

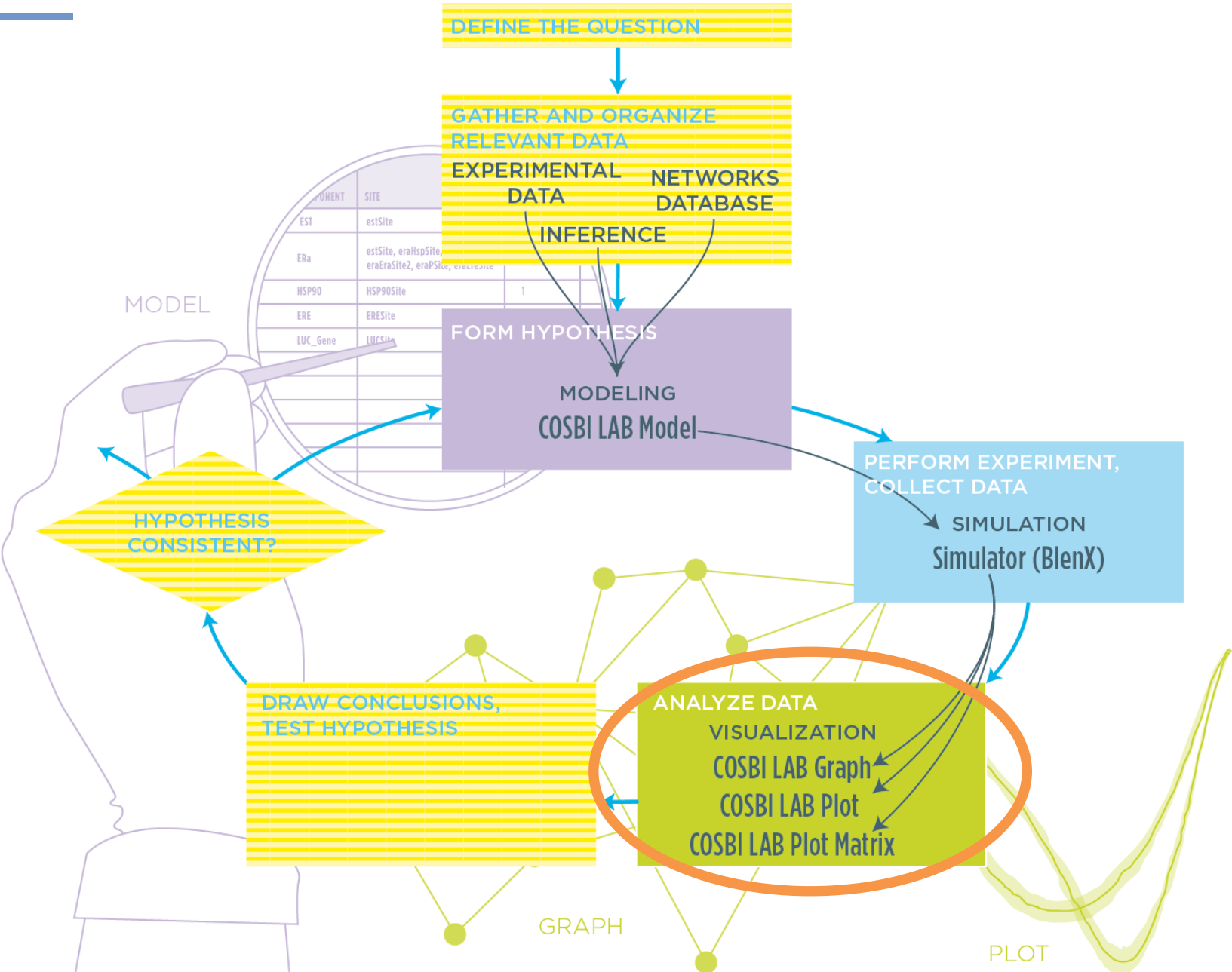


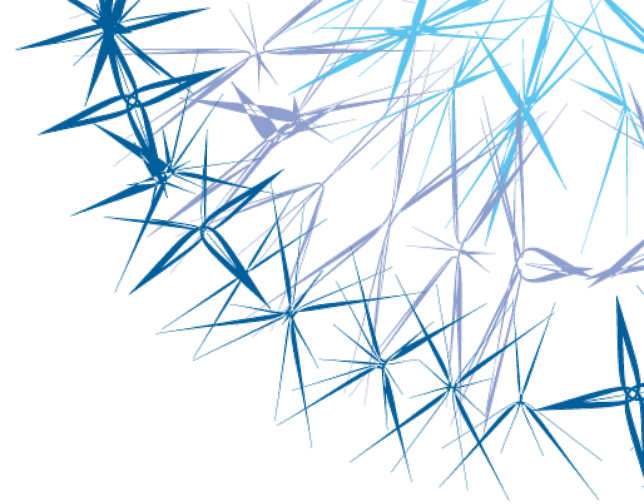
COSBI

# Network Analysis



# COSBI WORKFLOW





# NETWORK Analysis and Visualization

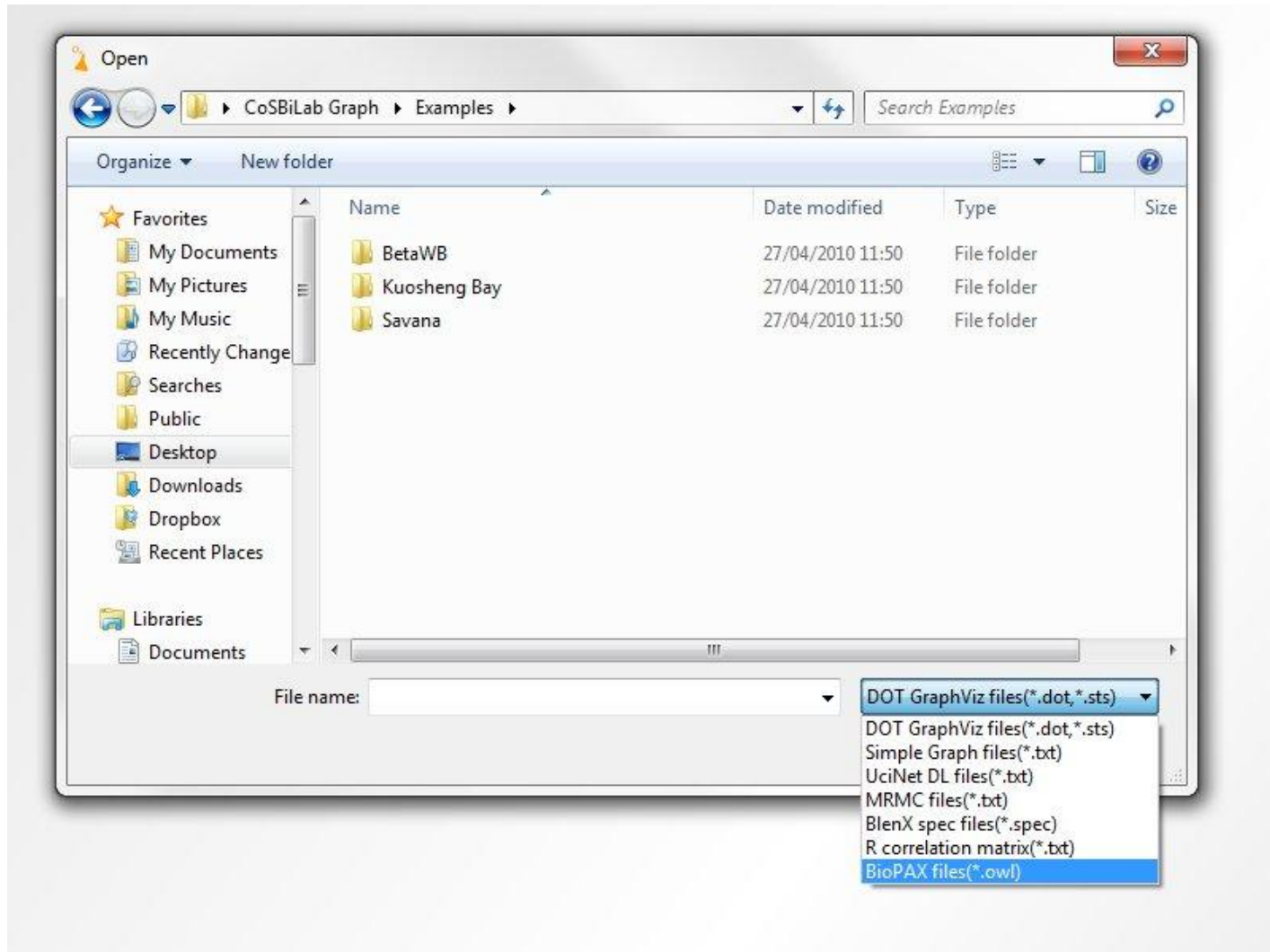
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R. Valentini, F. Jordan. *CoSBI Lab Graph: the network analysis module of CoSBI Lab*. **Environmental Modelling and Software**, 25:886-888, 2010.

