Pathway-VisualiseR: An Interactive Web Application for Visualising Gene Networks

Göknur Giner and Alexandra Garnham

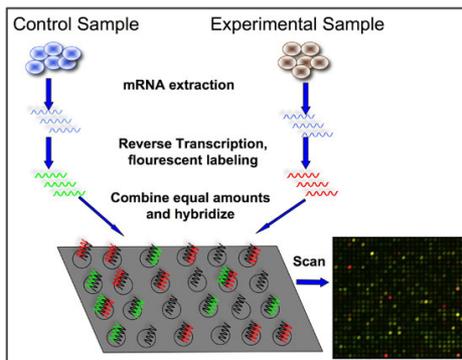10-12th July 2019

useR2019

@goknurginer   algarnham/Pathway-Visualiser
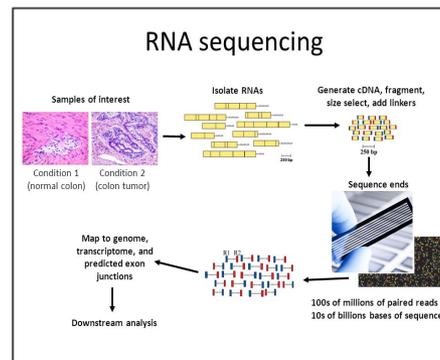
Motivation

The traditional biological research approaches were used to study **one gene** or a few genes at a time.

