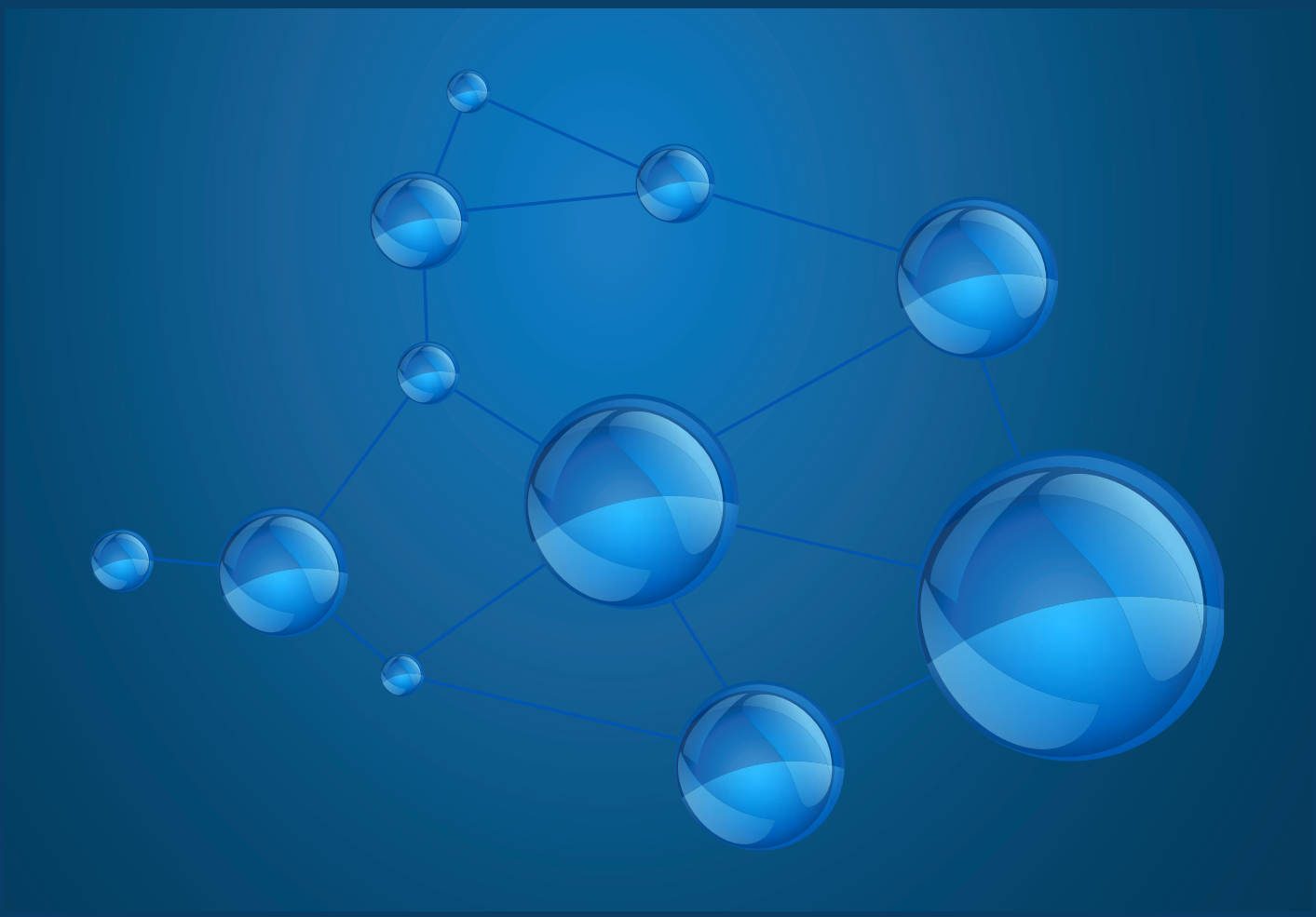


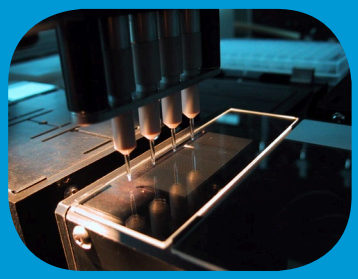
2016

ANDSystem

ANDVisio user's guide

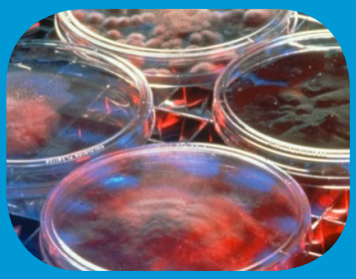
Information explosion in biology

GENOMICS



PROTEOMICS

METABOLOMICS

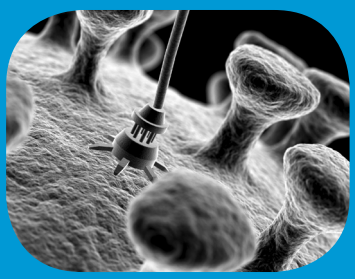


OVER 23 MILLION OF BIOLOGICAL PUBLICATIONS, THOUSANDS OF BIOLOGICAL DATABASES

OVER 10 MILLION OF PATENTS

PHARMACOLOGY

BIOTECHNOLOGY



NANOTECHNOLOGY

AGROBIOLOGY

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ANDVisio description

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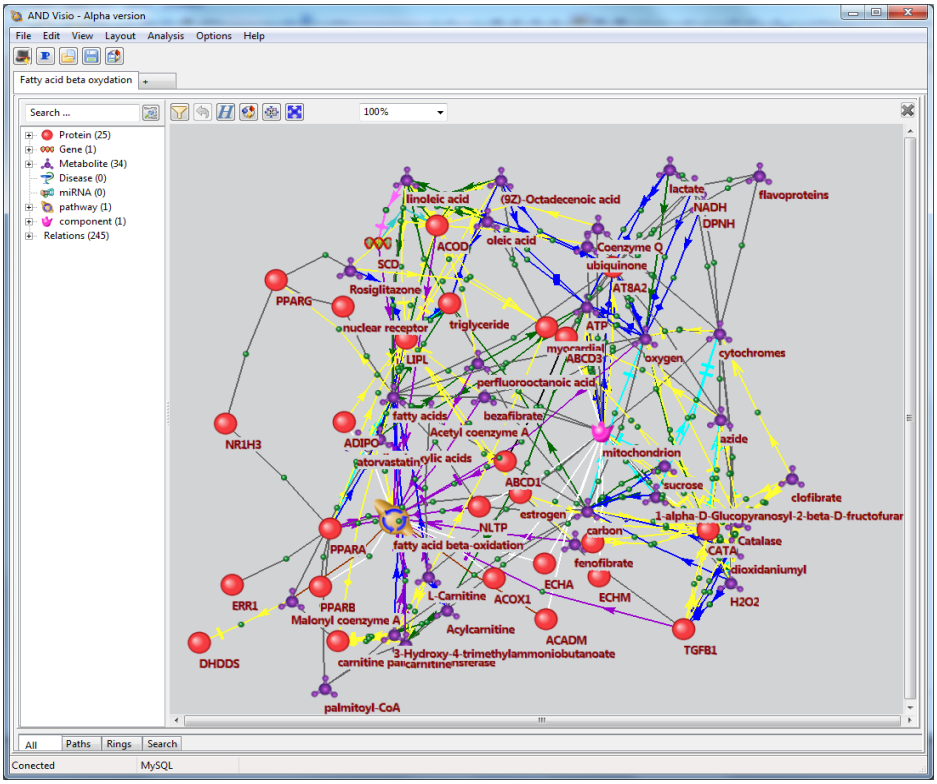
ANDVisio is a client module of ANDSystem which allows one to perform user queries to the ANDCell knowledge base and provides reconstruction, analysis and visualization of molecular genetic networks (associative networks) in the form of bipartite graph based on the results of these queries.

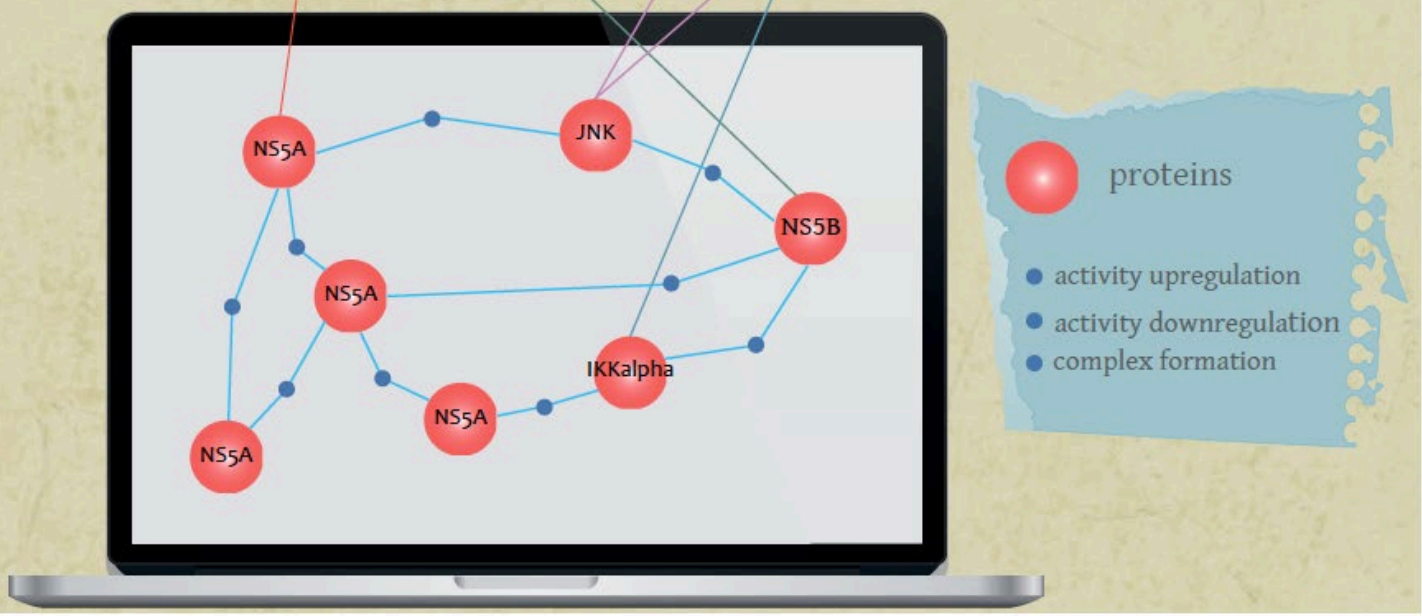


ANDVisio provides editing, search and saving of associative networks in different formats, as well as, filtering by object types, relationships between objects, information sources, etc.

