Home

Jump to bottom

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Cytoscape *tutorials*

Getting Started

Tour of Cytoscape

New to Cytoscape? This tutorial gives you a high-level introduction to Cytoscape's capabilities and features, and directs you to detailed training content for each step.

Recommended Exercises

Basic Data Visualization	Differentially Expressed Genes
Presents a scenario of how expression data can be assessed in the context of networks to tell a biological story through data visualization.	Describes a network analysis workflow in Cytoscape for a set of differentially expressed genes. Includes retrieving relevant networks, network functional enrichment analysis and integration and visualization of experimental data.

Protocols

Cytoscape Apps	Data Visualization	Importing Data	Network Analysis	Exporting and Publishing

Cytoscape Apps	Data Visualization	Importing Data	Network Analysis	Exporting and Publishing
				
How to use apps in your research	Transforming tables into network biology visualizations	Loading networks and datasets from a variety of sources	Using topology and graph theory to make sense of networks	Saving and sharing your work effectively

Presentations

Introduction	Visualization	Automation	Modules
			
Introductory presentations	Visualization of networks and data	Automation presentations	Presentation modules

Join the Community

Create your own Cytoscape protocol

Learn how to create your own Cytoscape protocol using our Making Cytoscape Tutorials protocol.

Sharing

Please feel free to use, share, copy or adapt any of the training materials you find here. They are all implicitly published under the CC0 waiver for maximum reuse potential.

PDFs

You can produce PDFs of any protocol by simply appending `?print-pdf` to the end of the base url (example) and then print or save as PDF in *landscape* orientation for the best result.

Protocols

Cytoscape Apps

stringApp

Provides exercises for importing networks from the STRING database via simple queries from within Cytoscape, as well as layout, data overlays, enrichment analysis and more.

WikiPathways App

Presents a basic workflow for visualizing experimental data on pathways from WikiPathways and using the built-in ID mapping functionality of Cytoscape to support data overlays.

Legend Creator

Describes how to use the Legend Creator App to generate legends representing the visual mappings used in network visualizations.

Data Visualization

Basic Data Visualization

Presents a scenario of how expression data can be assessed in the context of networks to tell a biological story through data visualization.

Visualizing Data

Outlines the common use of expression data in Cytoscape to set the visual attributes of the nodes in a network. The result is a powerful visualization, portraying functional relation and experimental response at the same time.

Network Layout

Overview of automatic layout algorithms in Cytoscape and how to apply layouts.

Custom Graphics and Labels

Overview of using Custom Graphics to add graphs, charts and other graphics to nodes.

Importing Networks and Tables

Loading Networks

This tutorial describes the details of importing an existing network and applying a layout.

Importing Data From Tables

This tutorial describes how to import expression data from a spreadsheet, and how to link it to already loaded networks.

Importing Network From Table

This tutorial describes how to import a network from tabular data.

Identifier Mapping

This protocol will show you how to map or translate identifiers from one database to another, to facilitate data visualization.

Network Analysis

Differentially Expressed Genes Network Analysis

Describes a network analysis workflow in Cytoscape for a set of differentially expressed genes. Includes retrieving relevant networks, network functional enrichment analysis and integration and visualization of experimental data.

Affinity Purification-Mass Spectrometry Network Analysis

This protocol describes how to use data from an affinity purification-mass spectrometry experiment to to generate relevant interaction networks, enriching the networks with information from public resources, analyzing the networks and creating effective visualizations.

Variant Data Analysis

Variant Data Analysis

Demonstrates network retrieval from the STRING database, basic analysis, TCGA data loading and visualization.

EnrichmentMap Pipeline

A step-by-step protocol explaining how to complete pathway enrichment analysis using g:Profiler (filtered gene list) and GSEA (unfiltered, whole genome, ranked gene list), followed by visualization and interpretation using EnrichmentMap in Cytoscape.

Functional Enrichment

Presents a functional enrichment workflow, including: Finding networks and pathways, integrating and exploring data, performing and displaying functional enrichment analysis.