Download:  
<http://www.cosbi.eu/index.php/research/prototypes/graph>

# INPUT FORMATS



# GRAPH IMPORTED

The screenshot displays the CoSBI Lab Graph application interface. The main window shows a circular graph with 50 nodes and 100 edges. The nodes are arranged in a circle, and the edges connect them in a complex, dense pattern. The interface includes a menu bar (File, Graph, Selection, Windows, Tools, Layout, Actions, Help) and a toolbar with various icons for file operations and graph manipulation. A Properties Inspector panel is visible on the right, showing the graph's details and a table of properties.

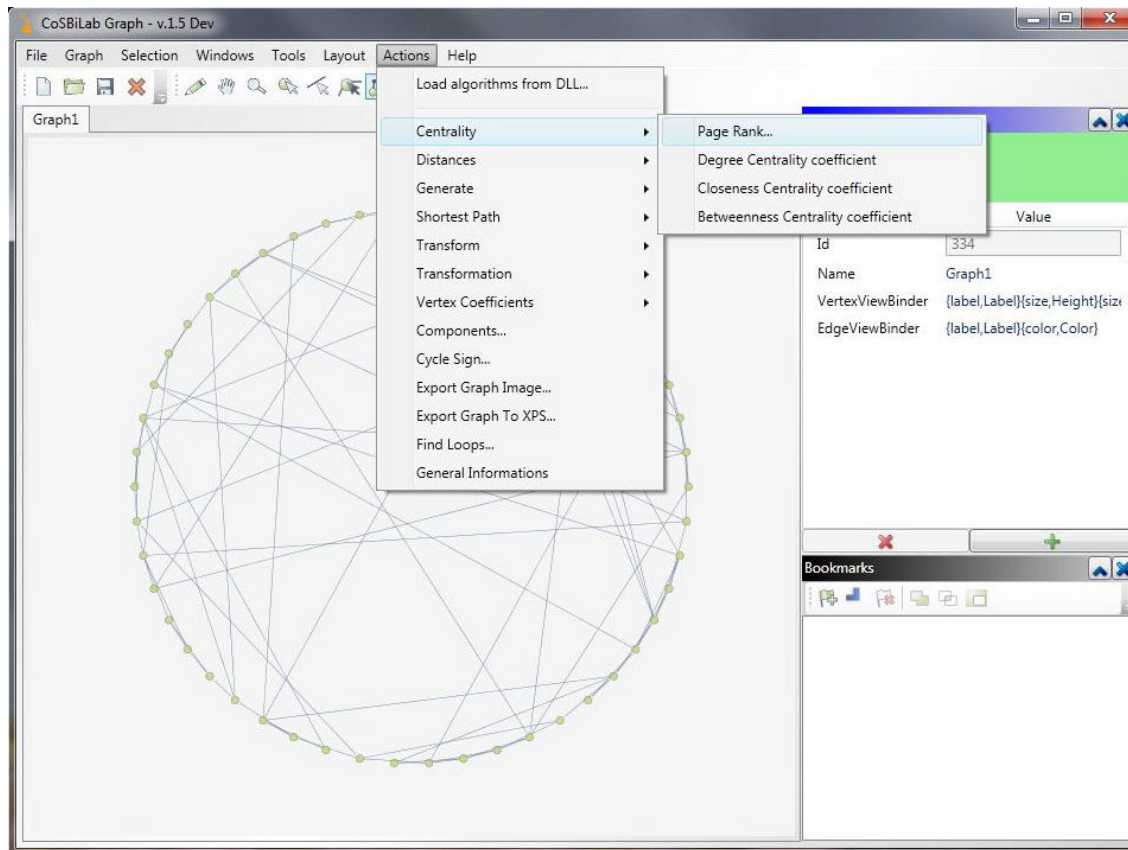
**Properties Inspector**

**Graph Graph1**  
Nodes: 50  
Edges: 100

Name	Value
Id	334
Name	Graph1
VertexViewBinder	{label,Label}{size,Height}{size
EdgeViewBinder	{label,Label}{color,Color}