Demenkov, P.S., et al. "ANDVisio: a new tool for graphic visualization and analysis of literature mined associative gene networks in the ANDSystem." In silico biology 11.3-4 (2012): 149-161

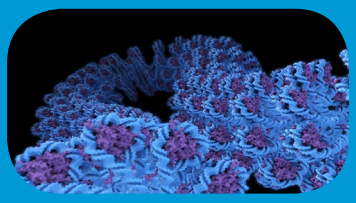
Illustration of the automated reconstruction process of the associative network describing HCV life cycle with text-mining module of ANDSystem

Hepatitis C virus (HCV) NS5B protein is a membrane-associated phosphoprotein that possesses an RNA-dependent RNA polymerase activity. We recently reported that NS5A protein interacts with TRAF2 and modulates tumor necrosis factor alpha (TNF-alpha)-induced NF-kappaB and Jun N-terminal protein kinase (JNK). Since NS5A and NS5B are the essential components of the HCV replication complex, we examined whether NS5B could modulate TNF-alpha-induced NF-kappaB and JNK activation. In this study, we have demonstrated that TNF-alpha-induced NF-kappaB activation is inhibited by NS5B protein in HEK293 and hepatic cells. Furthermore, NS5B protein inhibited both TRAF2- and IKK-induced NF-kappaB activation. Using coimmunoprecipitation assays, we show that NS5B interacts with IKKalpha. Most importantly, NS5B protein in HCV subgenomic replicon cells interacted with endogenous IKKalpha, and then TNF-alpha-mediated IKKalpha kinase activation was significantly decreased by NS5B. Using in vitro kinase assay, we have further found that NS5B protein synergistically activated TNF-alpha-mediated JNK activity in HEK293 and hepatic cells. These data suggest that NS5B protein modulates TNF-alpha signaling pathways and may contribute to HCV pathogenesis.



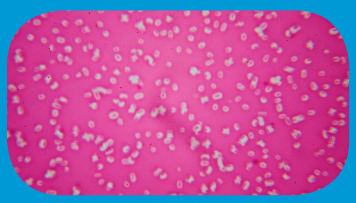
Statistics of dictionaries stored in the ANDCell database

Proteins / 566.249

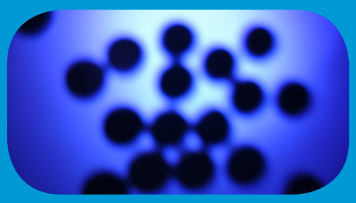


Genes / 15.480.756

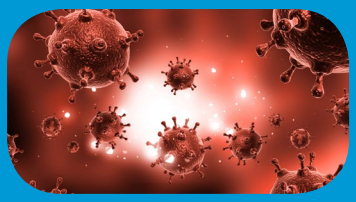
Diseases / 15.500



Metabolites / 46.226

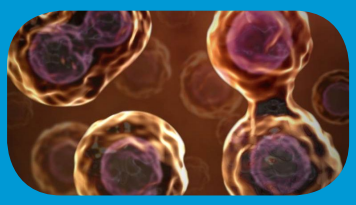


Organisms / 21.981

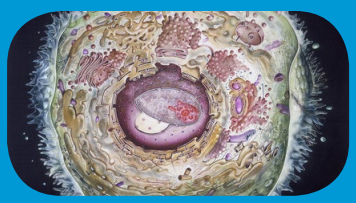


microRNAs / 28.645

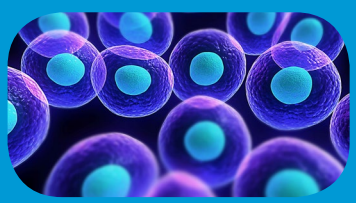
Processes / 26.645



Cell components / 3.680



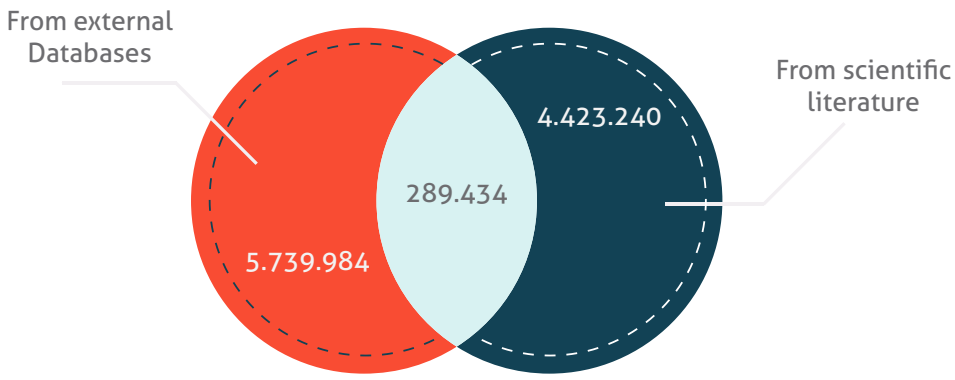
Cells and Tissues / 2.507



General statistics on interactions

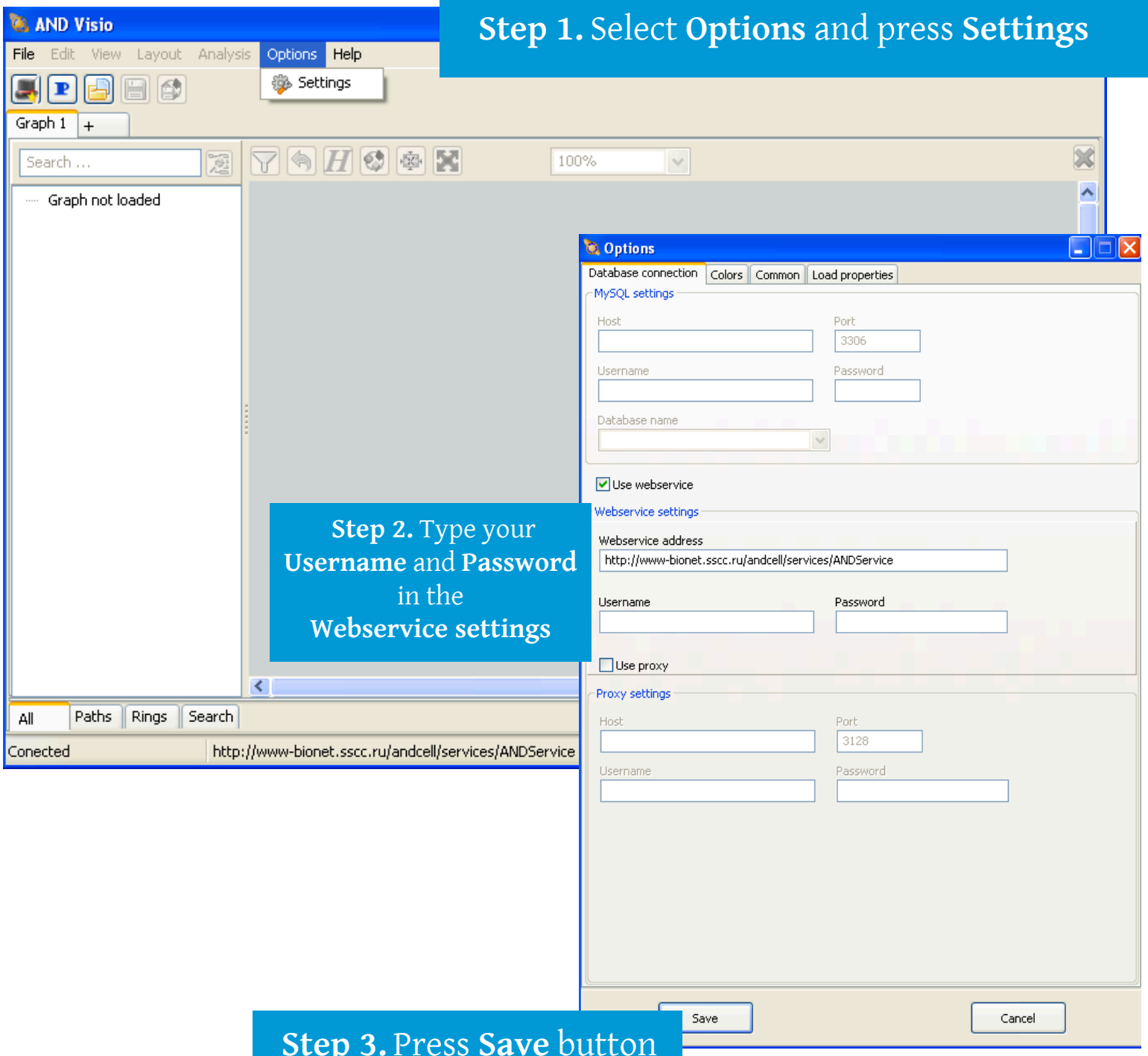
statistics on molecular-genetic interactions from ANDCell database of ANDSystem

Association	3.755.191	Activity downregulation	16.030
Involvement	4.504.760	Expression upregulation	14.706
Interaction	588.260	Activity upregulation	14.085
Expression	442.973	Expression downregulation	11.651
Catalyze	361.953	Degradation downregulation	4.805
Regulation	99.392	Activity regulation	4.805
Downregulation	71.069	Degradation upregulation	3.459
Upregulation	62.633	Coexpression	2.265
Transport regulation	58.226	Cleavage	905
Treatment	56.207	Degradation regulation	385
Expression regulation	48.234	Catalyze modification	62
Conversion	38.897		
Total		10.161.038	



