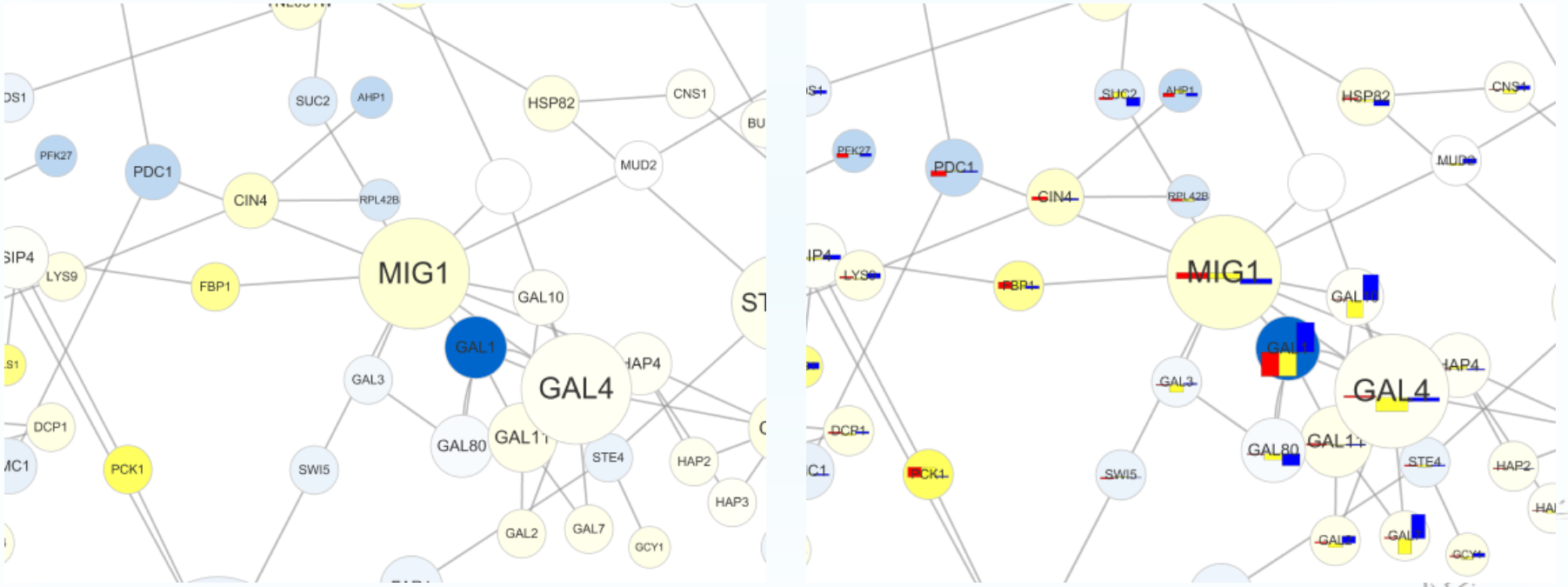
- Image/chart 1 设置