Nowadays it is possible to measure the changes and the regulation of **genome-wide** genes under certain biological conditions.
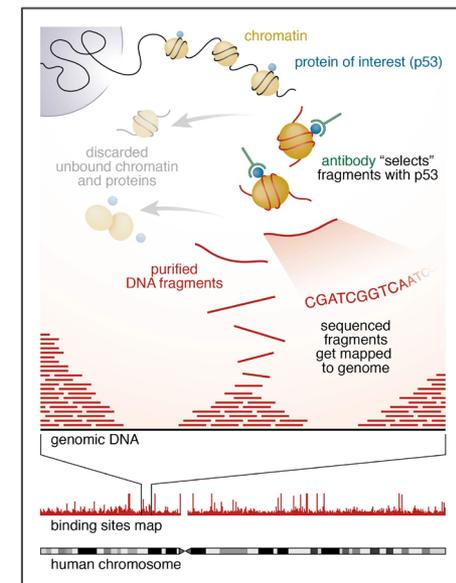
Microarray   **RNA-Seq**   **ChIP-Seq**
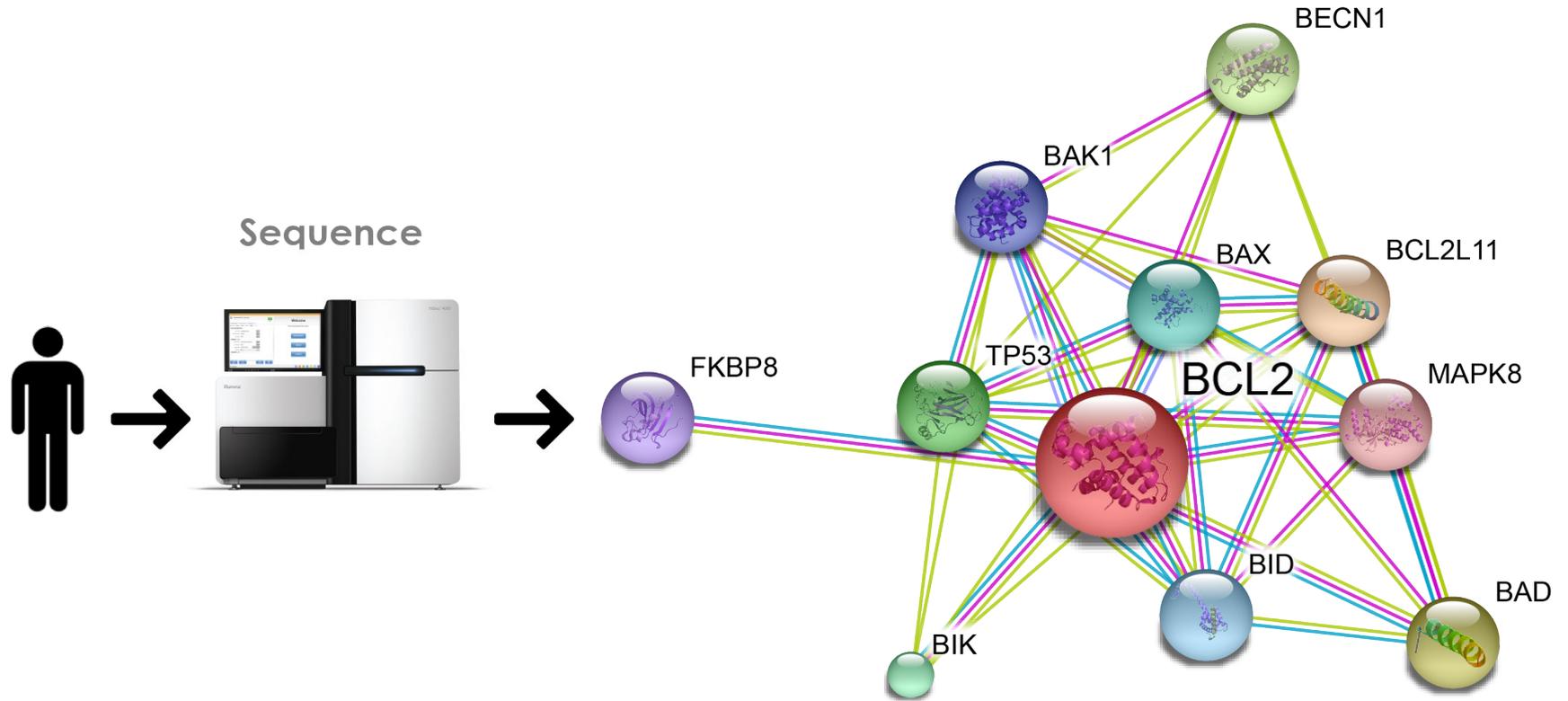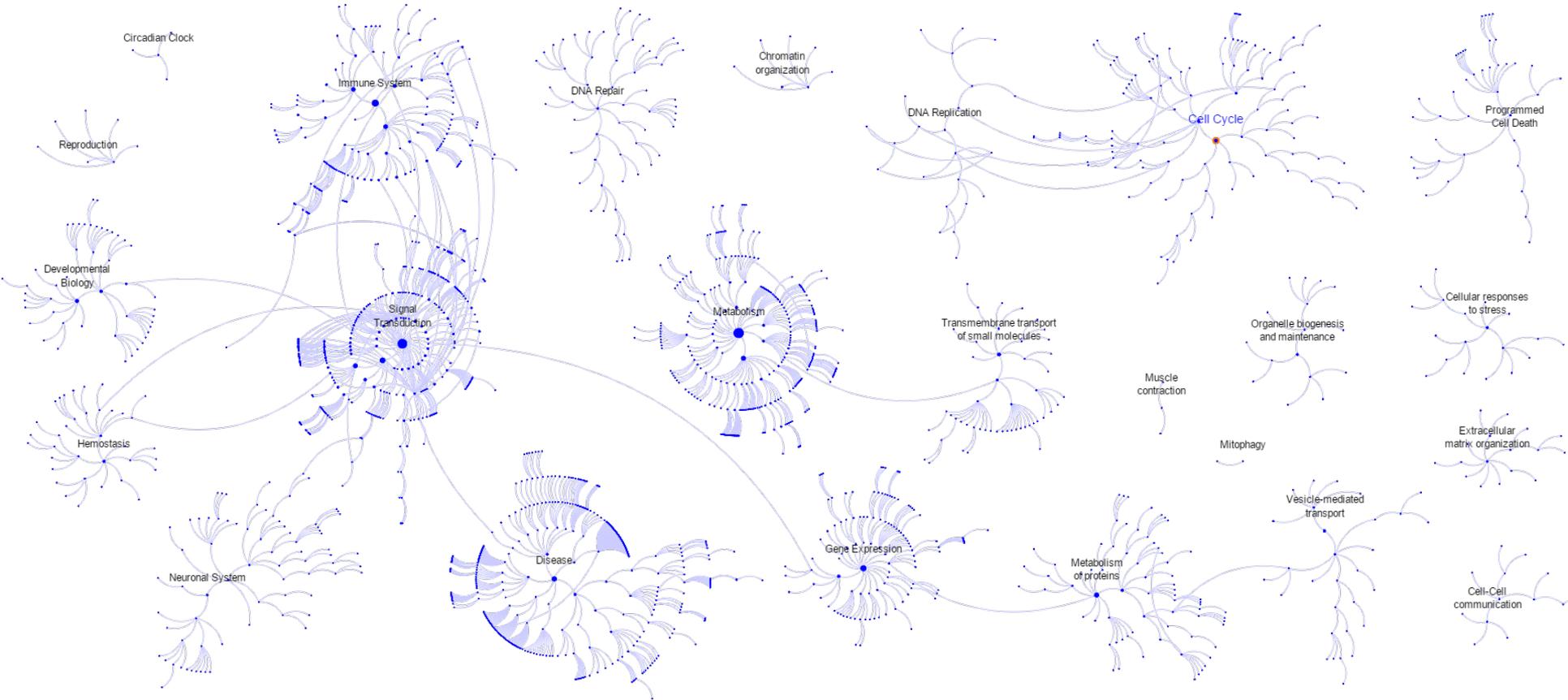
Set of Genes As a Focus of Biological Research

