# NDEx in 2019

## Workflows and Application Integration

Trey Ideker, Dexter Pratt, UCSD

ndexbio.org

# Social Media, Photos? Yes, Please.

@NDExProject

*link to demos, slides:*

https://bit.ly/2McHl5D

# NDEx, A Public Database of Networks

## NDEx is a Platform Integrated with Cytoscape

- **Find** networks to use in applications.
- **Store** networks in your private account.
- **Share** your networks - "DropBox for networks".
- **Disseminate** your networks.
- **Publish** your networks as computable, actionable data.
- **Integrate** networks with your applications.

CIViC Clinical Interpretations of Variants in Cancer

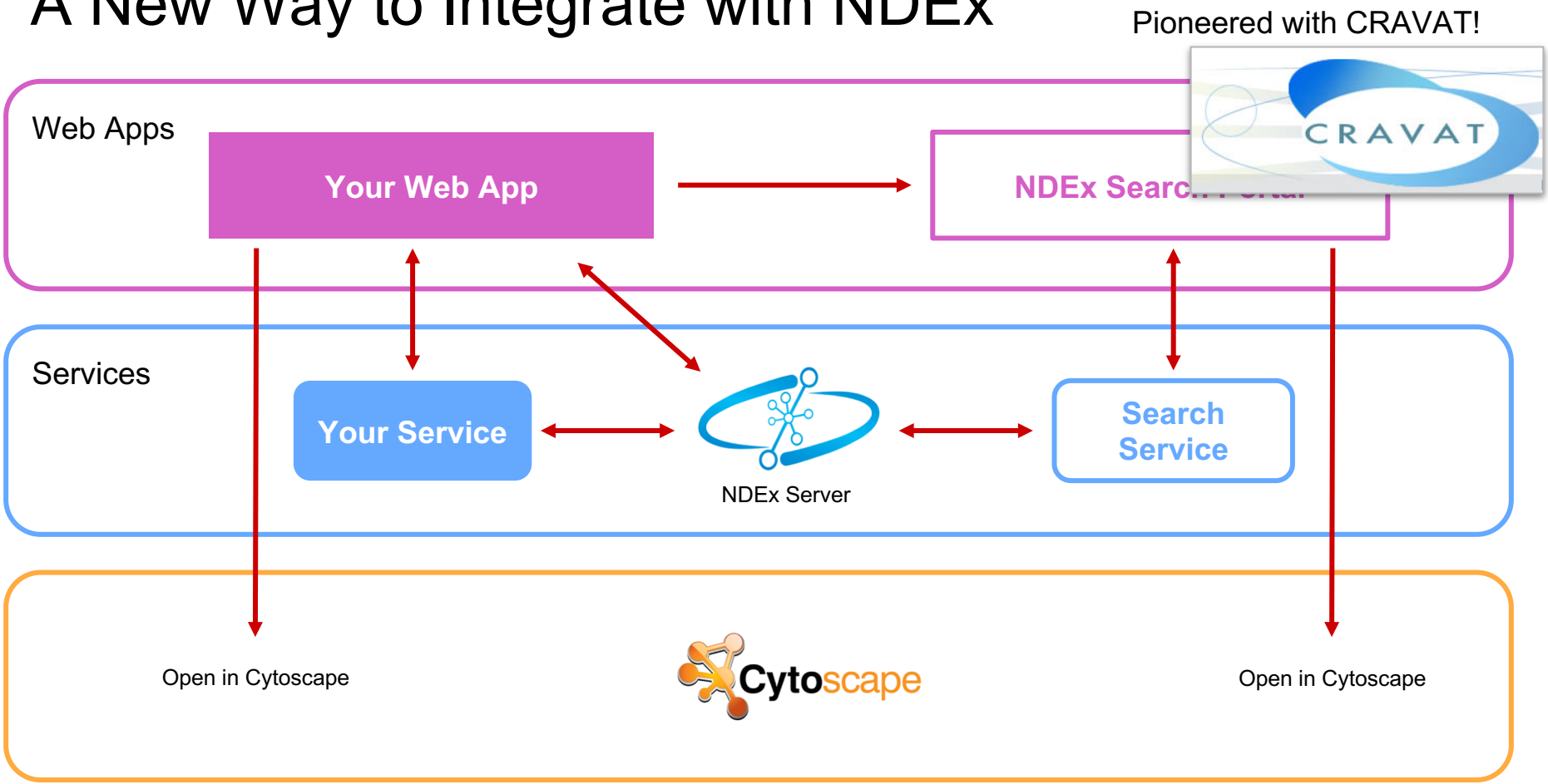
The Cancer Proteome Atlas
Enable Scientific Discovery through Functional Proteomics