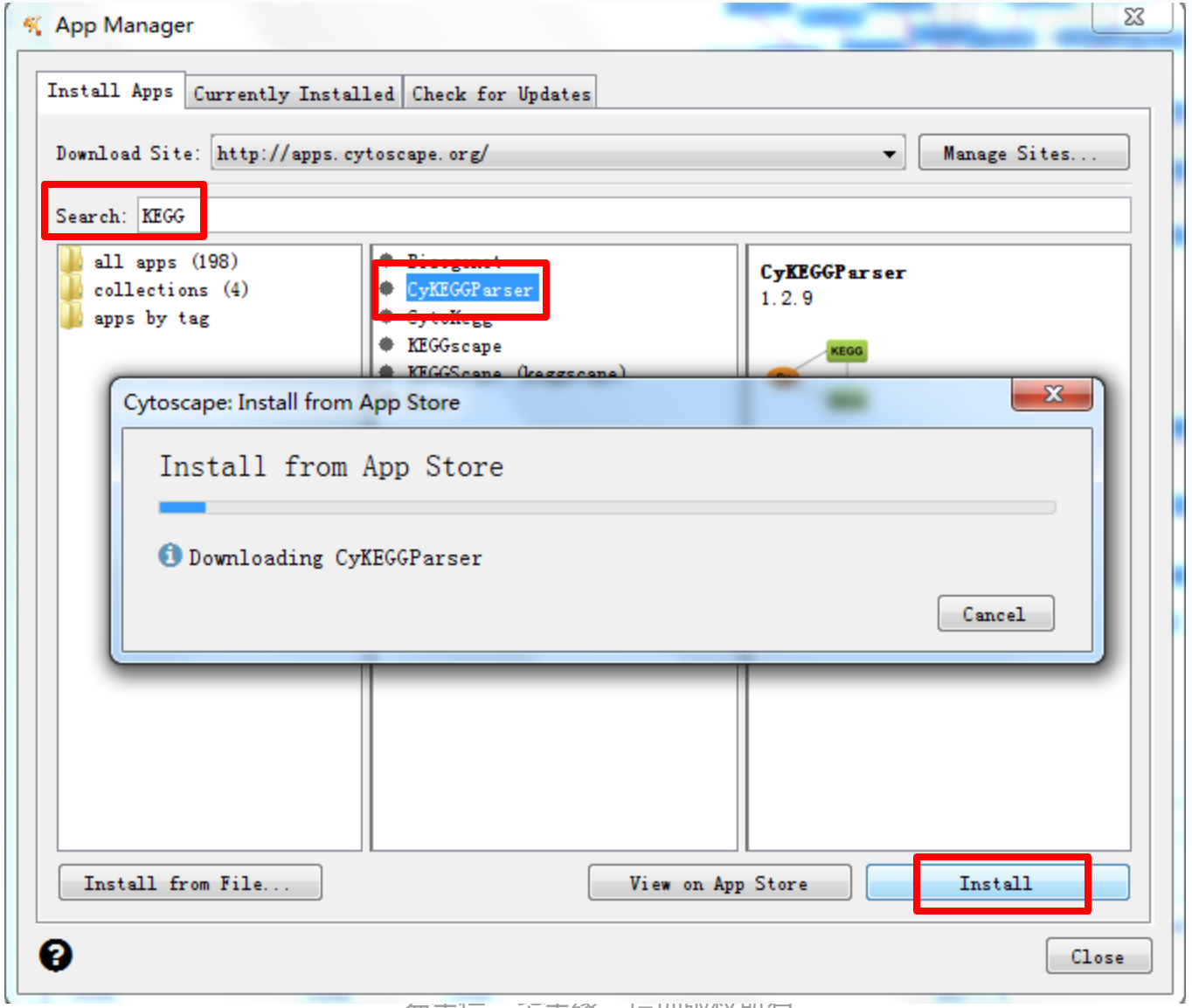




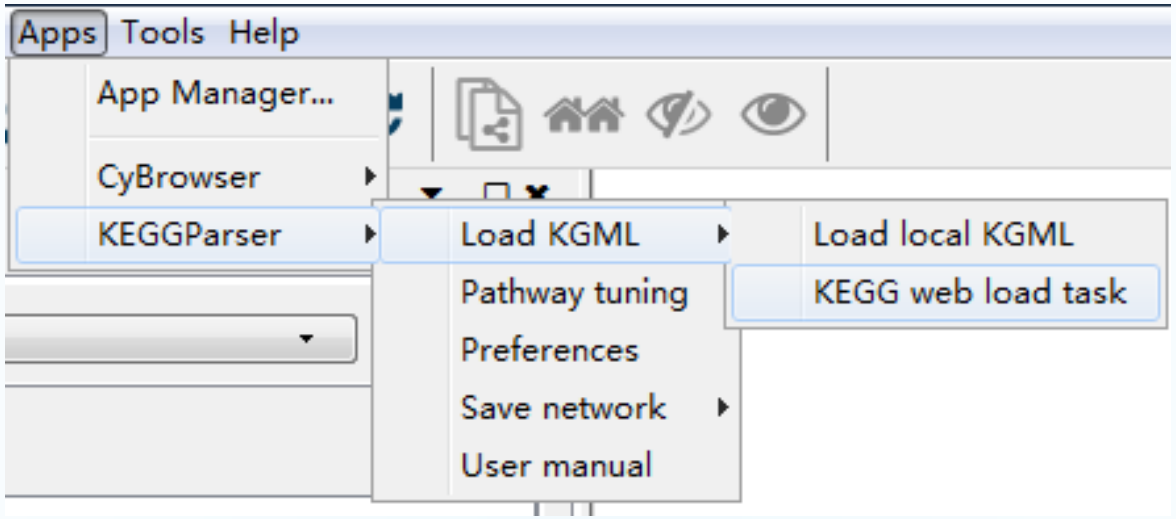
Fun with Charts