Pathways for Human

Reactome pathway browser

Pathway-Visualiser

Pathway-Visualiser constructs these pathways for a given set of genes.

☑ Interactive

☑ Reproducible

☑ Shareable

Algorithm

01 INPUT GENE LIST
A list of genes OR a count matrix OR a fit object from the linear model used.

02 GET AND IDENTIFY SIGNIFICANT PATHWAYS
Retrieve pathways from relevant database. Apply gene set test.

03 PREPARE EDGES AND NODES MATRIX
Pull the pathway hierarchy. Create the matrix of edges and nodes.

04 CONSTRUCT NETWORK
Use visNetwork() to build the network diagram.

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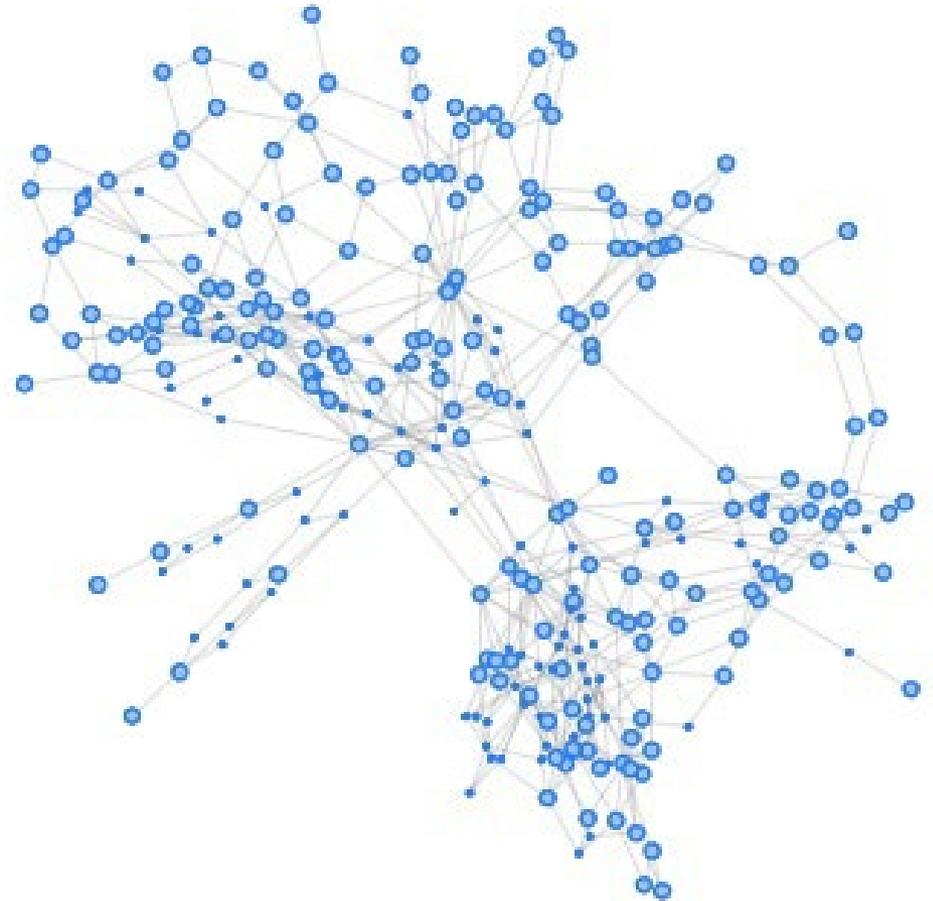
Build the Entire Network