ANDVisio configuration

Step 1. Select **Options** and press **Settings**

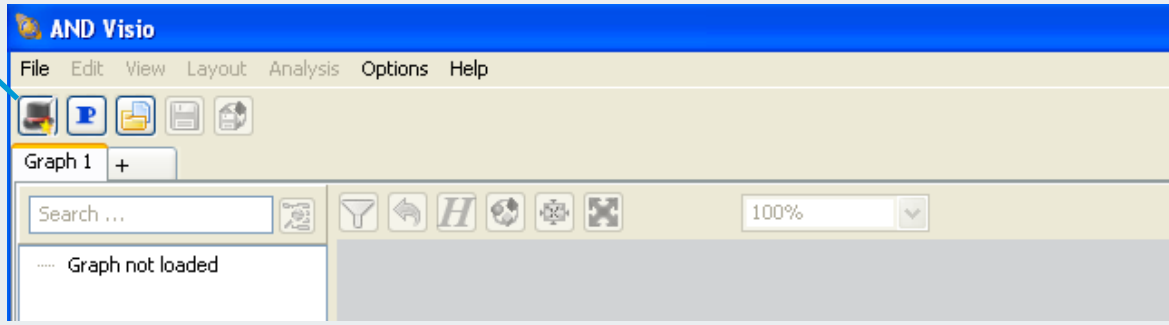


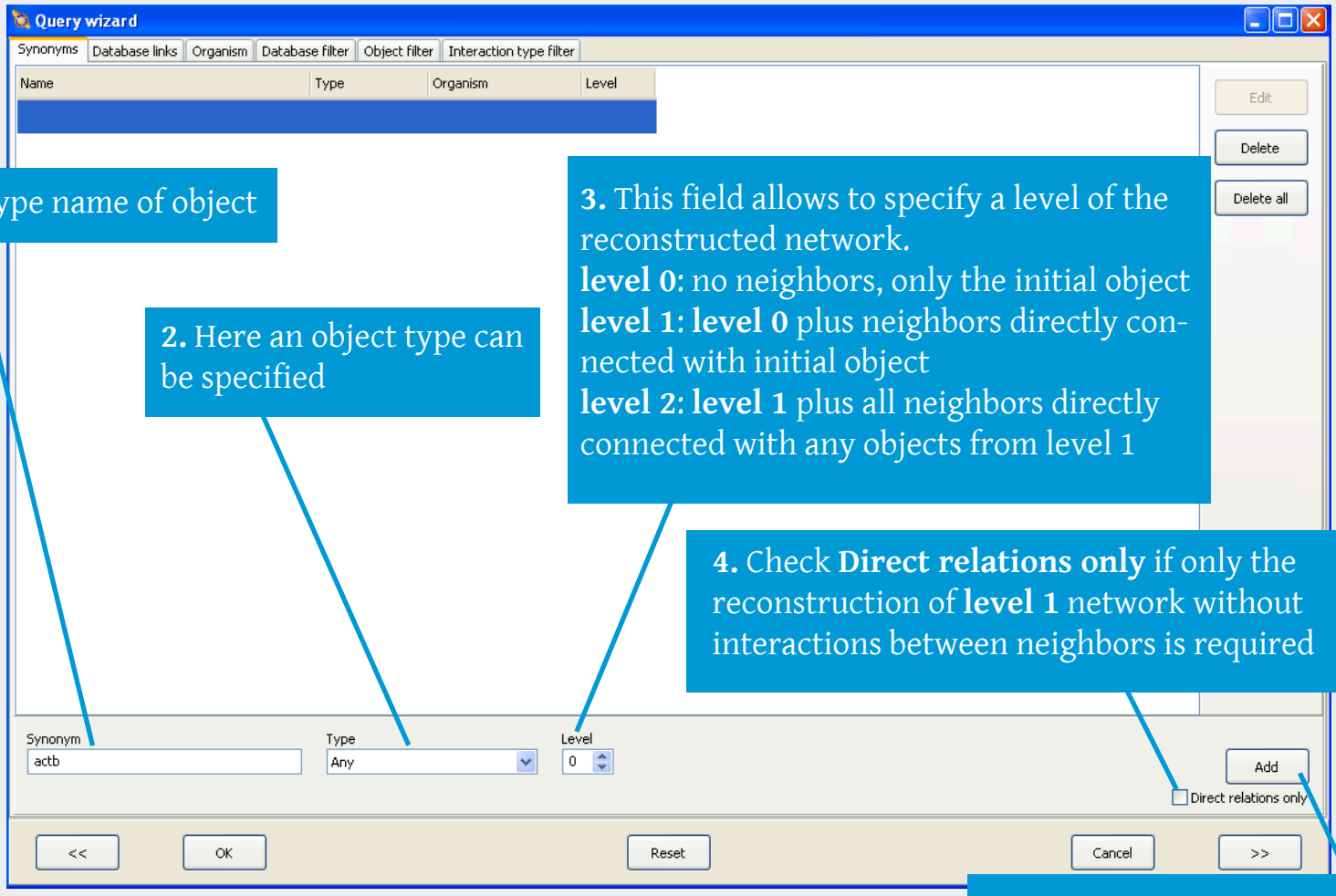
Step 2. Type your **Username** and **Password** in the **Webservice settings**

Step 3. Press **Save** button

ANDVisio
Network reconstruction

Press hat icon to start a **Query Wizard**





1. Type name of object

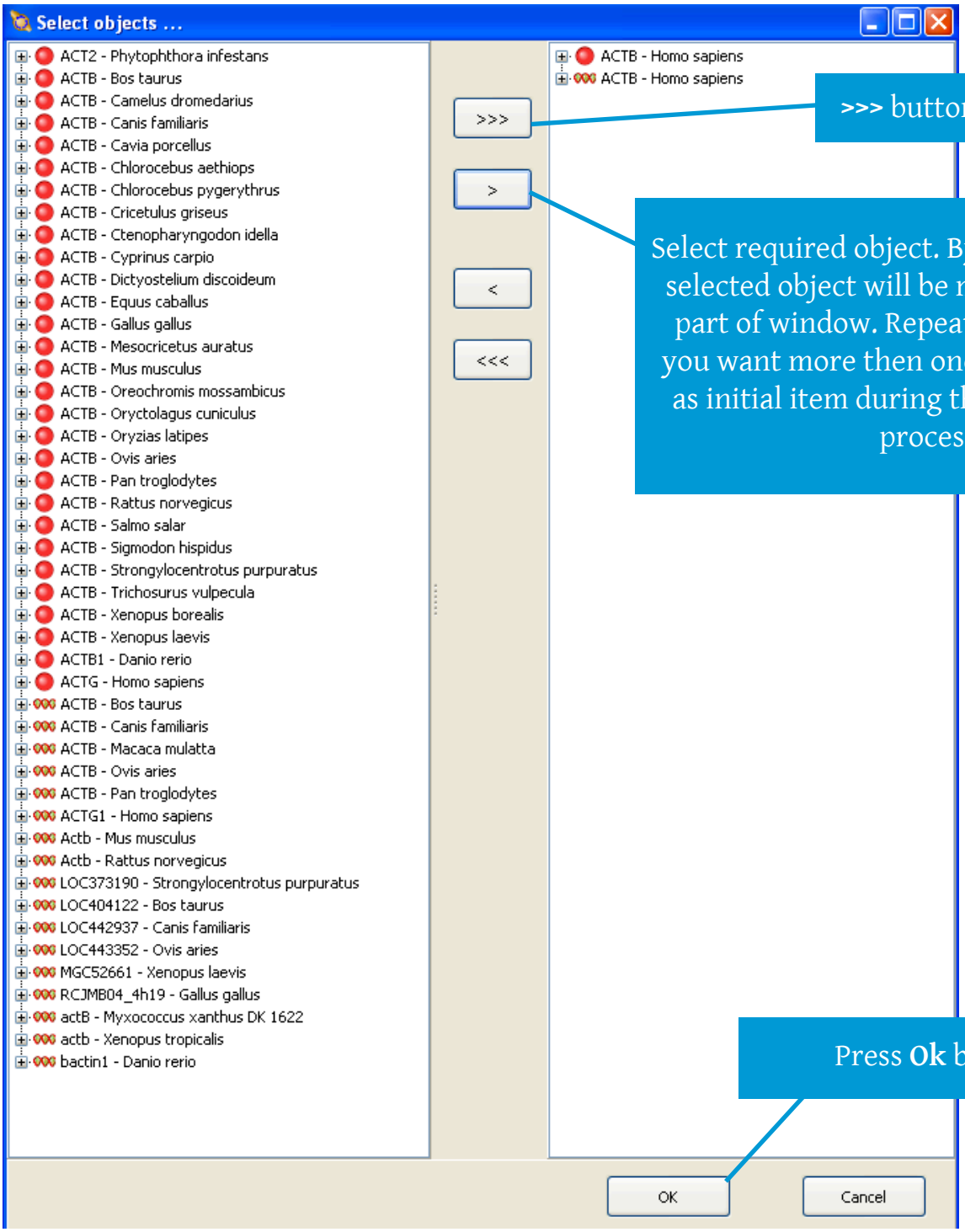
2. Here an object type can be specified

3. This field allows to specify a level of the reconstructed network.
level 0: no neighbors, only the initial object
level 1: **level 0** plus neighbors directly connected with initial object
level 2: **level 1** plus all neighbors directly connected with any objects from level 1

4. Check **Direct relations only** if only the reconstruction of **level 1** network without interactions between neighbors is required

5. Press **Add** button to be proceeded

ANDVisio
Network reconstruction

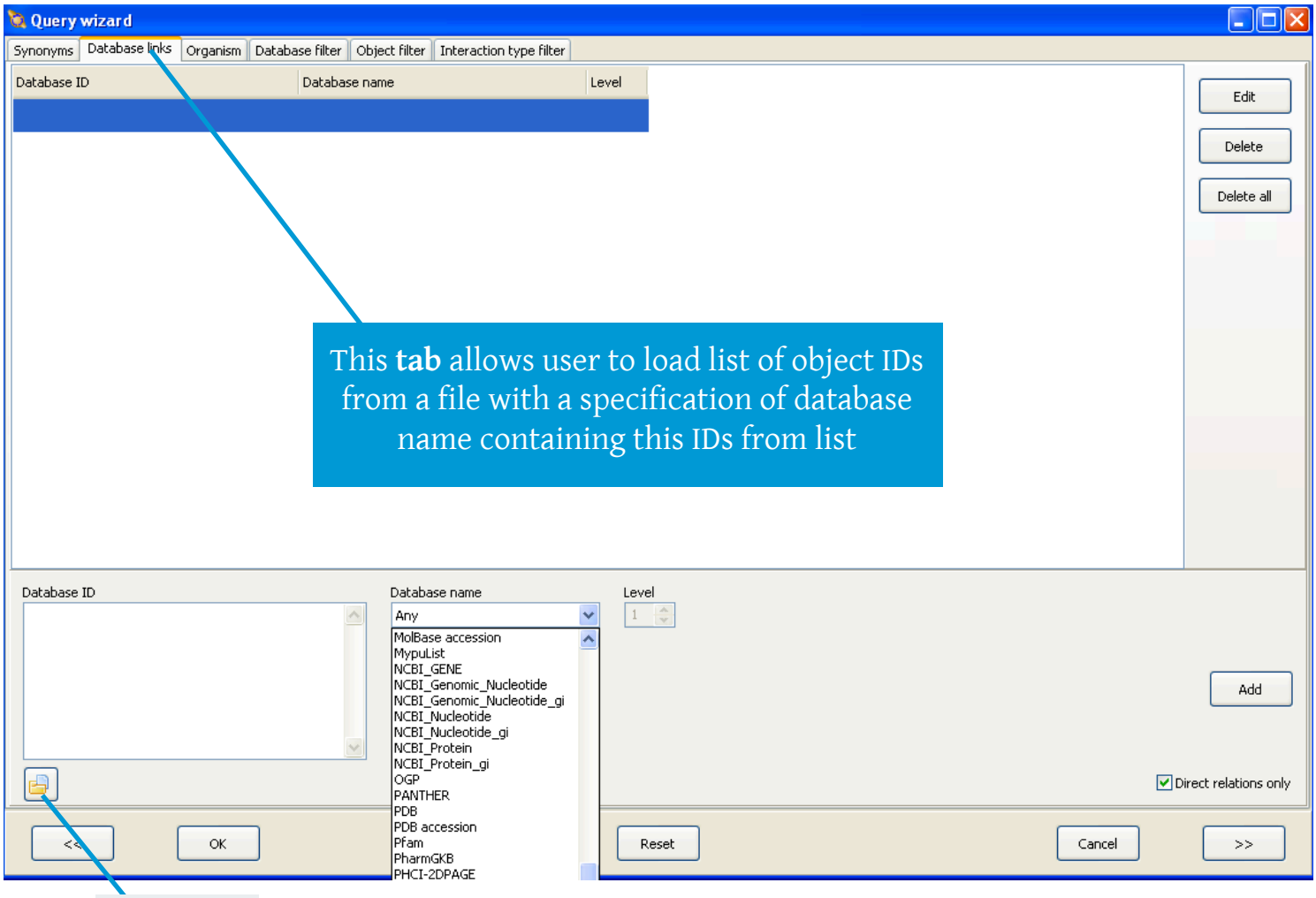


>>> button allows to select all objects

Select required object. By pressing > button selected object will be moved to the right part of window. Repeat the procedure if you want more then one object to be used as initial item during the reconstruction process.

