

BCB420 - Computational Systems Biology

Lecture 8 - GSEA continued and Cytoscape

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Assignment #2

- differential gene expression and preliminary ORA
- Due March 3, 2020! @ 20:00

What to hand in?

- **html rendered RNotebook** - you should submit this through quercus
- Make sure the notebook and all associated code is checked into your github repo as I will be pulling all the repos at the deadline and using them to compile your code. - Your checked in code must replicate the handed in notebook.
- Document your work and your code directly in the notebook.
- **Reference the paper associated with your data!**
- **Introduce your paper and your data again**
- You are allowed to use helper functions or methods but make sure when you source those files the paths to them are relative and that they are checked into your repo as well.

Homework for next week

Practise using GSEA. Given the ranked list comparing mesenchymal and immunoreactive ovarian cancer (mesenchymal genes have positive scores, immunoreactive have negative scores). perform a GSEA preranked analysis using the following parameters:

- genesets from the baderlab geneset collection from February 1, 2020 containing GO biological process, no IEA and pathways.
- maximum geneset size of 200
- minimum geneset size of 15
- gene set permutation

and answer the following questions in your journal:

1. What is the top gene set returned for the Mesenchymal sub type? What is the top gene set returned for the Immunoreactive subtype?
2. What is its pvalue, ES, NES and FDR associated with it.
3. How many genes in its leading edge?
4. What is the top gene associated with this geneset

Cytoscape

Cytoscape is an open source Network analysis tool programmed in Java.

- Download it from [here](#)
- You will need Java 8 or higher installed in order to run it.
- Check out all the [Cytoscape Tutorials and Protocols](#)

Read this article for great background on Network Biology:

"A Guide to Conquer the Biological Network Era Using Graph Theory" -
<https://www.frontiersin.org/articles/10.3389/fbioe.2020.00034/full>

Today's lecture on Cytoscape is from the set of Cytoscape's Tutorials:

Introduction to Cytoscape for Computer Scientists