List of genes

Pathway-Visualiser

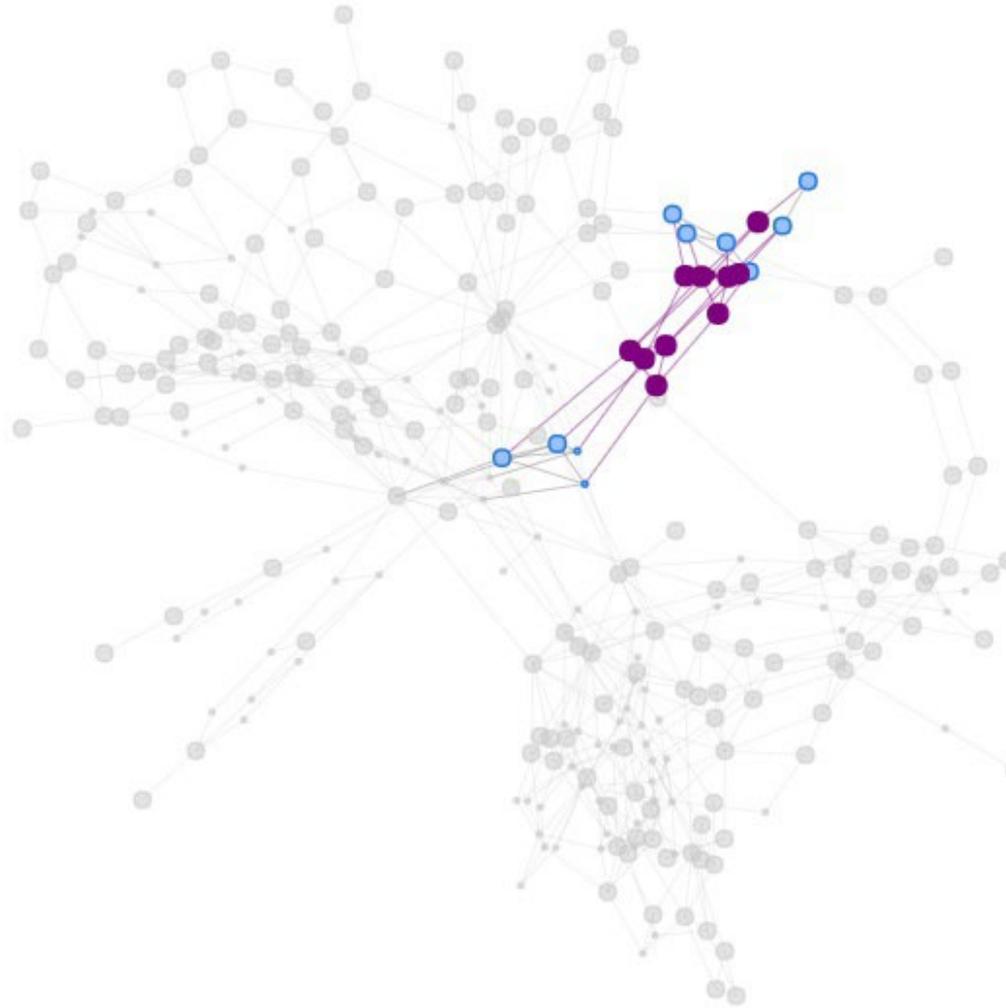Significant Gene Ontologies that includes the input list of genes