CRAVAT

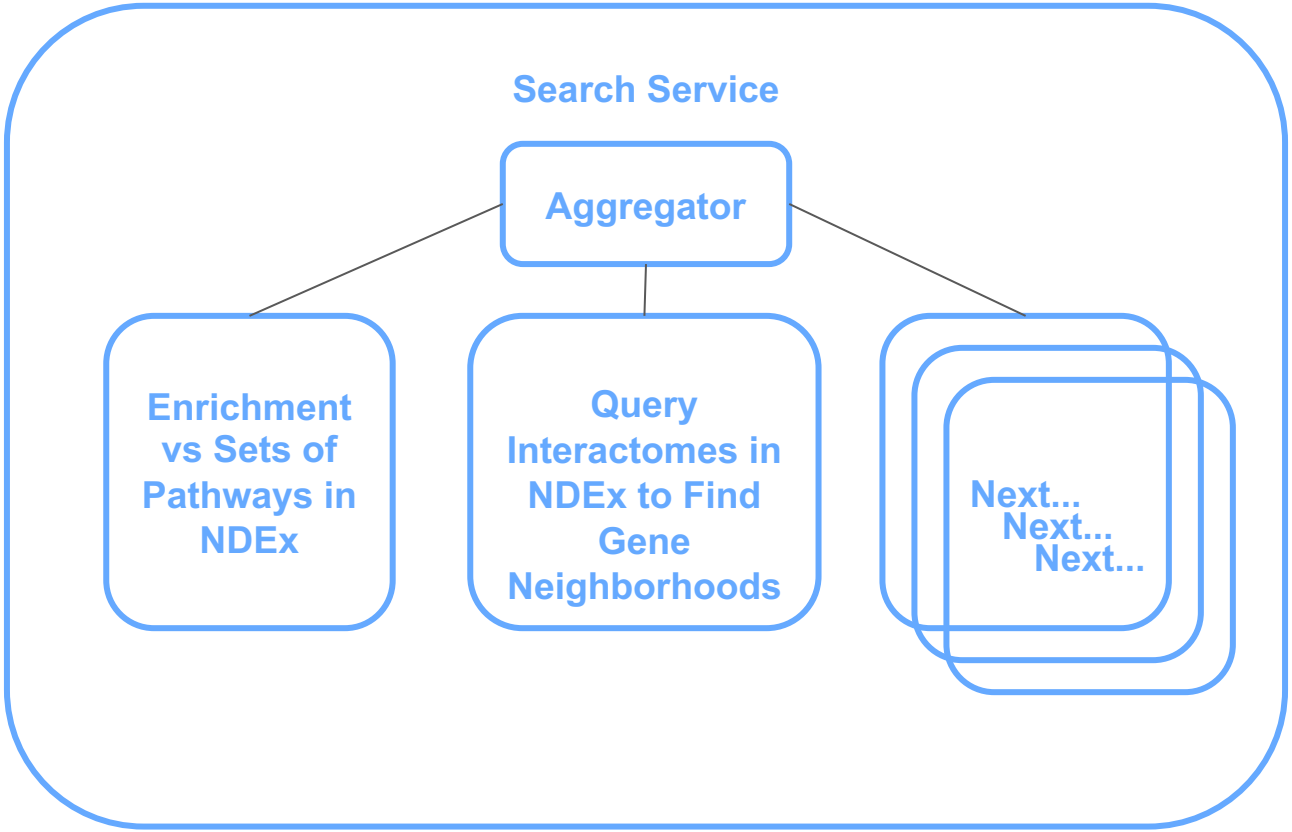
CDGNet

MSigDB Molecular Signatures Database

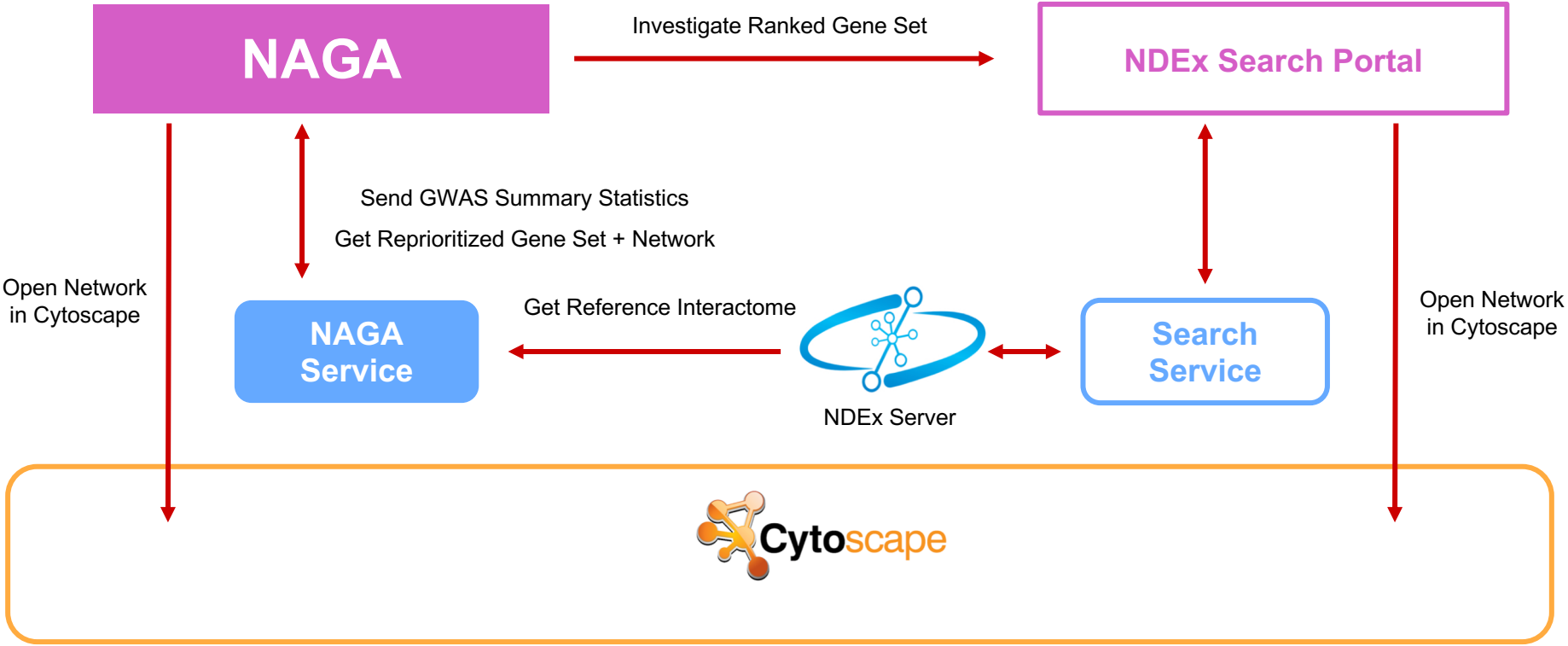
# A New Way to Integrate with NDEx



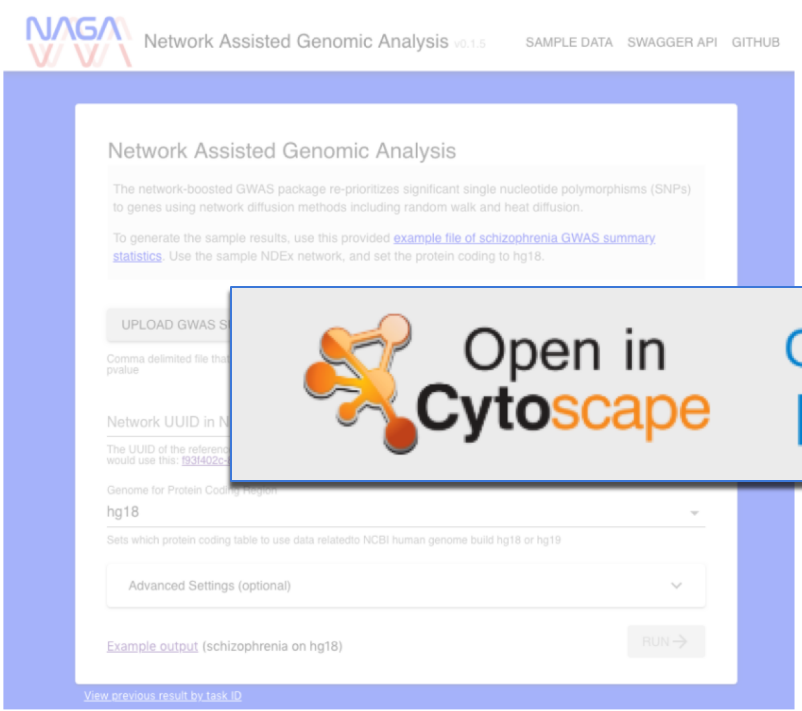
# "Search" is an Aggregator of Analyses

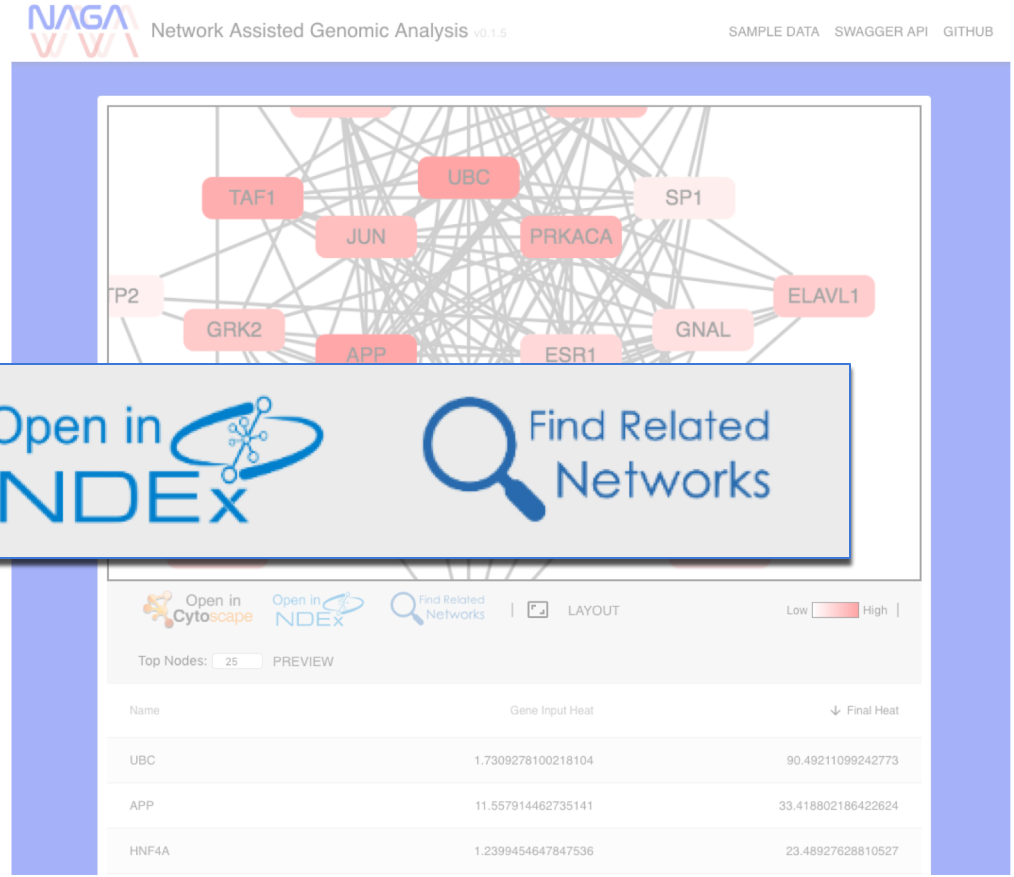


# NAGA Uses NDEx

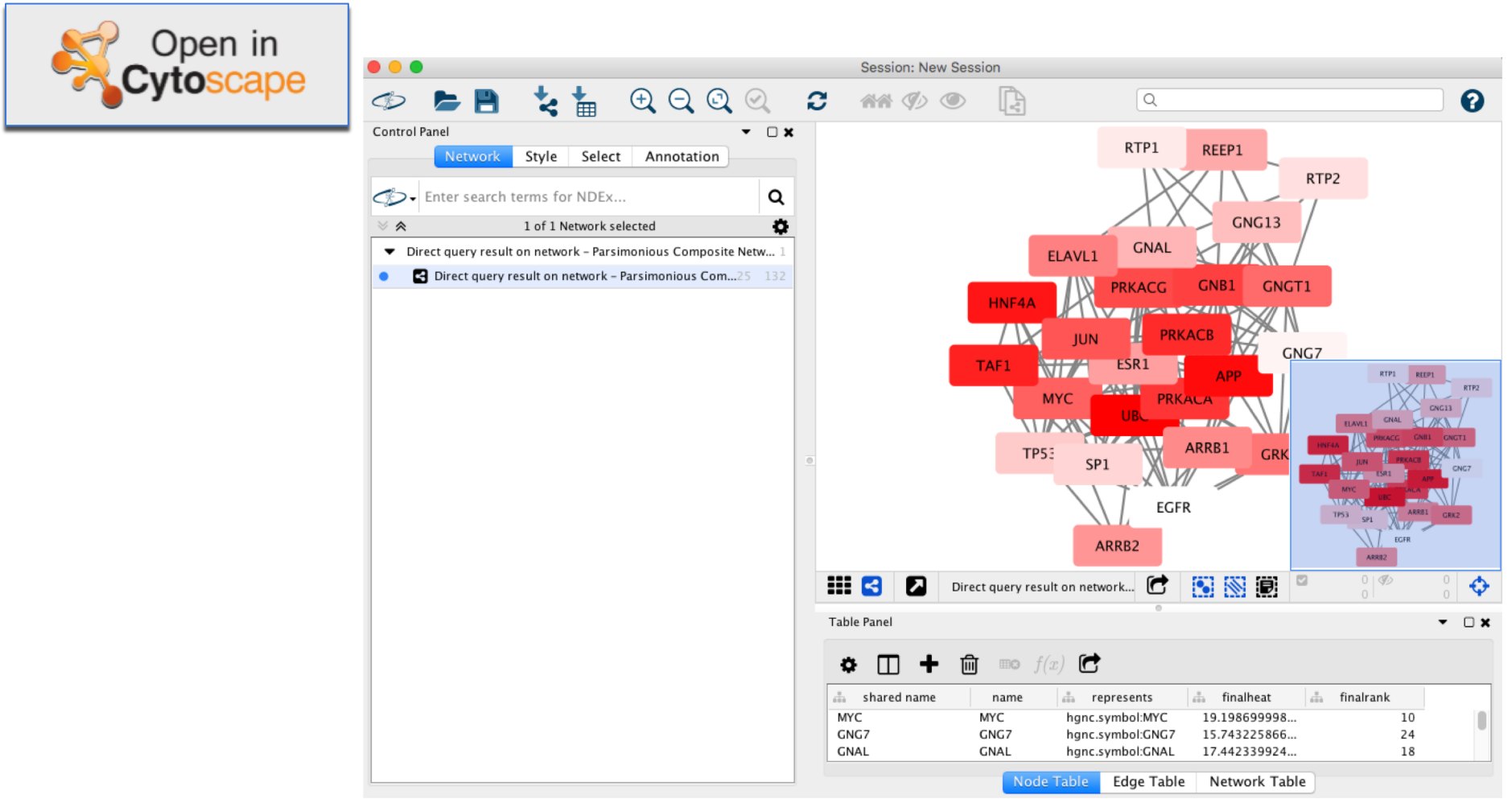


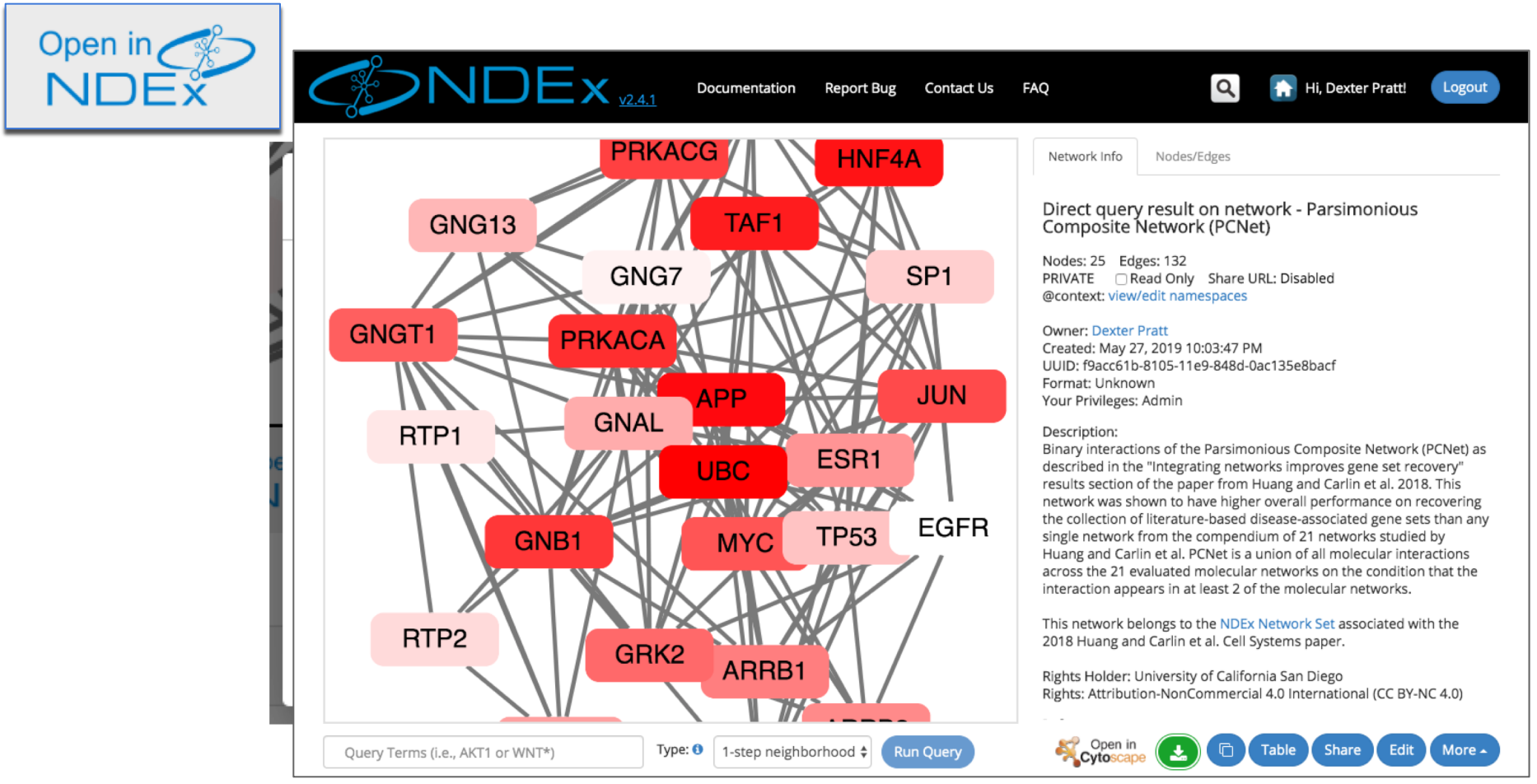
# NAGA


NAGA
Network Assisted Genomic Analysis v0.1.5
SAMPLE DATA
SWAGGER API
GITHUB
Network Assisted Genomic Analysis
The network-boosted GWAS package re-prioritizes significant single nucleotide polymorphisms (SNPs) to genes using network diffusion methods including random walk and heat diffusion.
To generate the sample results, use this provided example file of schizophrenia GWAS summary statistics. Use the sample NDEx network, and set the protein coding to hg18.
UPLOAD GWAS S
Network UUID in N
Genome for Protein Coding Region
hg18
Sets which protein coding table to use data relatedto NCBI human genome build hg18 or hg19
Advanced Settings (optional)
Example output (schizophrenia on hg18)
RUN
View previous result by task ID


NAGA
Network Assisted Genomic Analysis v0.1.5
SAMPLE DATA
SWAGGER API
GITHUB
TAF1
UBC
SP1
JUN
PRKACA
ELAVL1
GRK2
GNAL
APP
ESR1
Open in Cytoscape
Open in NDEx
Find Related Networks
LAYOUT
Low
High
Top Nodes: 25
PREVIEW
Name
Gene Input Heat
Final Heat
UBC
1.7309278100218104
90.49211099242773
APP
11.557914462735141
33.418802186422624
HNF4A
1.2399454647847536
23.48927628810527

Open in Cytoscape
Open in NDEx
Find Related Networks


Open in Cytoscape
Session: New Session
Control Panel
Network
Style
Select
Annotation
Enter search terms for NDEx...
1 of 1 Network selected
Direct query result on network – Parsimonious Composite Netw... 1
Direct query result on network – Parsimonious Com... 25 132
RTP1
REEP1
RTP2
GNG13
ELAVL1
GNAL
PRKACG
GNB1
GNGT1
HNF4A
JUN
PRKACB
GNG7
TAF1
ESR1
APP
MYC
PRKACA
UBC
TP53
SP1
ARRB1
GRK
EGFR
ARRB2
Direct query result on network...
Table Panel
shared name
name
represents
finalheat
finalrank
MYC
MYC
hgnc.symbol:MYC
19.198699998...
10
GNG7
GNG7
hgnc.symbol:GNG7
15.743225866...
24
GNAL
GNAL
hgnc.symbol:GNAL
17.442339924...
18
Node Table
Edge Table
Network Table