Filtering by Selection

Introduction to techniques for filtering and editing a network, such as applying filters to remove low-confidence edges, and performing basic network edits.

Exporting and Publishing

Saving Results

Overview of options for saving and exporting results from Cytoscape.

Presentations

Introduction

Basic introductions to network biology and Cytoscape for a variety of research applications. This is a great place to start if you are new to the *joy of networks*.

Introduction to Cytoscape - Marshall University, West Virginia, February 2019

An introduction to Network Biology and how to use Cytoscape. Review of the major applications of network biology; How to finding relevant networks and pathways; Importing your data; Network analyses, layout and visualization; Example workflows.

Data Analysis & Visualization in Cytoscape - EMBO, Rome, October 2018

Computational analysis of protein-protein interactions: Sequences, networks and diseases.

Visualization

These talks focus on the challenge of data visualization and the benefits of using networks to meet these challenges. Cytoscape provides a tons of features dedicated to network visualization.

Data visualization with Cytoscape - Marshall University, West Virginia, February 2019

Dive deeper into data visualization with Cytoscape. Learn some approaches to effective communication through network visualizations; Master network layouts and data visualization; Learn some of the new, advanced visualization features of Cytoscape; Know where to find relevant Cytoscape apps and tutorials.

Network Visualization - Flatiron Institute, New York, October 2017

Network Visualization with Cytoscape. Identify relevant types and sources of networks; various approaches to network visualization; when and how to use Cytoscape; publish, share and export networks online.

Cytoscape and STRING - University of Copenhagen, Copenhagen, November 2018

Visualizing and Analyzing Biological Networks with STRING and Cytoscape.

Automation

These presentations cover how to access and control Cytoscape programmatically through the CyREST interface, for example via the RCy3 package for R.

Advanced Automation in Cytoscape - Marshall University, West Virginia, March 2019

Learn how to access and control Cytoscape from R or any programming language. Integrate Cytoscape into your bioinformatics pipelines involving any type of data and network analysis or visualization challenge.

Cytoscape Automation in R using RCy3 - BioC, 2018, Toronto

Cytoscape Automation in R using RCy3 - BioC, 2018, Toronto
Cytoscape Automation in R using Rcy3

Modules

These modular sets of slides cover isolated topics and are meant to be resused and combined into proper presentations (like the ones listed above). Browse these before you make your own and please consider contributing your presentation modules here for others to reuse.

Intro to Cytoscape
Introduction to Cytoscape including Cytoscape Apps, network and data loading and exporting visualizations.

Intro to Network Biology
Introduction to Network Biology. Review of networks applications in research.

Finding Network Data
Finding Network Data. Review of public network and pathway databases accessible from Cytoscape.

Network Analysis
Network Analysis. Review of analytical approaches and tools.

Network Visualization
Network Visualization. Network depiction, data mapping, layouts and animation.

Advanced Visualization
Advanced Visualization: Tips and tricks.

Complexes
Enriching PPI networks with complexes: Sources of protein complex data and using complex data in Cytoscape.

Group Visualization

Working with Groups in Cytoscape. Manipulating groups, groups visualization and configuration.

Ten Simple Rules

From *Ten simple rules to create biological network figures for communication* (manuscript in review) .

Network Taxonomy

Network Taxonomy. Pathways, Interactions and Similarity.

Network Visualization Challenge

Making sense out of biological networks.

PPI Data Sources

PPI Data Sources. Reviews public sources of PPI data, including relevant experimental techniques, computational techniques and public repositories.

Questions

Contact Cytoscape Help Desk with any questions about Cytoscape usage.

To report any issues with the tutorial content, click "Issues" above and open a new issue.

▸ Pages 1

Cytoscape website

Additional introductory materials

- Cytoscape manual
- Cytoscape YouTube channel
- Documentation for users

- Cytoscape automation home

Clone this wiki locally

https://github.com/cytoscape/cytoscape-tutorials.wiki.git