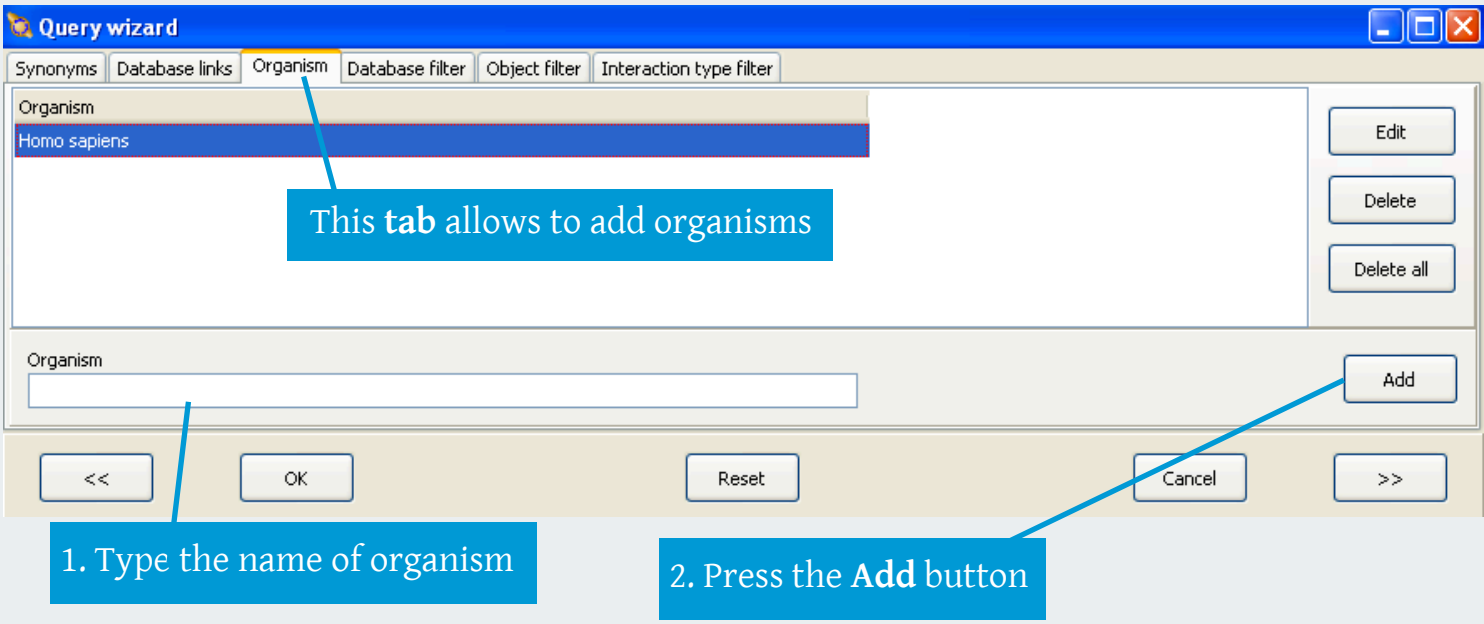
Press **Ok** button to continue

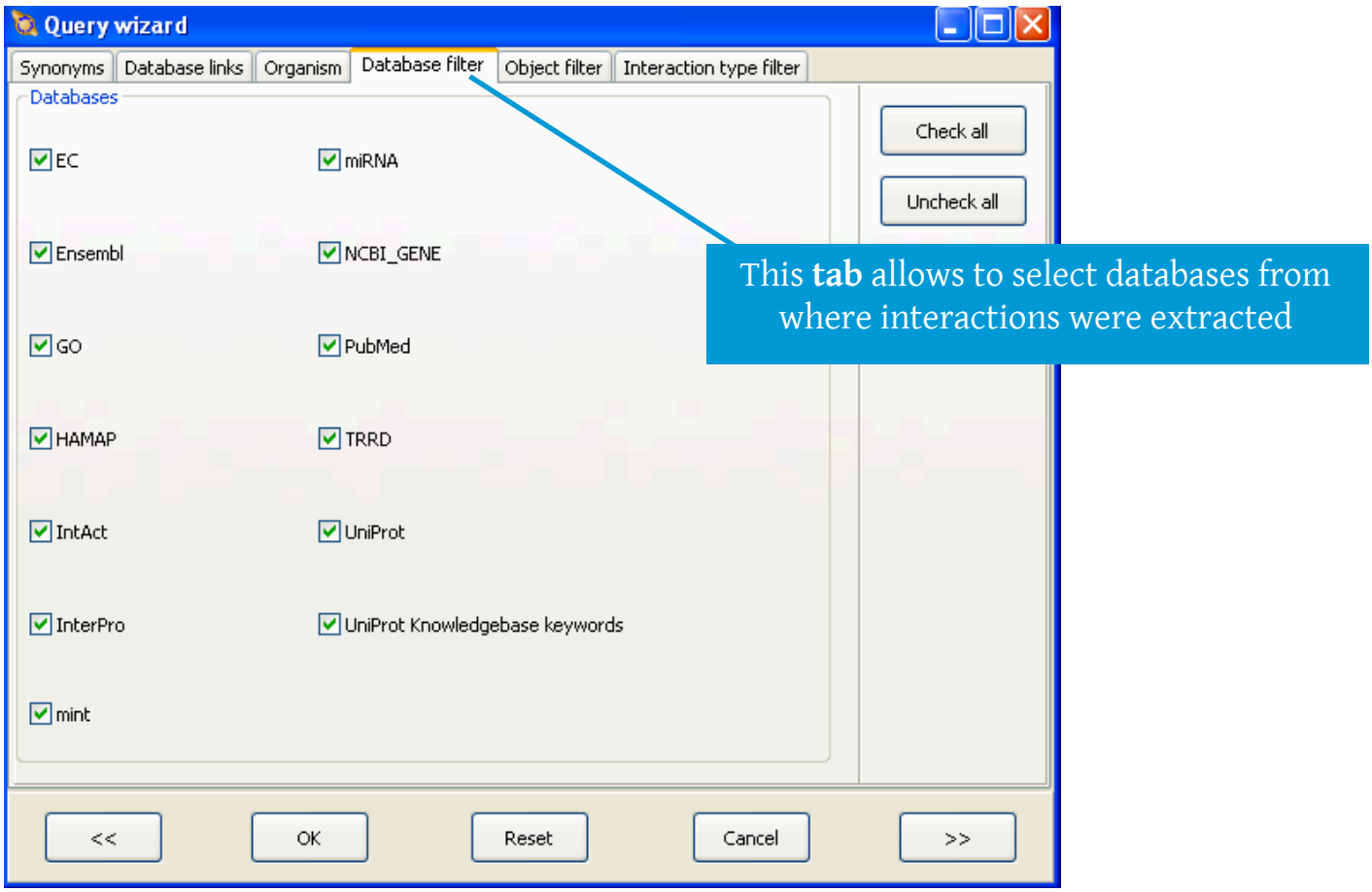
ANDVisio
Network reconstruction



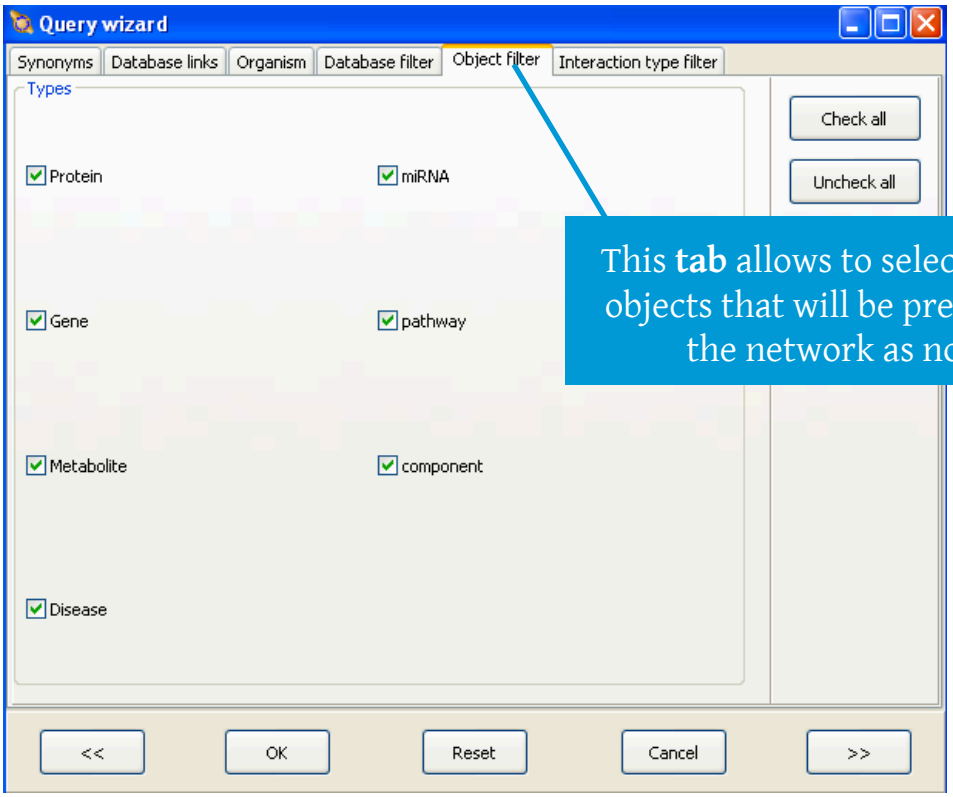
IPI00020091
IPI00003919
IPI00883772
IPI00902579
IPI00946417
IPI00382926
IPI00029260