Open in NDEx
NDEx v2.4.1
Documentation
Report Bug
Contact Us
FAQ
Hi, Dexter Pratt!
Logout
PRKACG
HNF4A
GNG13
TAF1
GNG7
SP1
GNGT1
PRKACA
APP
JUN
RTP1
GNAL
UBC
ESR1
GNB1
MYC
TP53
EGFR
RTP2
GRK2
ARRB1
Network Info
Nodes/Edges
Direct query result on network - Parsimonious Composite Network (PCNet)
Nodes: 25 Edges: 132
PRIVATE Read Only Share URL: Disabled
@context: view/edit namespaces
Owner: Dexter Pratt
Created: May 27, 2019 10:03:47 PM
UUID: f9acc61b-8105-11e9-848d-0ac135e8bacf
Format: Unknown
Your Privileges: Admin
Description:
Binary interactions of the Parsimonious Composite Network (PCNet) as described in the "Integrating networks improves gene set recovery" results section of the paper from Huang and Carlin et al. 2018. This network was shown to have higher overall performance on recovering the collection of literature-based disease-associated gene sets than any single network from the compendium of 21 networks studied by Huang and Carlin et al. PCNet is a union of all molecular interactions across the 21 evaluated molecular networks on the condition that the interaction appears in at least 2 of the molecular networks.
This network belongs to the NDEx Network Set associated with the 2018 Huang and Carlin et al. Cell Systems paper.
Rights Holder: University of California San Diego
Rights: Attribution-NonCommercial 4.0 International (CC BY-NC 4.0)
Query Terms (i.e., AKT1 or WNT*)
Type:
1-step neighborhood
Run Query
Open in Cytoscape
Table
Share
Edit
More

Find Related Networks

NDEx
Network Search

UBC,APP,HNF4A,TAF1

Query Genes

ENRICHMENT | INTERACTOME | KEYWORD

- G GNAL
- G GNB1
- G GNG13
- G GNG7
- G GNGT1
- G PRKACA
- G PRKACB
- G PRKACG
- G APP
- G ARRB1
- G ARRB2
- G EGFR

wikipathways: WP35 - G Protein Signaling Pathways - Homo sapiens
Nodes: 129, Edges: 24 Hit/Query = 8/25

cptac: Sustaining proliferative signaling
Nodes: 586, Edges: 713 Hit/Query = 13/25

wikipathways: WP3929 - Chemokine signaling pathway - Homo sapiens
Nodes: 236, Edges: 75 Hit/Query = 9/25

wikipathways: WP289 - Myometrial Relaxation and Contraction Pathways - Homo sapiens
Nodes: 275, Edges: 84 Hit/Query = 9/25

wikipathways: WP4249 - Hedgehog Signaling Pathway - Homo sapiens
Nodes: 93, Edges: 30 Hit/Query = 6/25