**Bookmarks**

# ALGORITHMS FOR NETWORK ANALYSIS



## Centrality:

Page Rank

Degree Centrality coefficient

Closeness Centrality coefficient

## Distances:

Diameter

Compactness Index

Center of Gravity

Average Distance

## Generate:

Watts-Strogatz Radom

GraphErdos-Reyni Random Graph

Barabasi-Albert Random Graph

## Shortest Path:

Shortest Path

Shortest Path Matrix

Dijkstra Shortest Path

BellmanFord Shortest Path

## Vertex Coefficients:

Status, Contrastatus, Netstatus

K-Index

Degree

Clustering Coefficients

# LAYOUTS: FRUCHTERMAN REINGOLD

The screenshot displays the CoSbiLab Graph - v.1.5 Dev application interface. The main window shows a graph visualization with a circular layout. A 'Layout' menu is open, listing various layout algorithms: Random, Balloon Tree, Tree, Fruchterman, Spring, Grid, H Sinusoid, V Sinusoid, Spiral, and Circle. The 'Fruchterman' layout is highlighted. A smaller window in the foreground shows a graph visualization with a different layout, and a search filter is applied: '=PageRank>1.4'. The Properties Inspector on the right shows the following information:

Properties Inspector  
Selection  
Number of vertices: 5  
Number of edges: 0  
Selected Vertices  
Selected Edges

Name	Value
PageRank	Different values

Bookmarks  
Search result: "=PageRank>1.4"

# PROPERTY INSPECTOR

The screenshot displays the CoSBI Lab Graph - v.1.5 Dev application window. The main area shows a network graph with a central node highlighted in blue and its incident edges also highlighted. The Properties Inspector panel on the right provides details for the selected node.

**Properties Inspector**

**Node**

Size: (20, 20)  
Location: (672, -374)  
Degree: 5  
Incident Edges

Name	Value
Id	372
Name	
PageRank	1.31

**Bookmarks**

# SEARCH: PAGE RANK > 1.4

The screenshot displays the CoSBI Lab Graph interface (v.1.5 Dev) with a network graph. The search filter is set to `=PageRank>1.4`, resulting in 5 highlighted vertices. The Properties Inspector shows the selection statistics: 5 vertices and 0 edges. The Bookmarks panel shows the search result: "Search result: '=PageRank>1.4'".

CoSBI Lab Graph - v.1.5 Dev

File Graph Selection Windows Tools Layout Actions Help

Graph1

Properties Inspector

Selection

Number of vertices: 5  
Number of edges: 0

- Selected Vertices
- Selected Edges

Name	Value
PageRank	Different values

Bookmarks

Search result: "=PageRank>1.4"

# SHORTEST PATH TOOL

The screenshot displays the CoSBI Lab Graph software interface (v.1.5 Dev). The main window shows a network graph with numerous vertices and edges. A specific path of four edges is highlighted in green, representing the shortest path. The interface includes a menu bar (File, Graph, Selection, Windows, Tools, Layout, Actions, Help) and a toolbar with various icons. A search filter `=PageRank>1.4` is applied to the graph. On the right side, there are two panels: the Properties Inspector and the Bookmarks panel.

**Properties Inspector**

**Selection**

Number of vertices: 2  
Number of edges: 4

- Selected Vertices
- Selected Edges

Name	Value
PageRank	Different values

**Bookmarks**

Search result: `"=PageRank>1.4"`

# NODE SIZE REFLECTING A NODE PROPERTY

The screenshot displays the CoSBI Lab Graph application interface. The main window shows a network graph with 50 nodes and 100 edges. The nodes are represented by green circles of varying sizes, where the size of each node corresponds to a specific property. The edges are thin, light blue lines connecting the nodes. The interface includes a menu bar (File, Graph, Selection, Windows, Tools, Layout, Actions, Help) and a toolbar with various interaction tools. On the right side, there is a Properties Inspector panel for 'Graph Graph1', which provides details about the graph and its components.