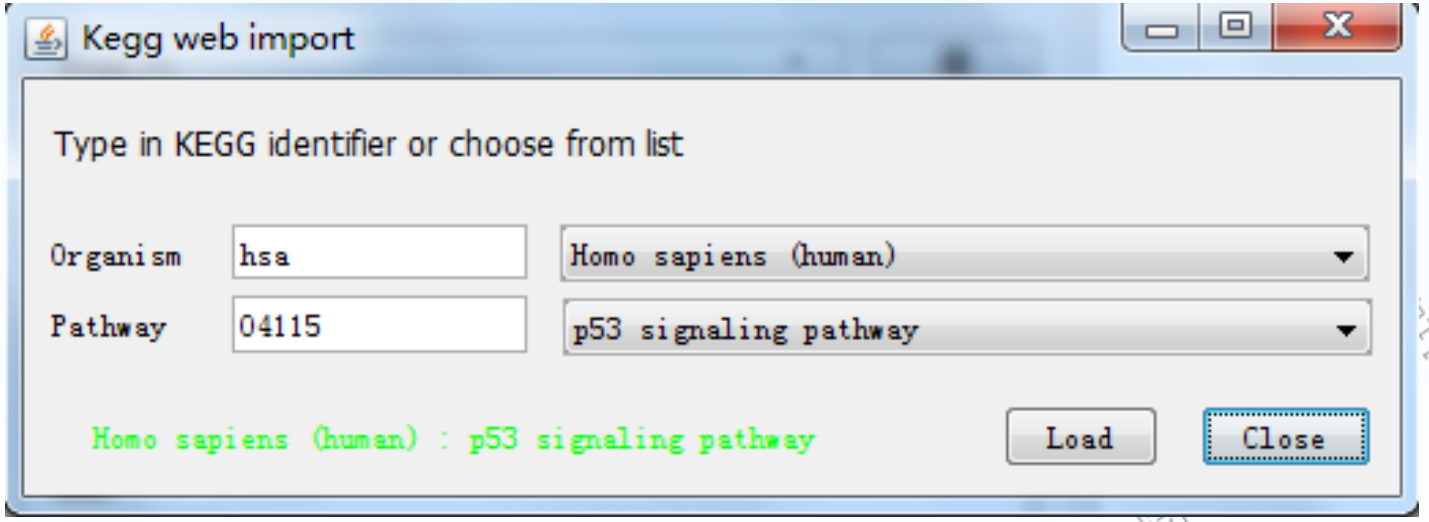


App的安装和使用

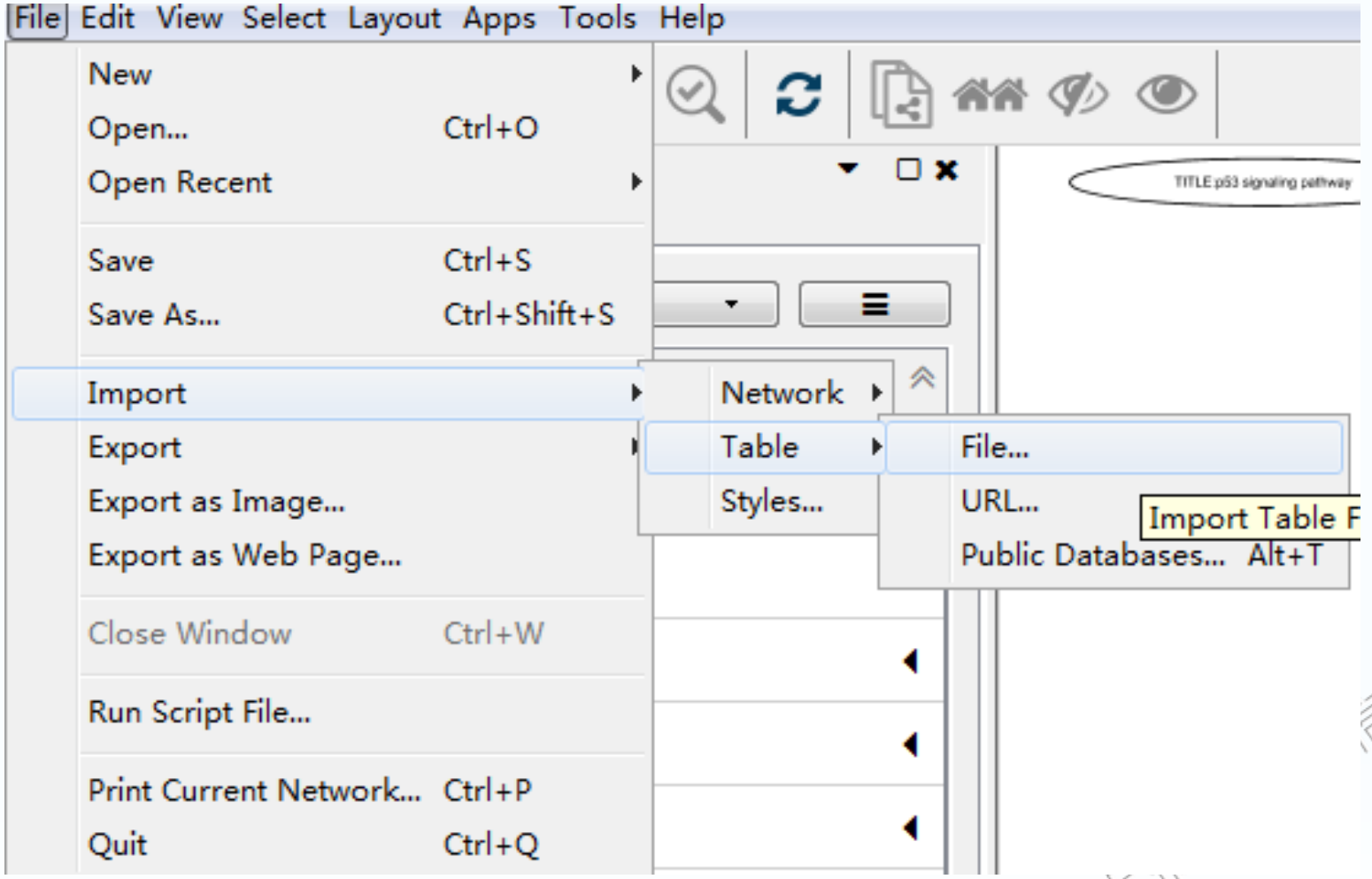