ANDVisio
Network reconstruction

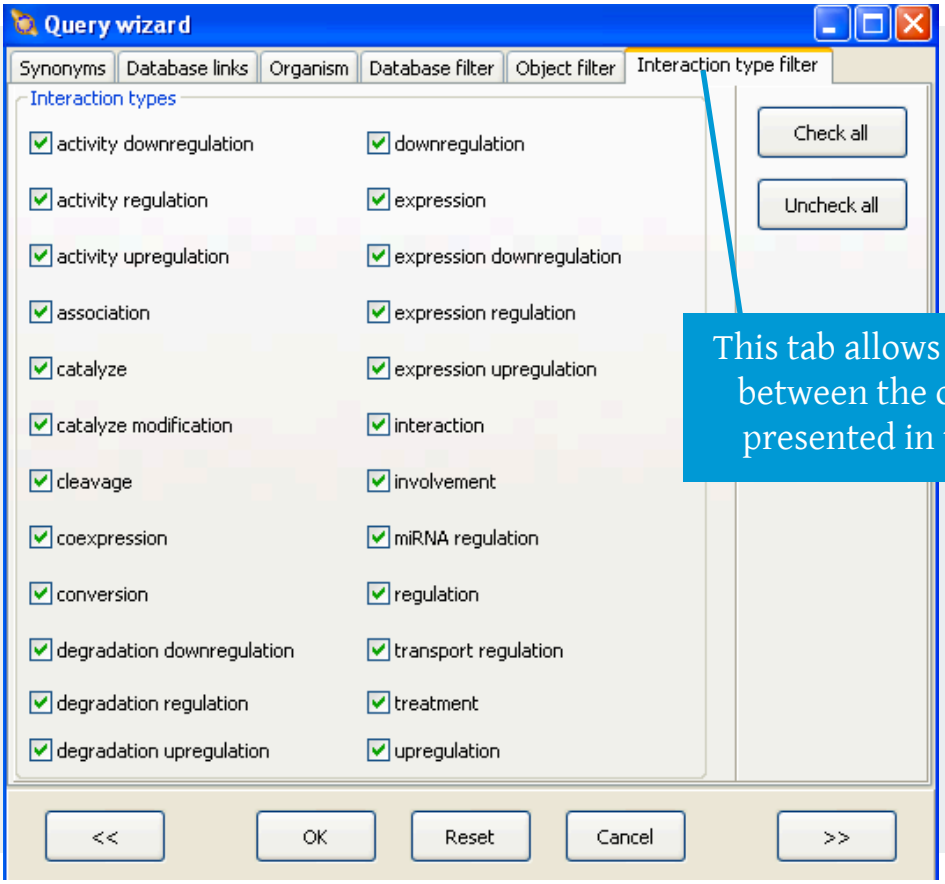




ANDVisio
Network reconstruction



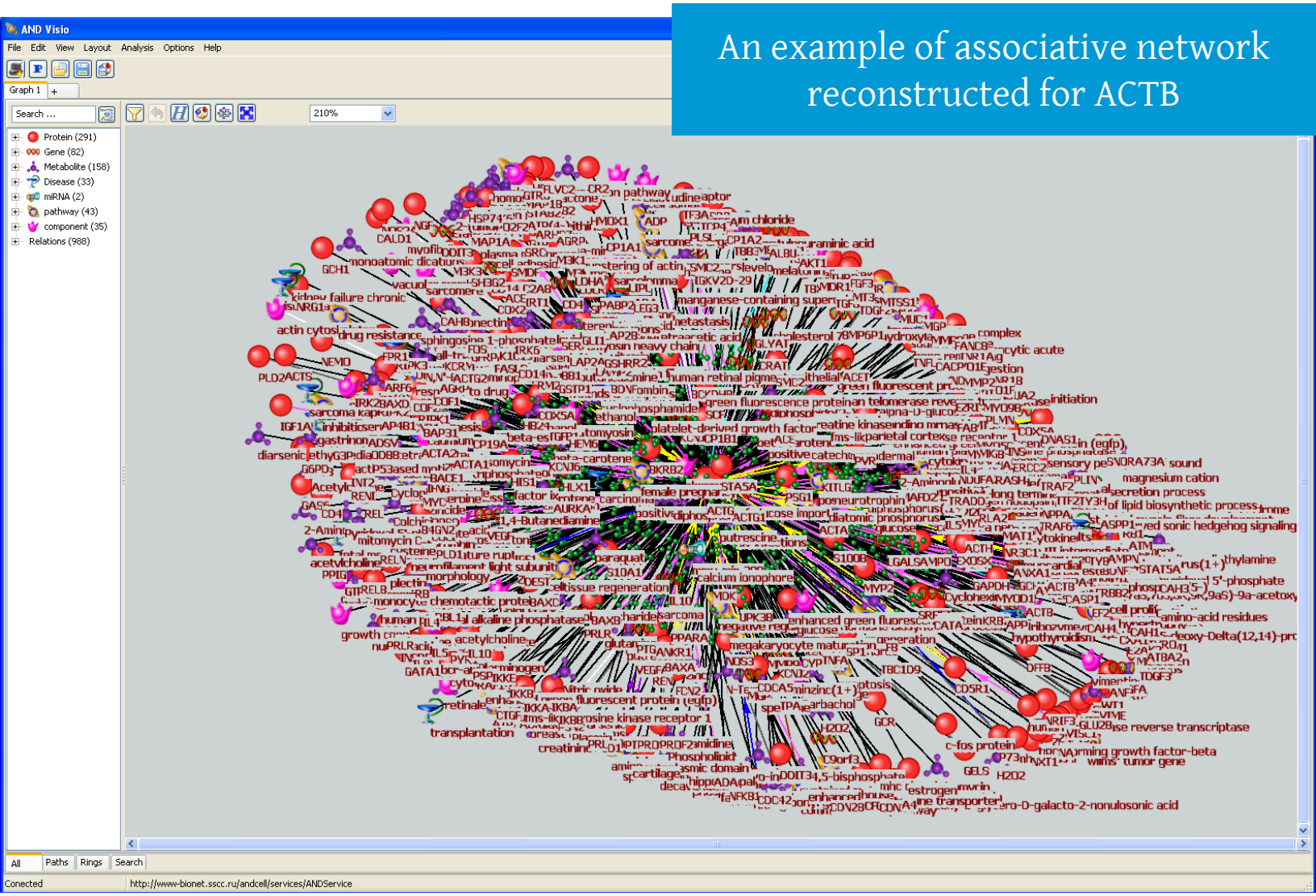
This **tab** allows to select types of objects that will be presented in the network as nodes



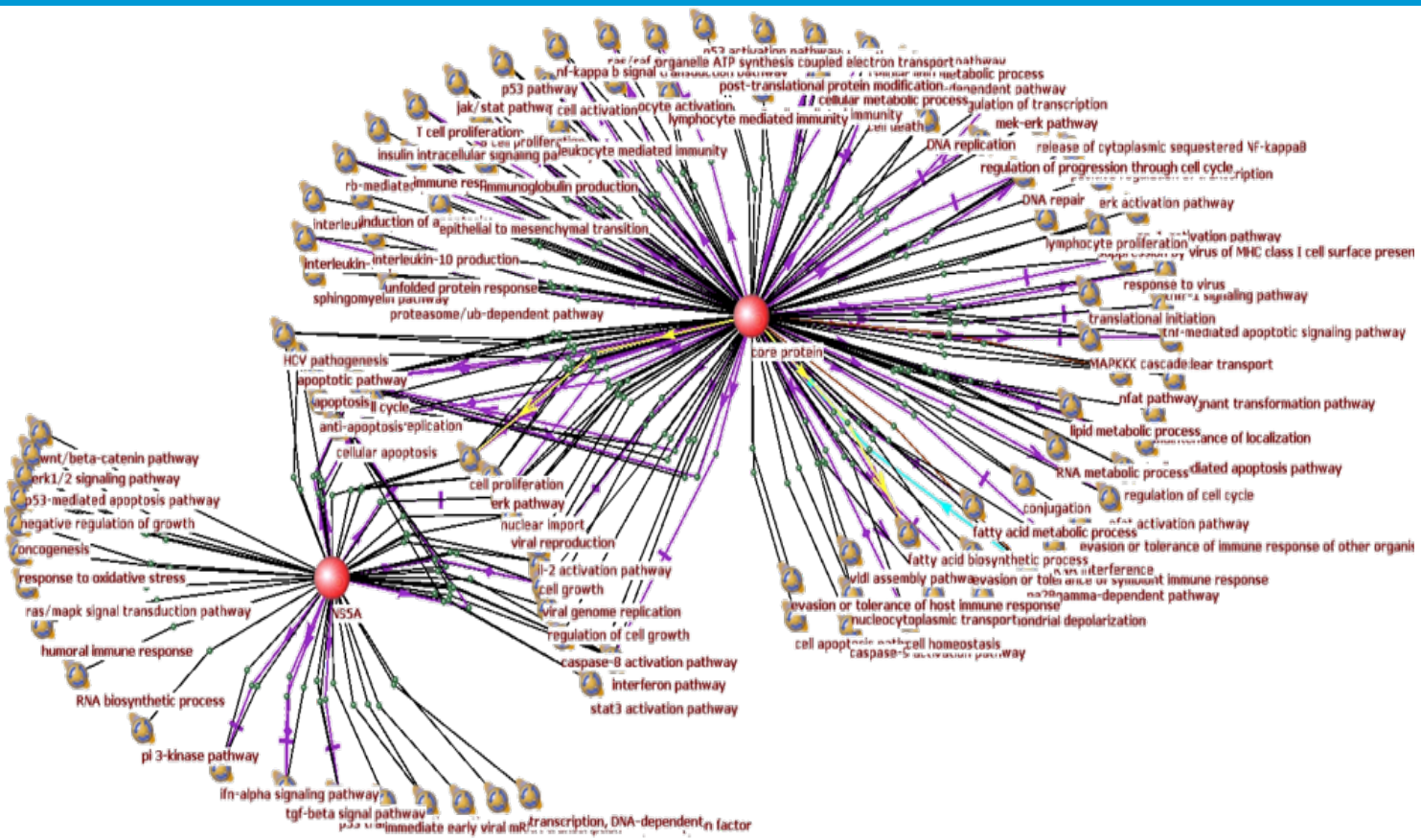
This tab allows to specify types of interactions between the objects, that will be presented presented in the network as edges, objects