CoSBI Lab Graph - v.1.5 Dev

File Graph Selection Windows Tools Layout Actions Help

Graph1

Properties Inspector

Graph Graph1

Nodes: 50  
Edges: 100

Name	Value
Id	334
Name	Graph1
VertexViewBinder	{label,Label}{size,Height}{size
EdgeViewBinder	{label,Label}{color,Color}

Bookmarks

# PICTURES AS NODE ATTRIBUTES

The screenshot displays the CoSBI Lab Graph - v.1.5 Dev application window. The main canvas shows a dense network graph with 50 nodes and 100 edges. Each node is represented by a small image, such as a fish, a bird, or a plant, illustrating the concept of using pictures as node attributes. The interface includes a menu bar (File, Graph, Selection, Windows, Tools, Layout, Actions, Help) and a toolbar with various editing tools. On the right side, there are two panels: the Properties Inspector and the Bookmarks panel.

**Properties Inspector**

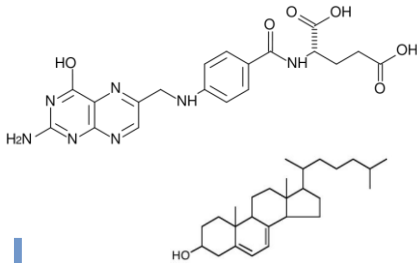
Graph Graph1  
Nodes: 50  
Edges: 100

Name	Value
Id	334
Name	Graph1
VertexViewBinder	{label,Label}{size,Height}{size
EdgeViewBinder	{label,Label}{color,Color}

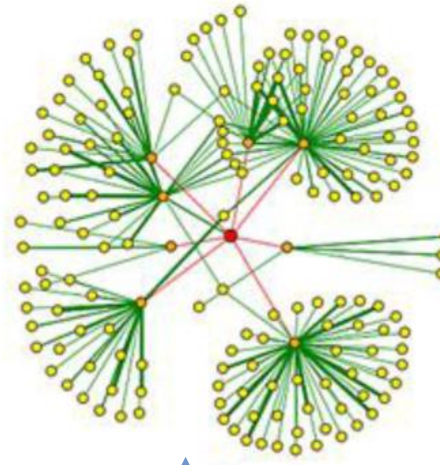
**Bookmarks**

# VITAMINS AND OBESITY

Select the micronutrients

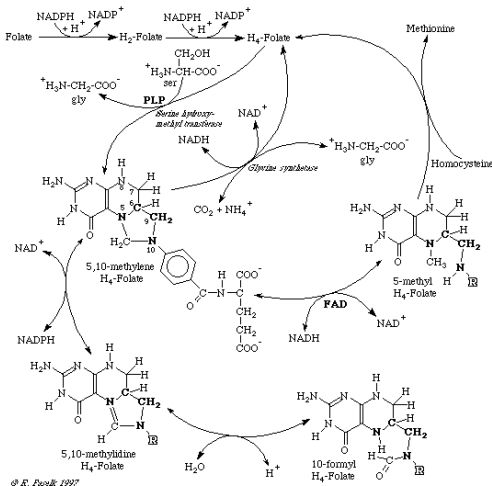


Search & Analyse Protein - Protein Interaction Database



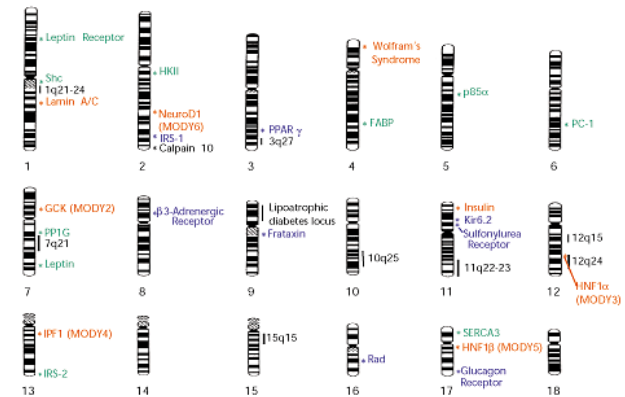
Select protein At Key Nodes

Search Networks & Pathways



Select genes involved and proteins codified

Map to QTL of Obesity/diabetes Phenotype



CANDIDATE GENES

# VITAMINS AND OBESITY