网络数据导入

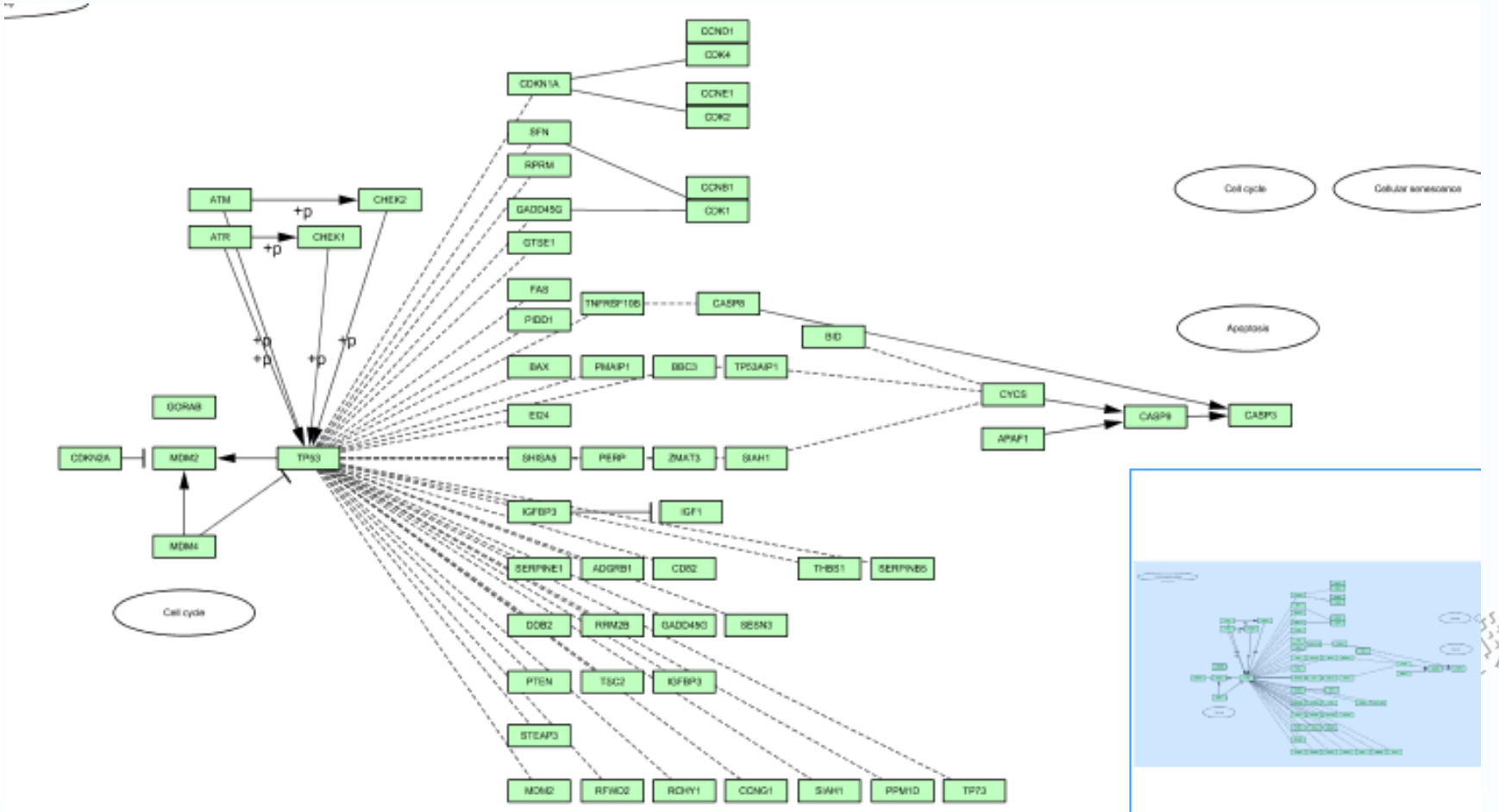