Highlight the Selected GO Terms

Pathway-Visualiser is **interactive.**

Purple nodes are the pathways of interest selected by the user.

Blue nodes are the periphery pathways.

The network of selected pathways

Table of GO Terms for Selected Nodes

Selected Term

Show 10 ▼ entries   Search: [   ]

	GO_ID	Term	Definition
53	GO:0008283	cell proliferation	The multiplication or reproduction of cells, resulting in the expansion of a cell population.
148	GO:0042127	regulation of cell proliferation	Any process that modulates the frequency, rate or extent of cell proliferation.

Showing 1 to 2 of 2 entries   Previous [1] Next

Periphery Terms

Show 10 ▼ entries   Search: [   ]

	GO_ID	Term	Definition
50	GO:0008150	biological_process	Any process specifically pertinent to the functioning of integrated living units: cells, tissues, organs, and organisms. A process is a collection of molecular events with a defined beginning and end.
53	GO:0008283	cell proliferation	The multiplication or reproduction of cells, resulting in the expansion of a cell population.
148	GO:0042127	regulation of cell proliferation	Any process that modulates the frequency, rate or extent of cell proliferation.
209	GO:0050794	regulation of cellular process	Any process that modulates the frequency, rate or extent of a cellular process, any of those that are carried out at the cellular level, but are not necessarily restricted to a single cell. For example, cell communication occurs among more than one cell, but occurs at the cellular level.

Showing 1 to 4 of 4 entries   Previous [1] Next

GO Terms with Inquired Gene
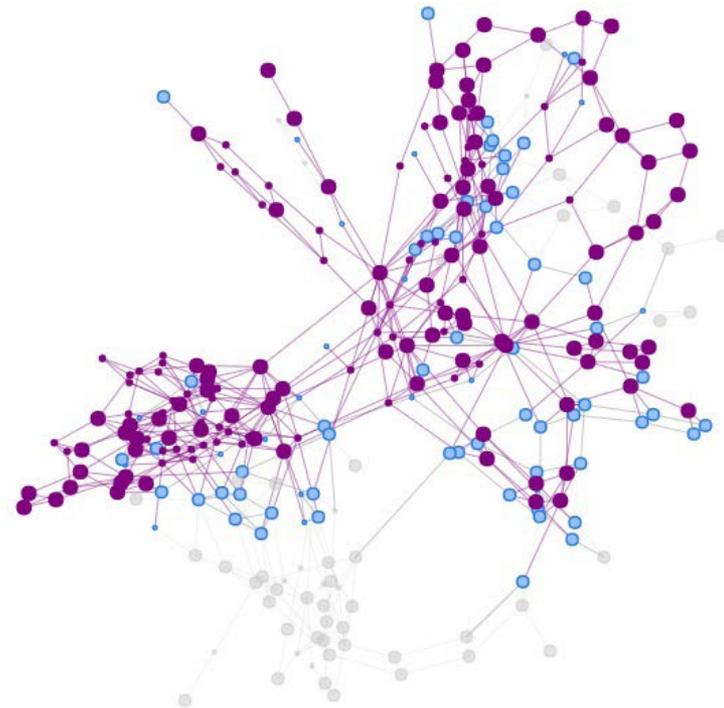
Acknowledgements

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Thanks for Listening ☺

Any Questions?

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