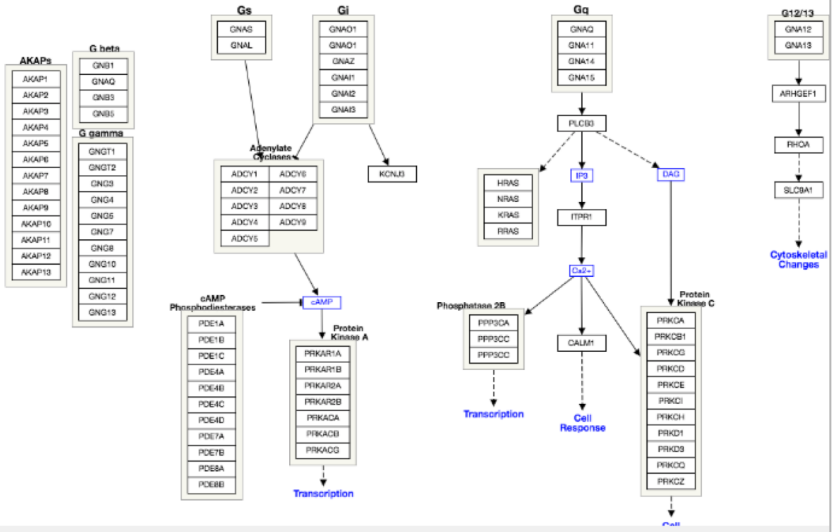
cptac: Inducing angiogenesis
Nodes: 167, Edges: 198 Hit/Query = 7/25

wikipathways: WP4223 - Ras Signaling - Homo sapiens
Nodes: 274, Edges: 94 Hit/Query = 8/25

wikipathways: WP35 - G Protein Signaling Pathways - Homo sa...