ANDVisio
Examples of reconstructed networks

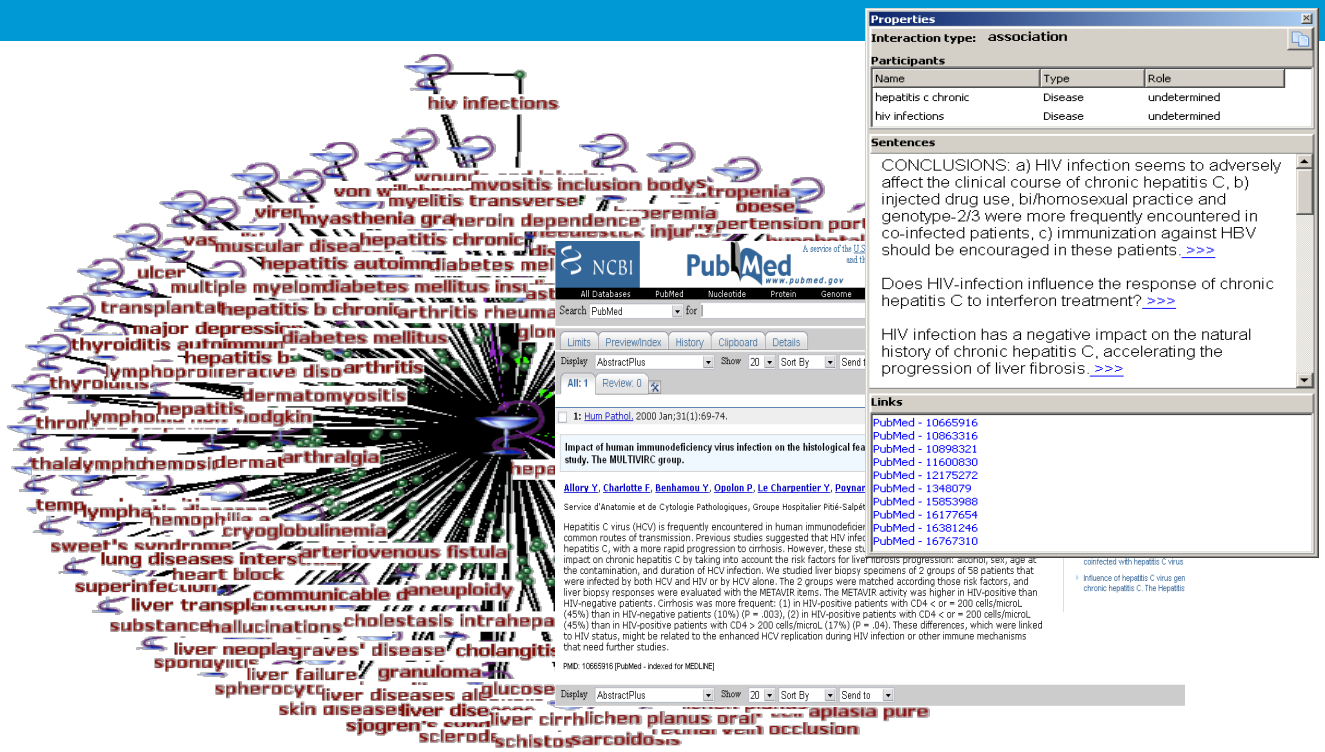
An example of associative network reconstructed for ACTB



An example of the reconstruction of interactions between HCV proteins (NS5A and Core protein) and molecular-biological processes with the help of ANDVisio



An example of the associative network of interactions of Hepatitis C virus with other diseases, obtained with the help of ANDVisio

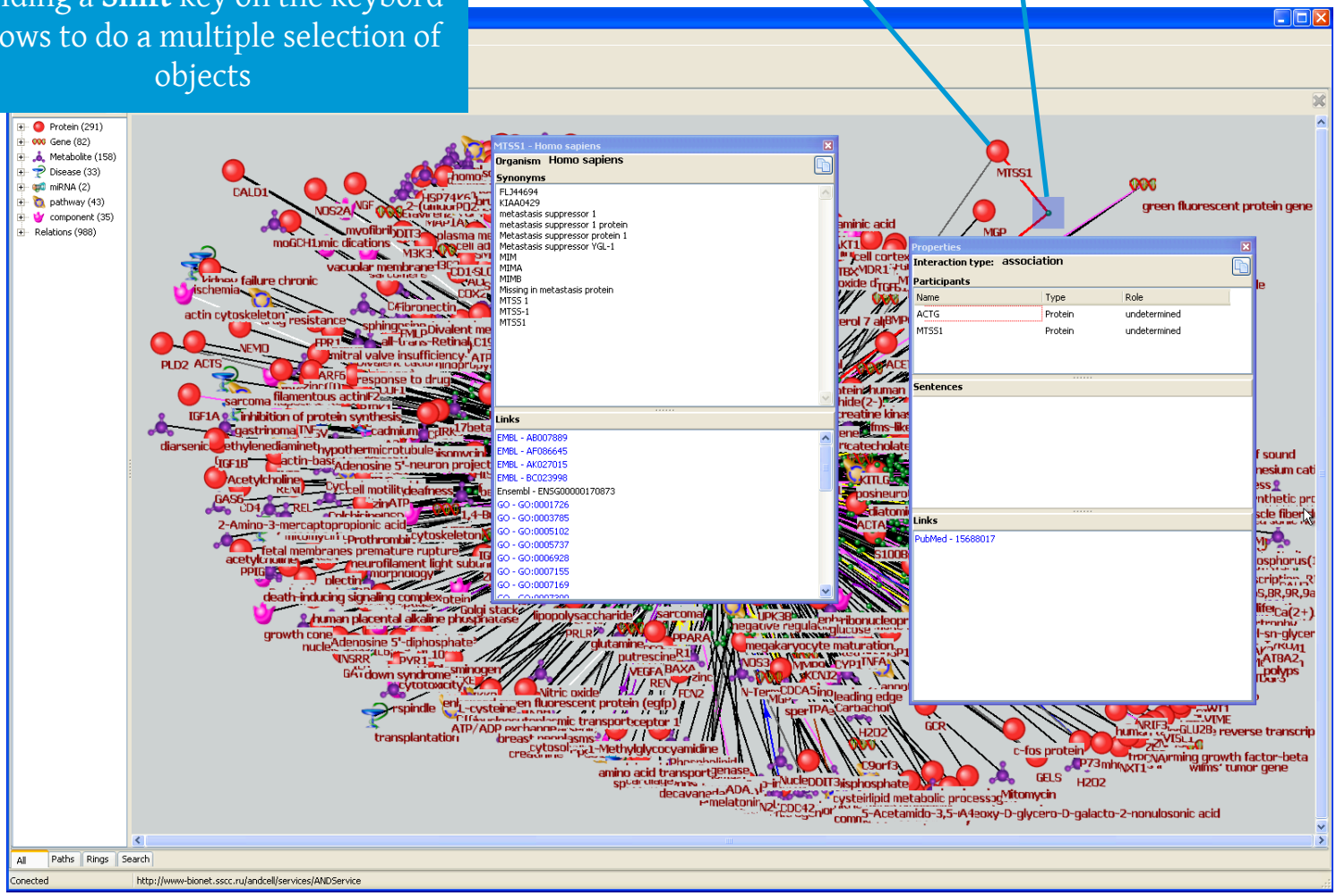


ANDVisio
Main window description

By right-clicking the edge and selecting **Property** in the appeared menu a window with edge's properties will be shown

By right-clicking the node and selecting **Property** in the appeared menu a window with node's properties will appear

Holding a **Shift** key on the keybord allows to do a multiple selection of objects



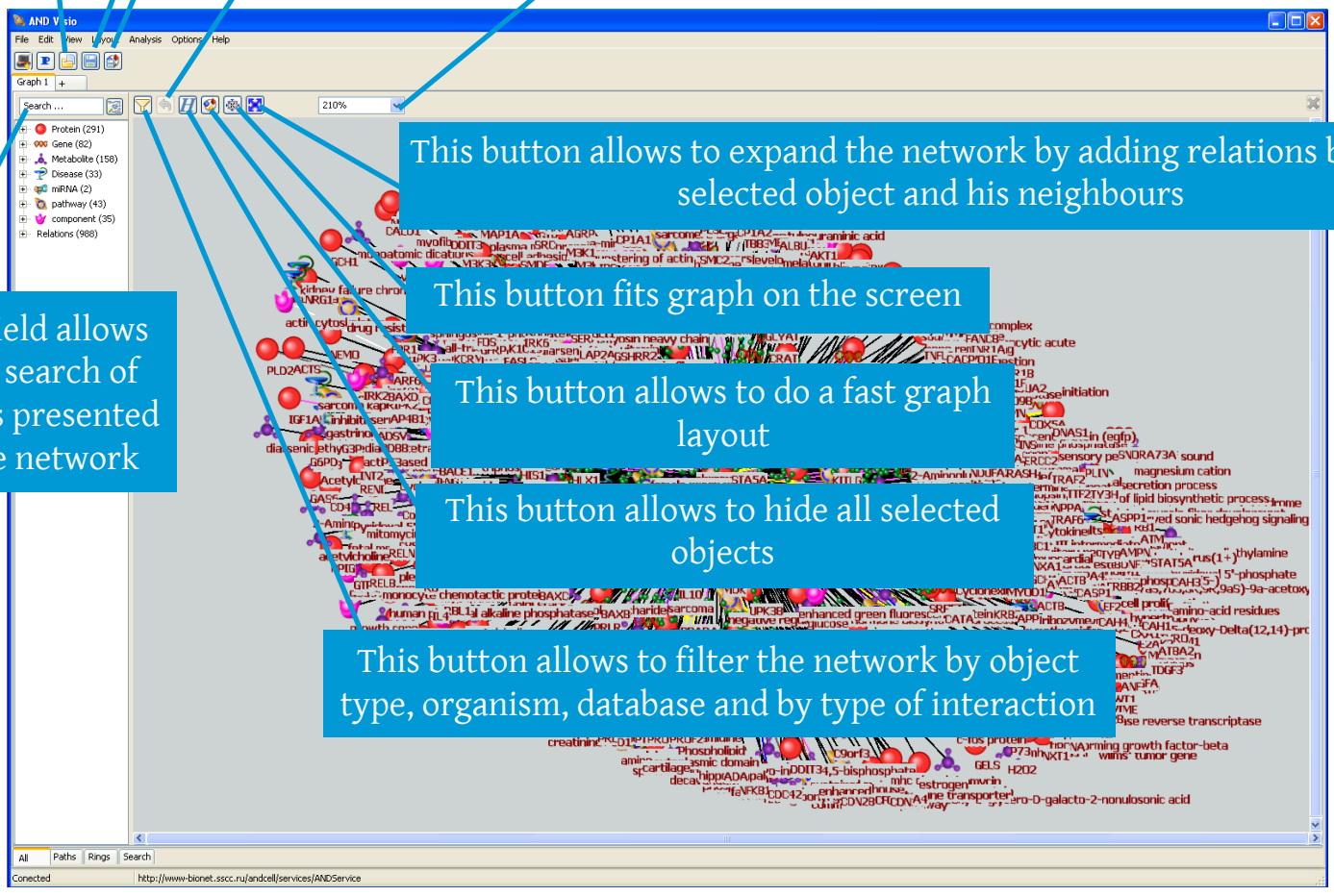
ANDVisio
Main window description

This buttons allows to save network in the different formats or as image

This button allows to load saved network

This button allows to undo last action

This dropdown list allows to change scale of the network, also scaling can be performed with scroll wheel of the mouse



This button allows to expand the network by adding relations between selected object and his neighbours

This button fits graph on the screen

This button allows to do a fast graph layout

This button allows to hide all selected objects

This button allows to filter the network by object type, organism, database and by type of interaction