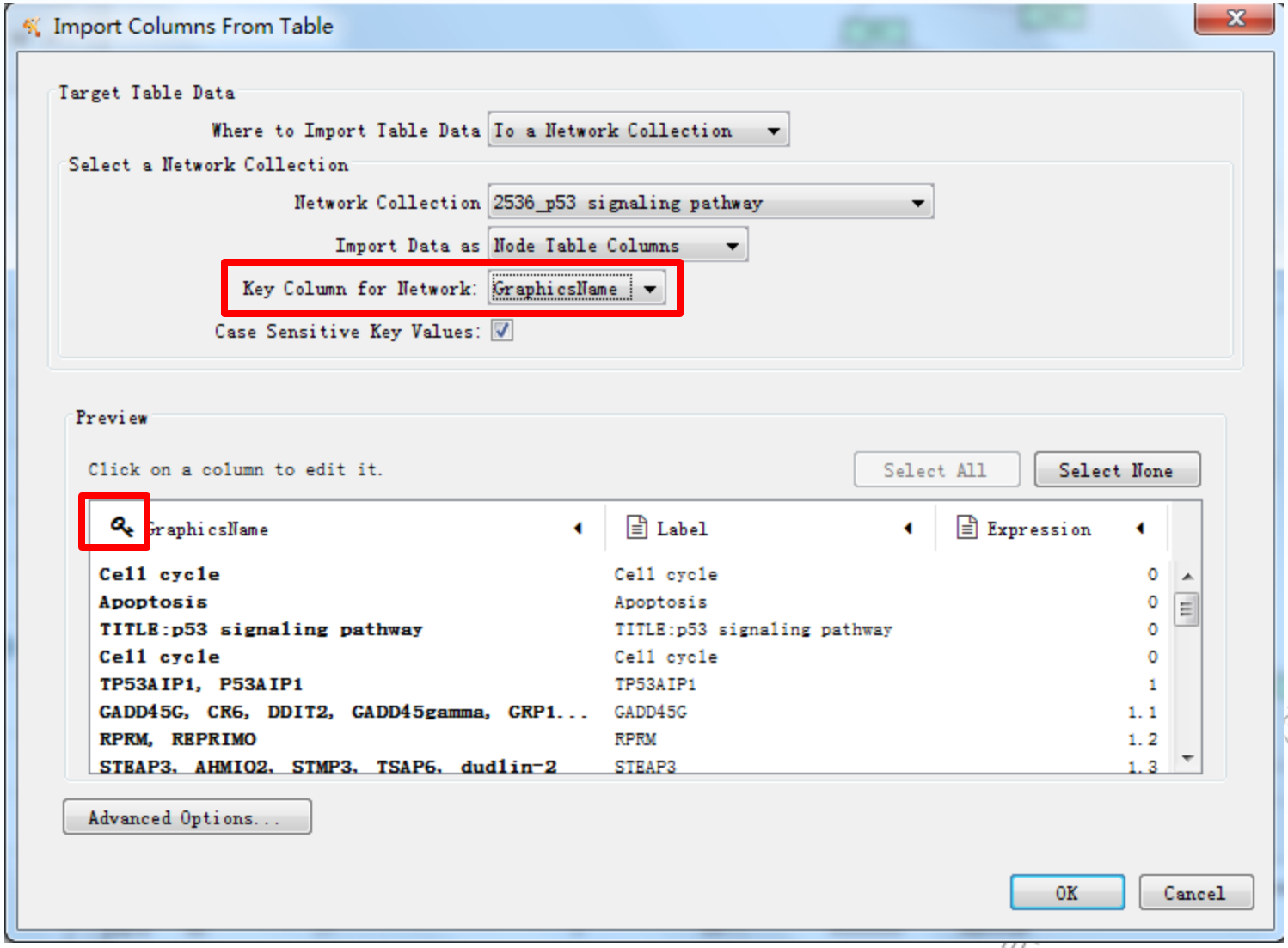
网络数据导入



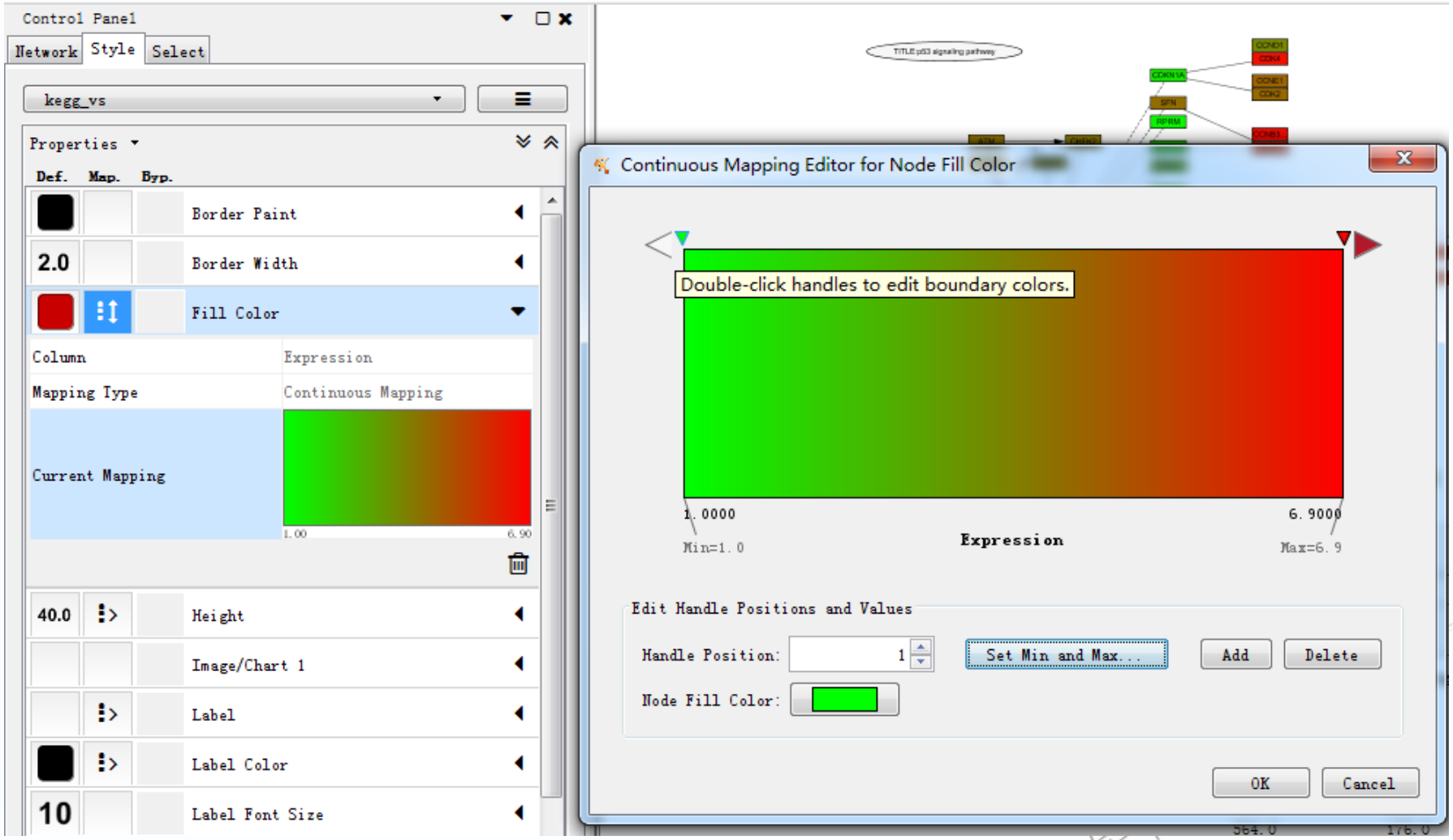
网络数据导入