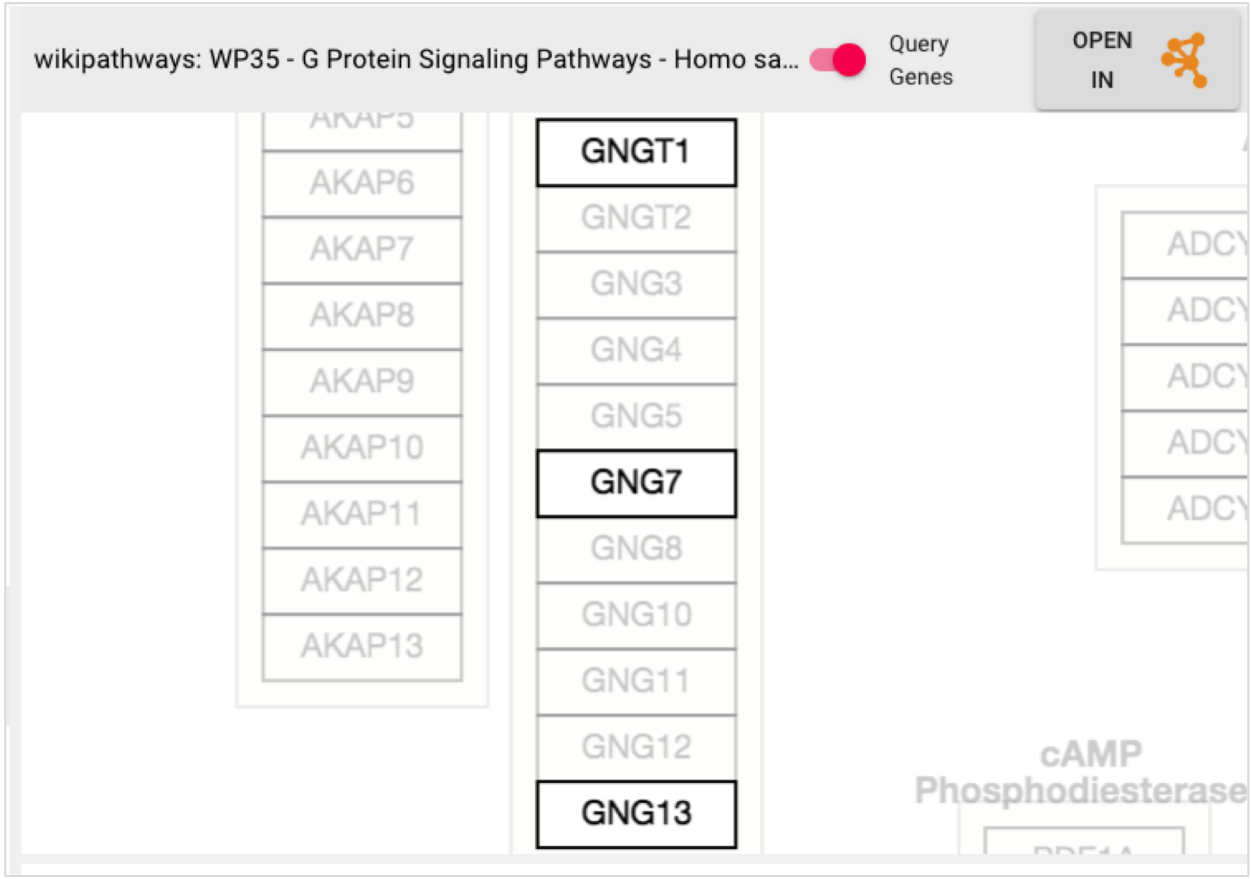
Query Genes

OPEN IN

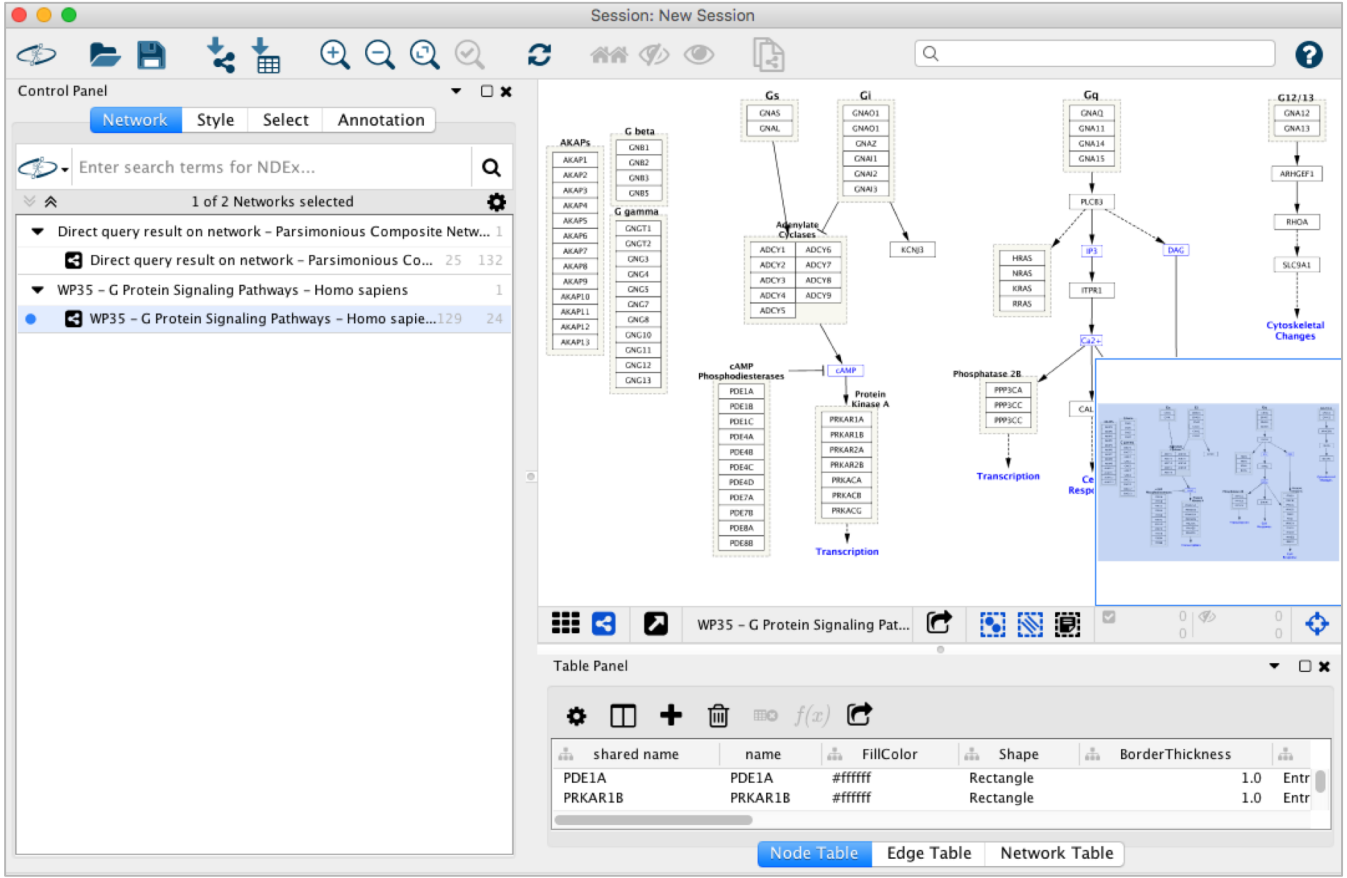



88601
wikipathwaysVersion

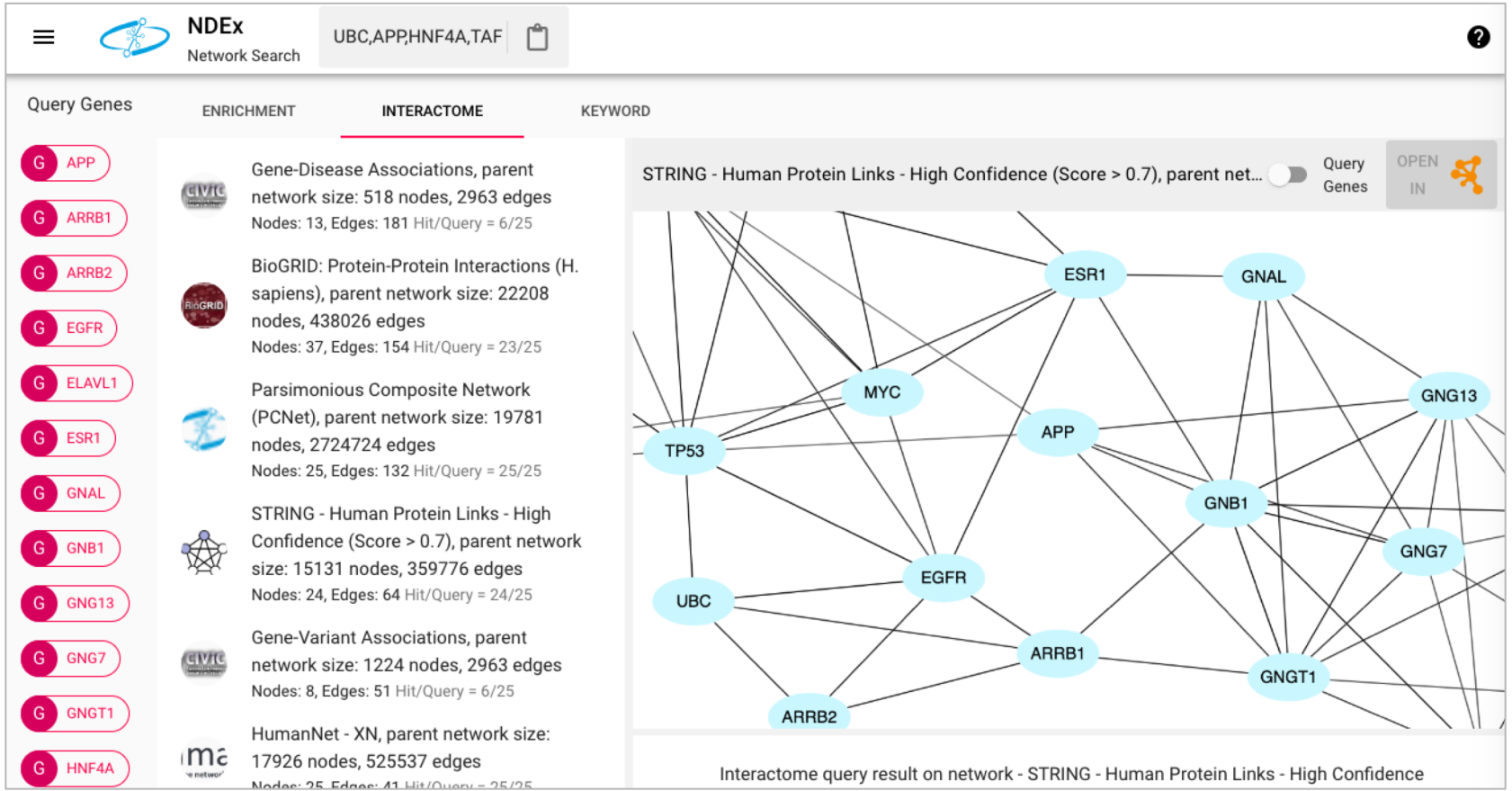
# Highlight and Zoom to Query Genes



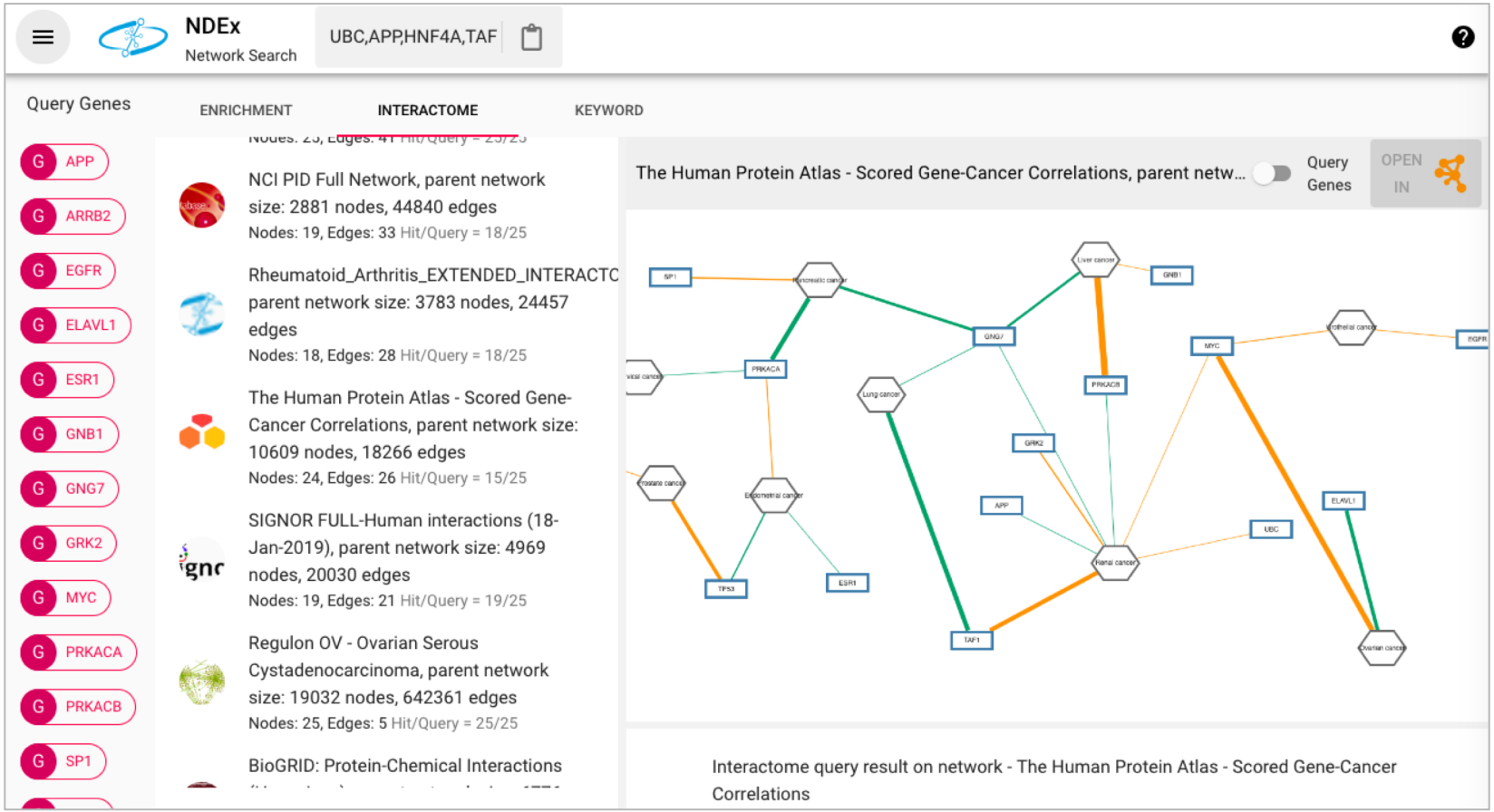
# Open Pathway in Cytoscape



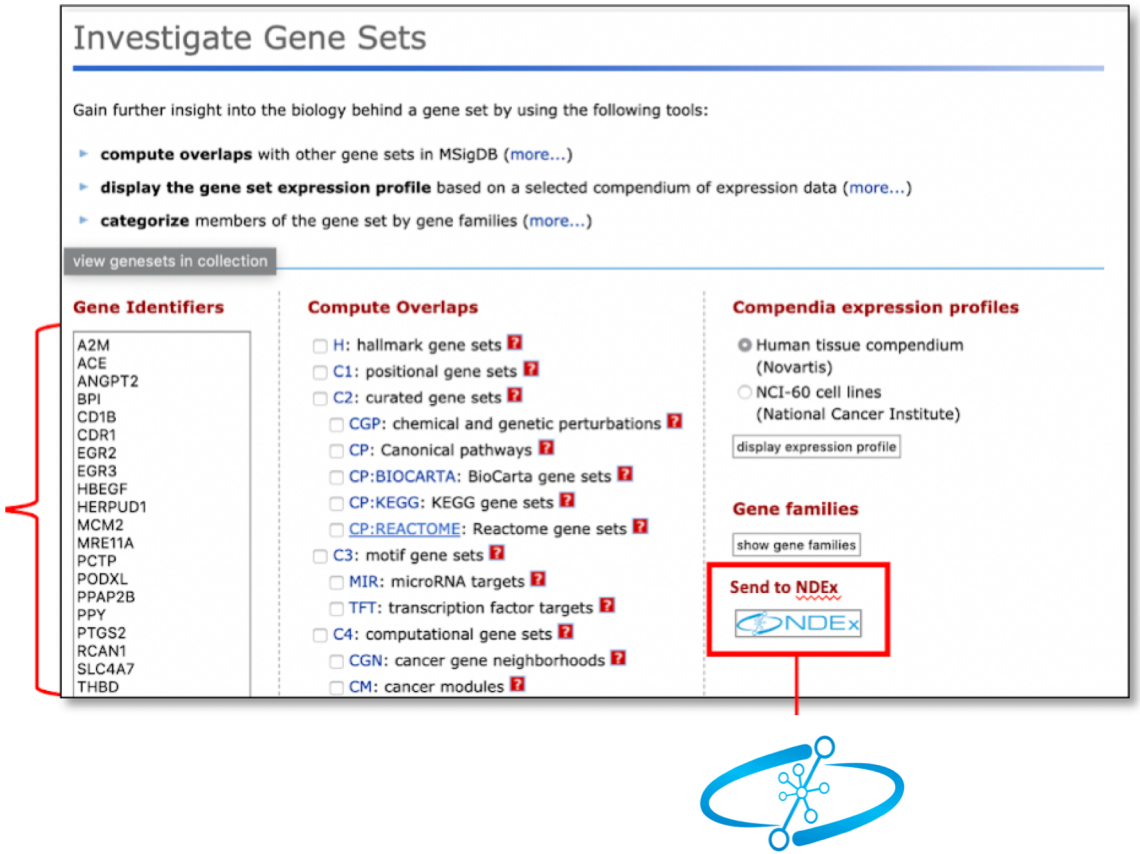