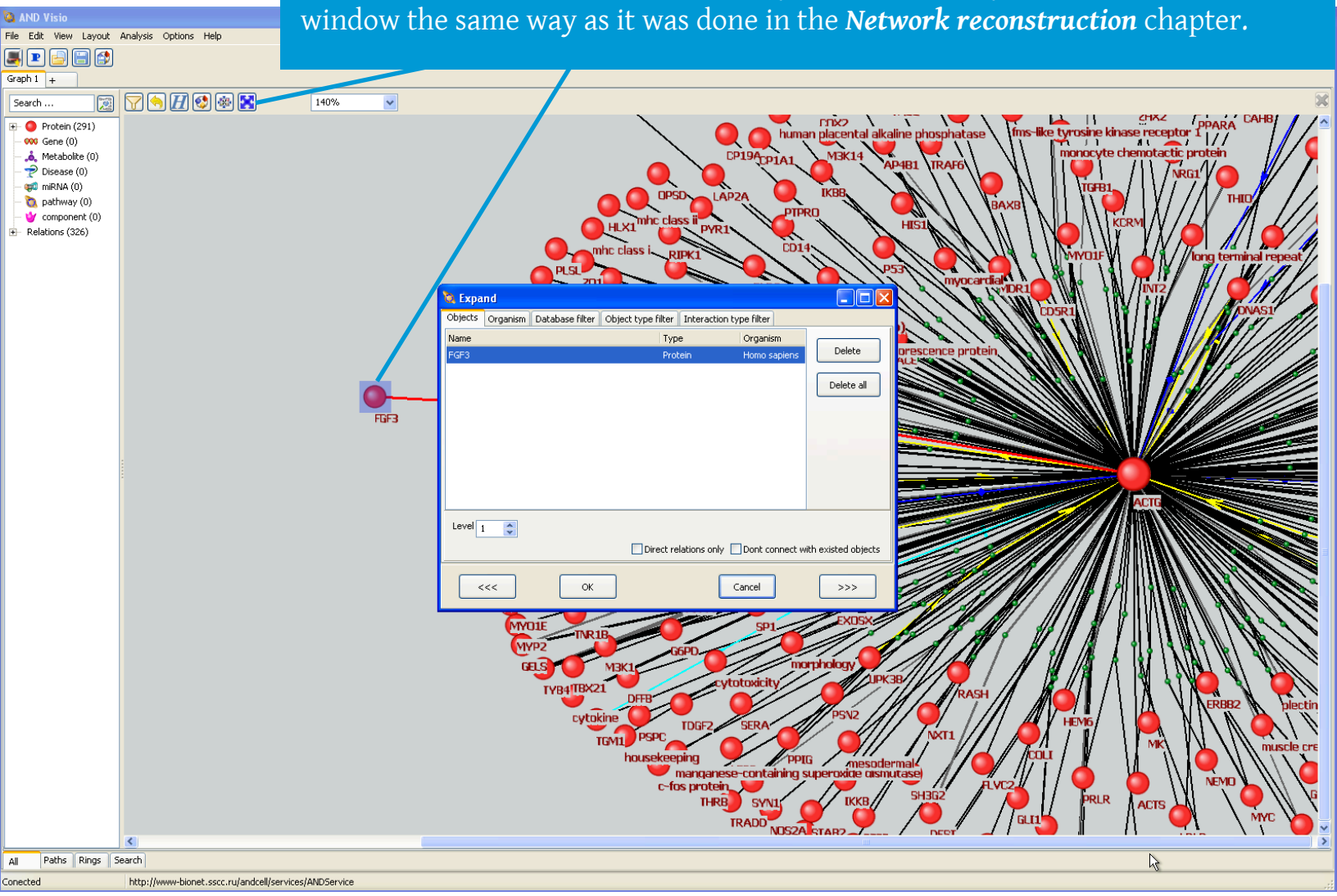
This field allows to do search of objects presented in the network

ANDVisio
Network expansion

Expansion of network with relations between selected object and other objects connected with it can be made by the following way:

1) Select required node from the network and press expand button or right-click the node and choose **Expand** in the appeared menu.

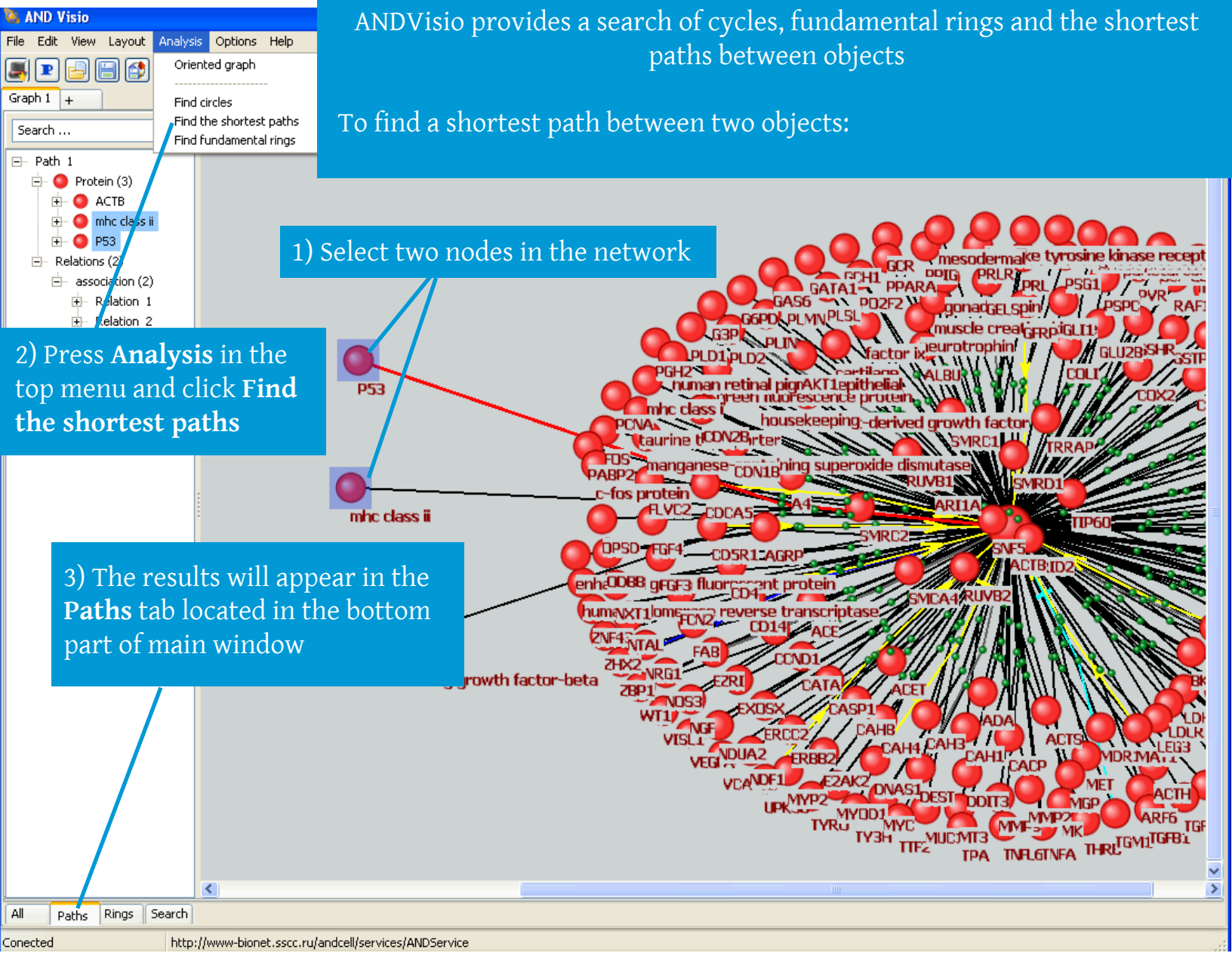
2) You can aply different filters, Organism and level of interaction as well as level of connection between the selected object and other objects in the appeared window the same way as it was done in the ***Network reconstruction*** chapter.



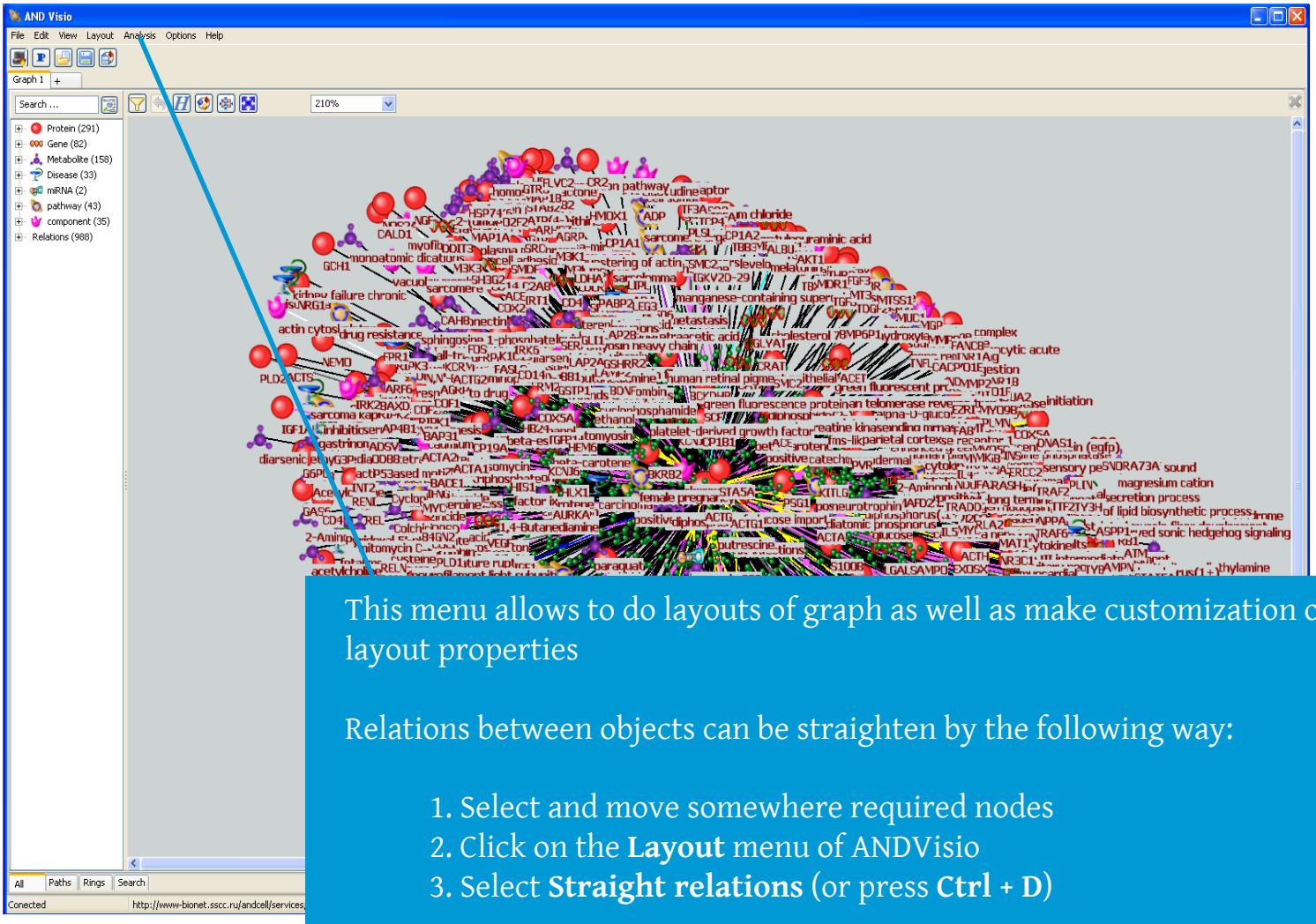
ANDVisio
Search of the shortest paths

ANDVisio provides a search of cycles, fundamental rings and the shortest paths between objects