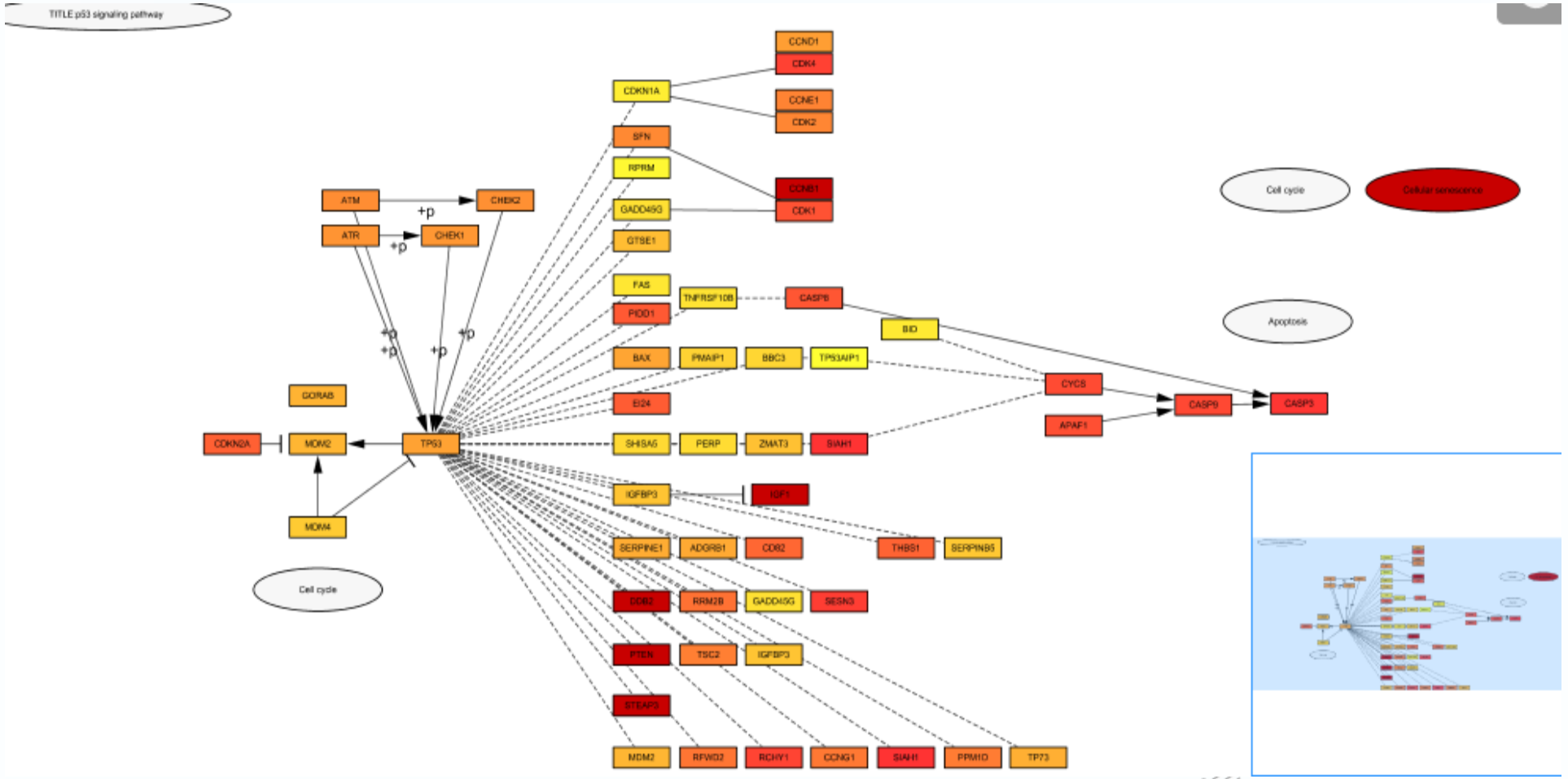
本地数据与网络数据的整合



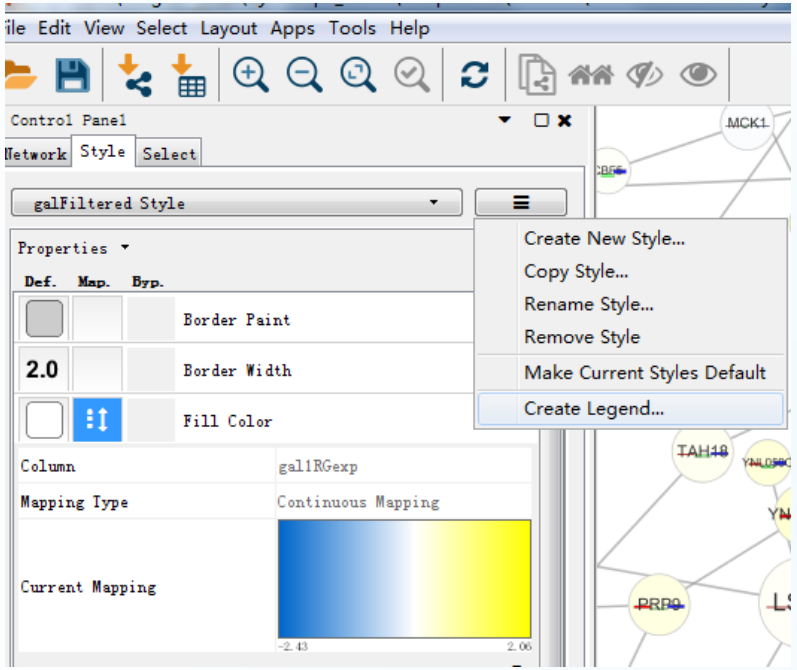