# Query Interactomes: String



# Query Interactomes: Human Protein Atlas



# MSigDB Collaboration



# DDOT and HiView Use NDEx

Cytoscape

Open Subsystem
in Cytoscape

Investigate Subsystem
Gene Set

NDEx Search Portal

Open Pathway
or Interactome
Query in
Cytoscape

Cytoscape

Save Subsystem
Networks

Get Interactomes
and Hierarchies

DDOT

Output Hierarchies

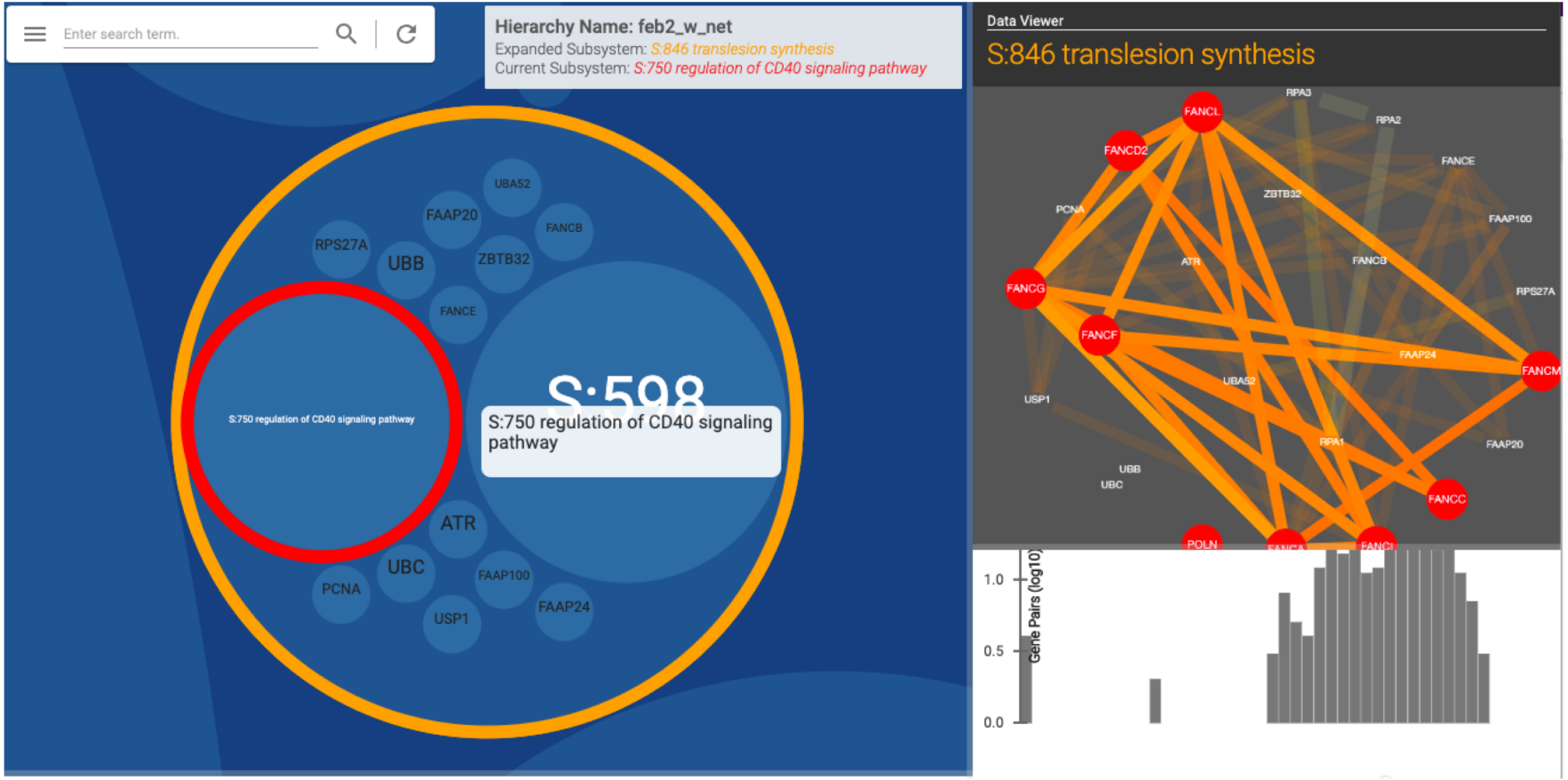