To find a shortest path between two objects:



ANDVisio
Graph Layout



This menu allows to do layouts of graph as well as make customization of layout properties

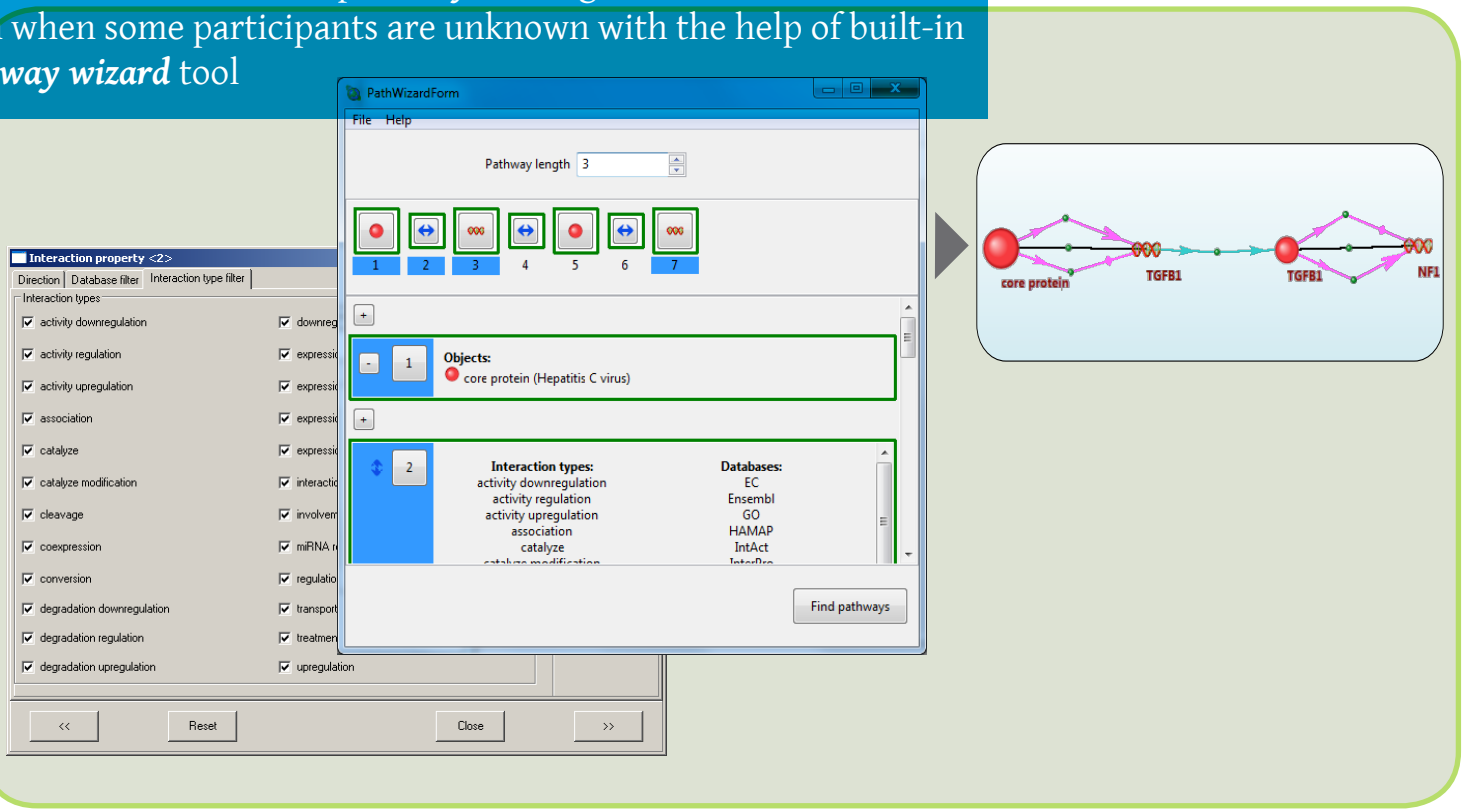
Relations between objects can be straighten by the following way:

1. Select and move somewhere required nodes
2. Click on the **Layout** menu of ANDVisio
3. Select **Straight relations** (or press **Ctrl + D**)

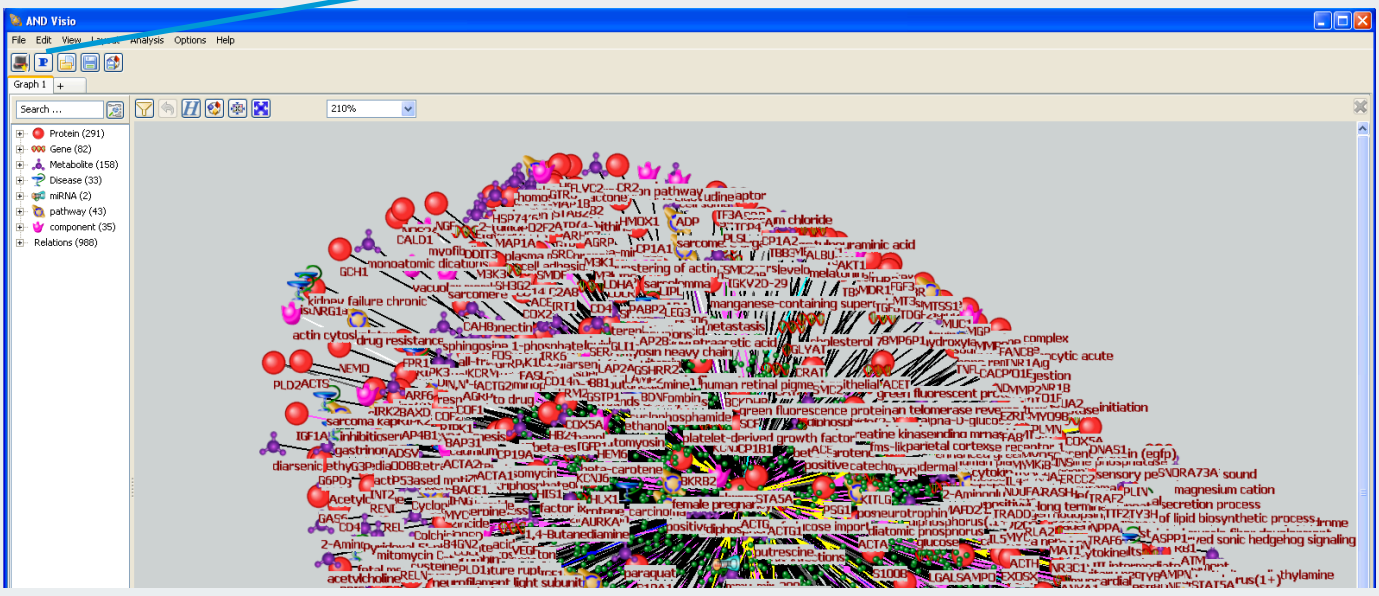
As the result - the layout will be recalculated in accordance with straighten relations between selected objects.

ANDVisio
Pathway wizard

ANDVisio allows to search pathways through ANDCell database even when some participants are unknown with the help of built-in ***Pathway wizard*** tool



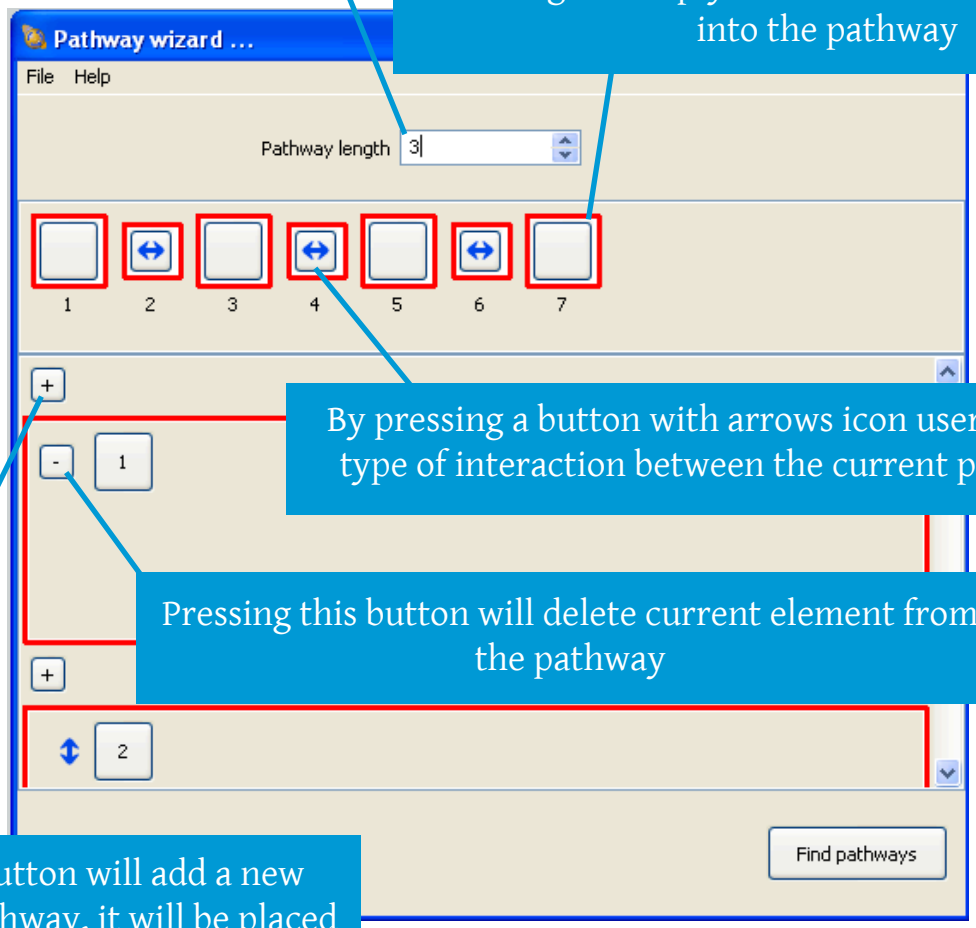
Press this button to start a ***Pathway wizard***



ANDVisio
Pathway wizard

This field allows to specify length of pathway

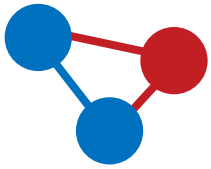
Pressing the empty button allows user to add object into the pathway



By pressing a button with arrows icon user can specify a type of interaction between the current pair of objects

Pressing this button will delete current element from the pathway

Pressing this button will add a new elemet to the pathway, it will be placed before the current object or interaction



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