基因表达量的映射

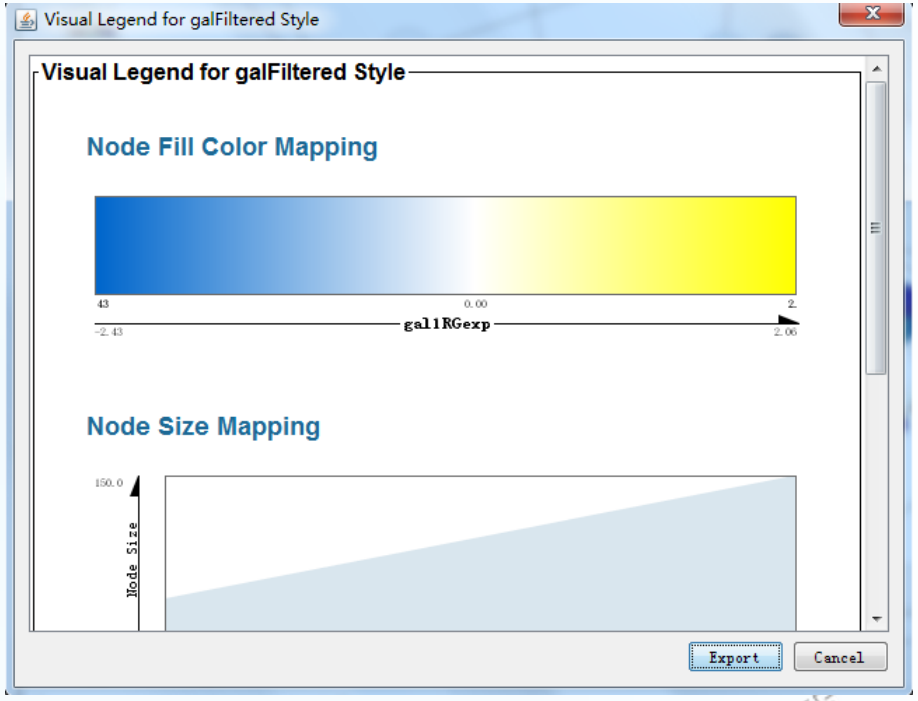


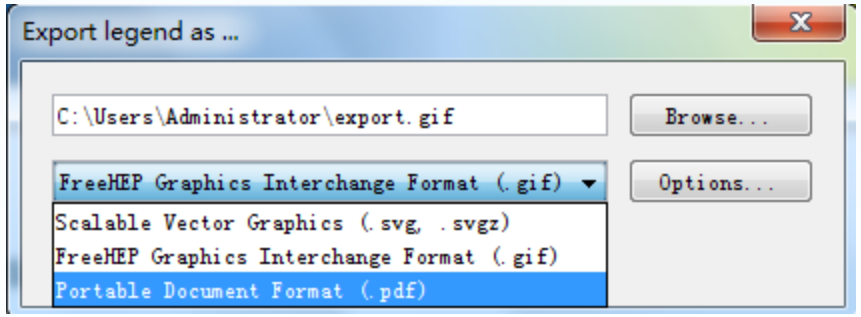
基因表达量的映射



导出legend







Practice makes perfect!