Get Interactomes

NDEx Server

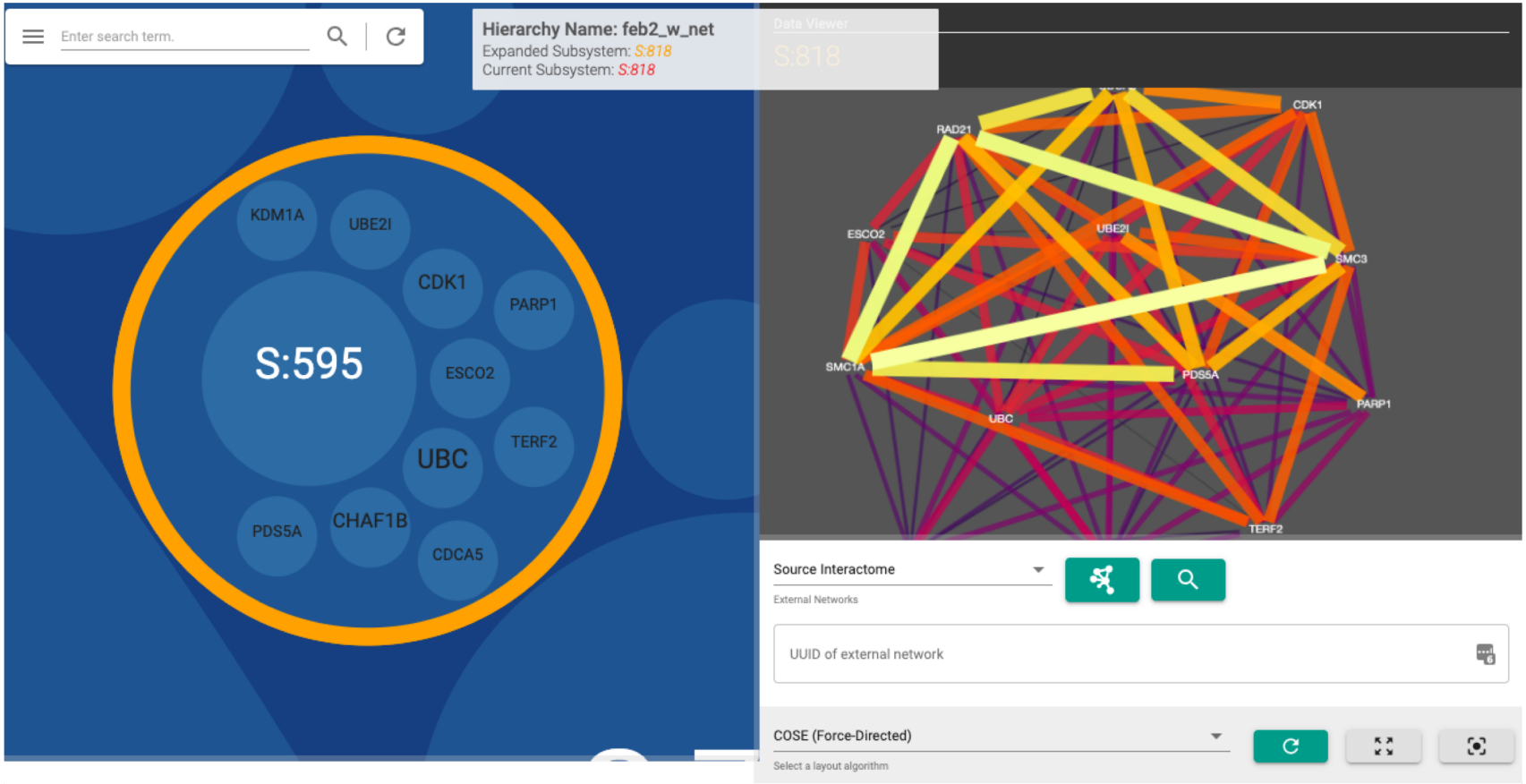
Get Networks

Search
Service

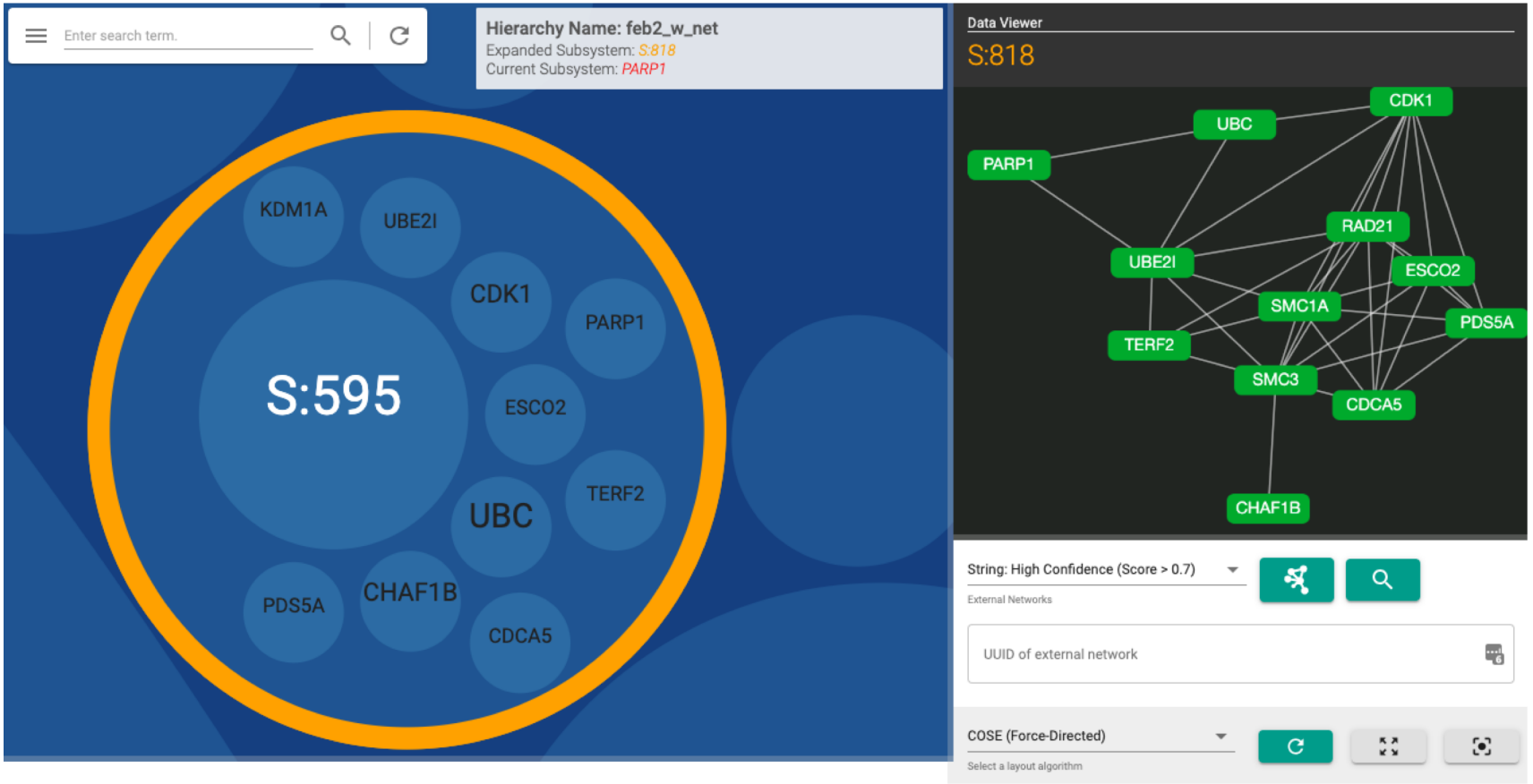
# DNA Repair Hierarchy in HiView



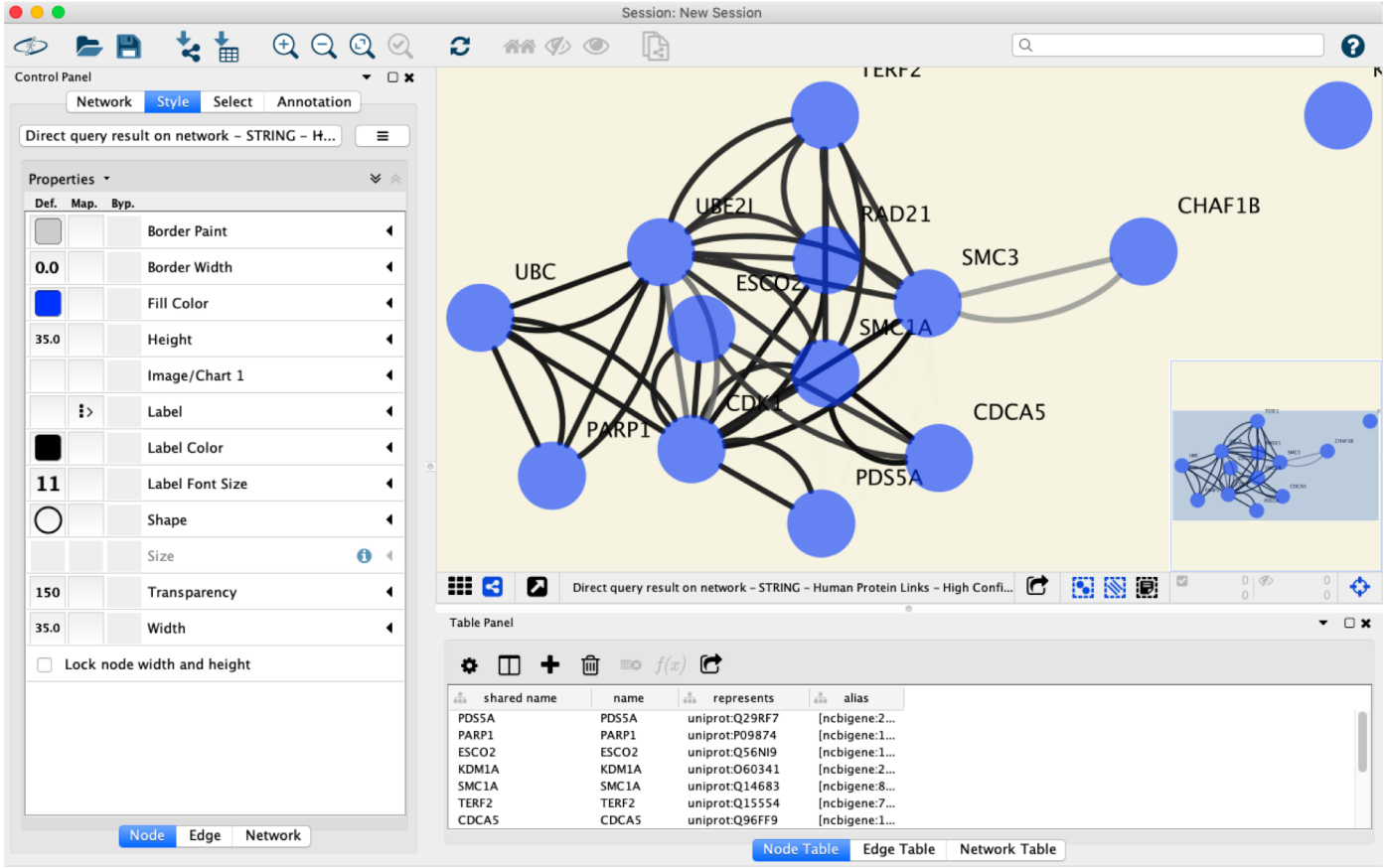
# Subsystem 818 of DNA Repair Hierarchy in HiView



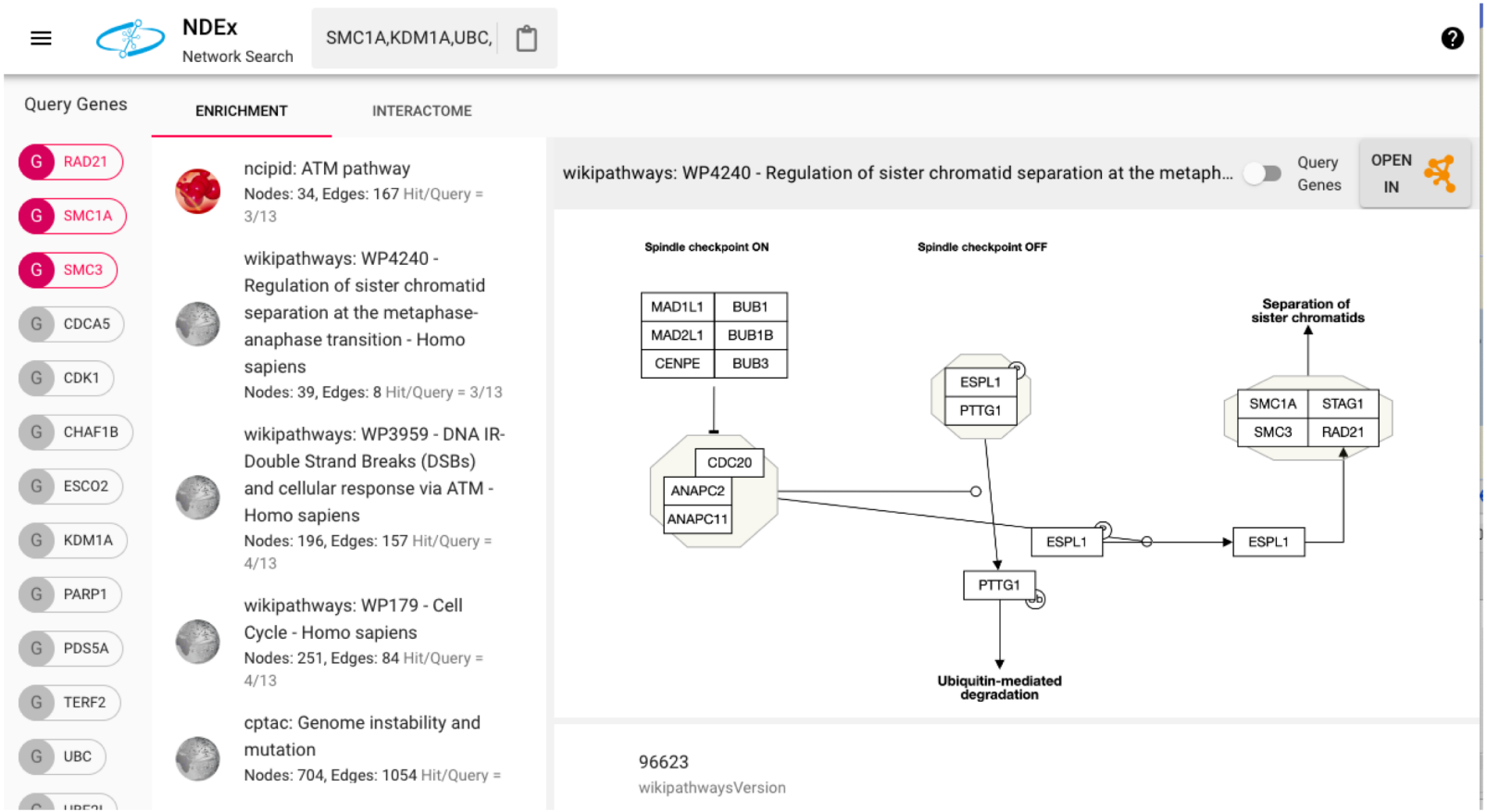
# HiView Lens: the Subsystem in Other Interactomes



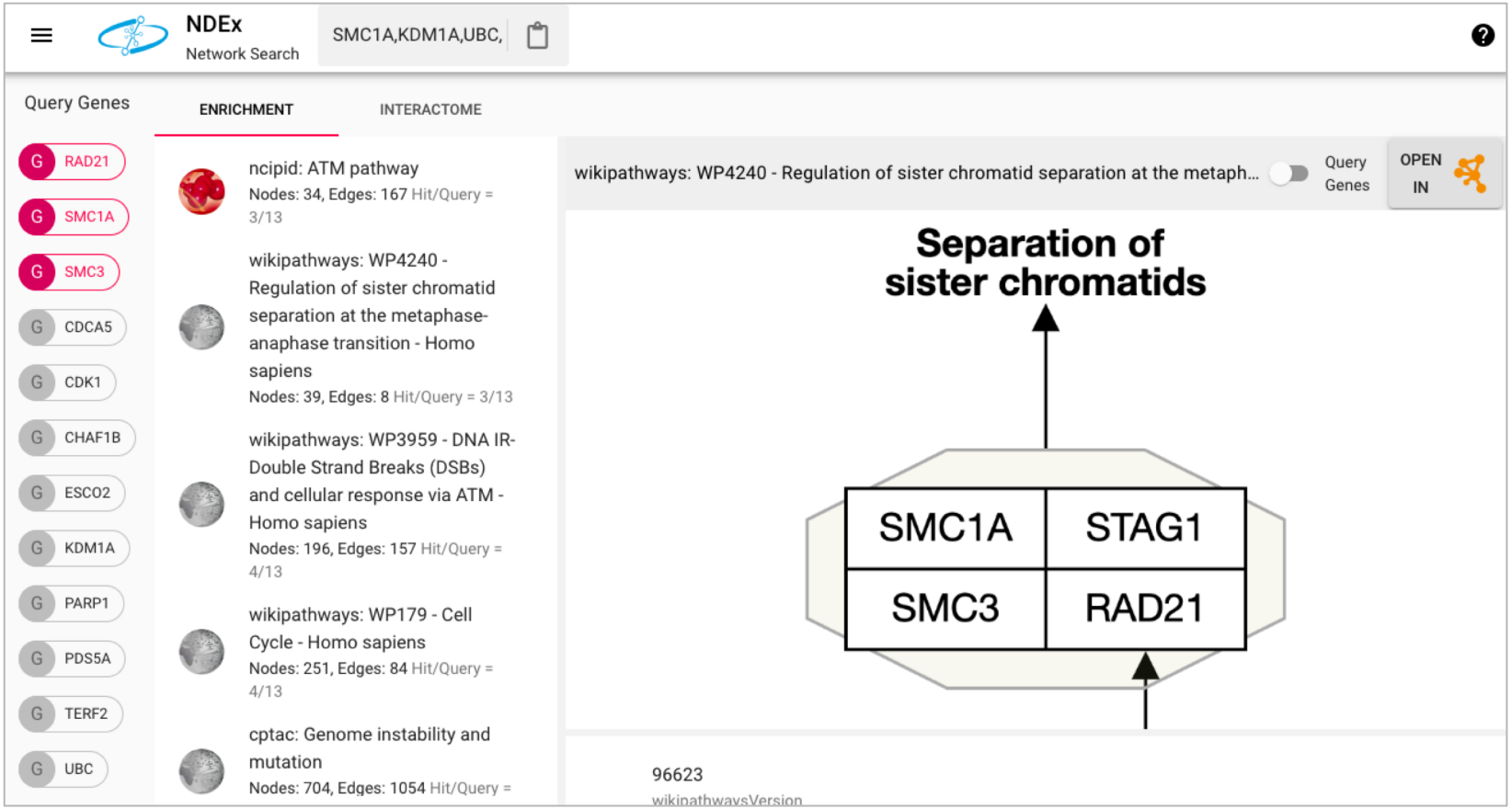
# Open the Subsystem in Cytoscape



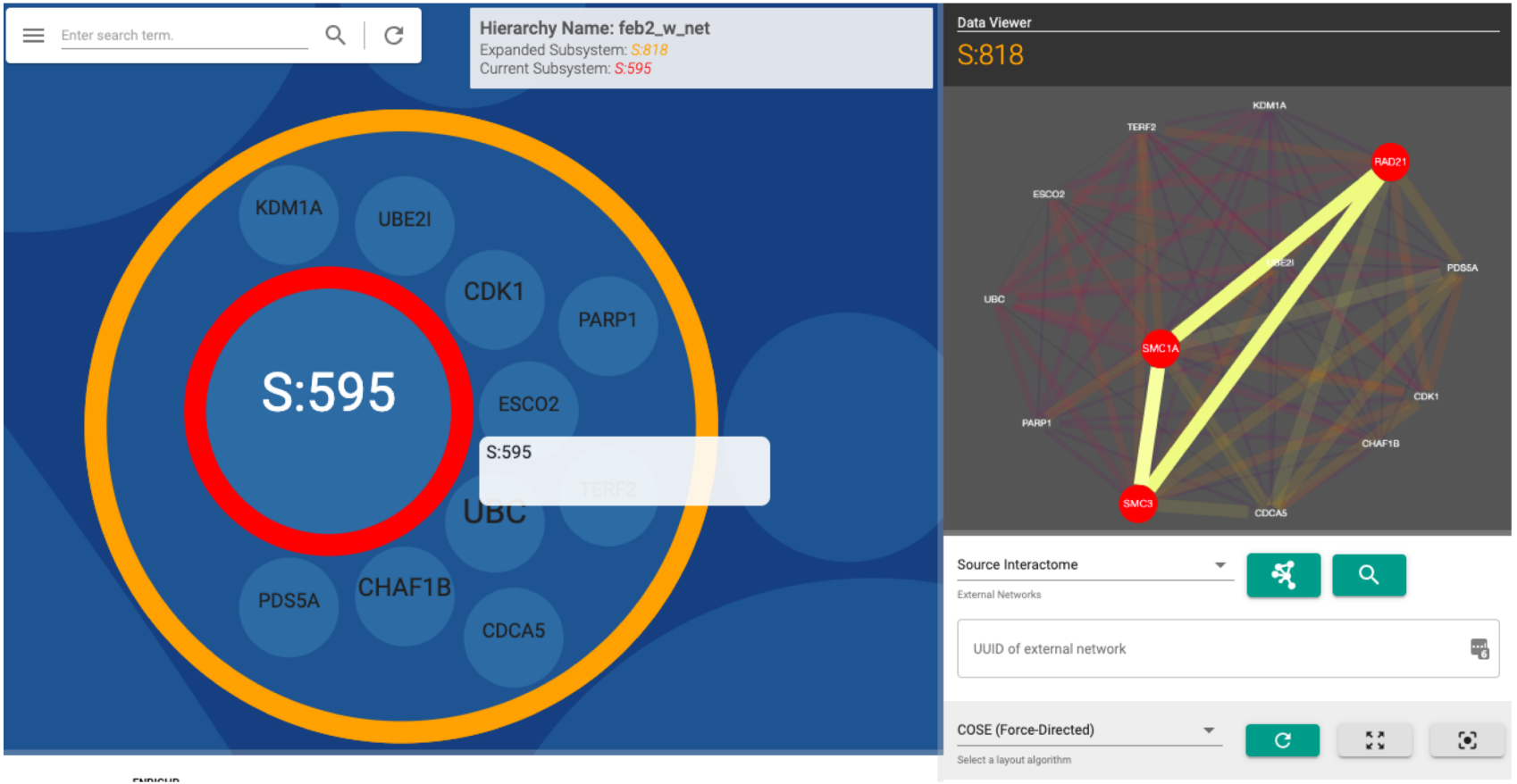
# Pathways Related to the Subsystem by Enrichment



# Zoom to the Query Genes - The Cohesin Complex



# S:595 Corresponds to the Cohesin Complex



Thanks!

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ndexbio.org

https://bit.ly/2McHl5D

Informatics Technology for Cancer Research

NRNB

U24 CA1884427

IGM Institute for Genomic Medicine