

## Exercise #1

### 1.1 - Single protein query

We will first retrieve a STRING network for human insulin receptor (INSR). Go to <https://string-db.org/>, open the **Protein by name** search interface, and type **INSR** in the field **Protein Name**. You can either specify *Homo sapiens* in the **Organism** field leave it on auto-detect. Click **SEARCH**. If you specified the organism, you will immediately receive a protein network; otherwise you will first be presented with a disambiguation page on which you can specify that you meant the human protein.

### 1.2 Visual representations

The STRING web interface provides several different visual representations of the network. The **Settings** tab below the network view allows you to change between different visual representations of the same network. Try changing between the **confidence** and **evidence** views; do not forget to press the **UPDATE** button.

- Which information is shown for the edges in each representation?
- Why are there sometimes multiple lines connecting the same two proteins in the evidence representation?

### 1.3 Evidence viewers

A key feature of the STRING web interface is the evidence viewers. One should not rely purely on the confidence scores; it is important to inspect the actual evidence underlying an interaction before relying on it, for example, for designing experiments.

- Which types of evidence support the interaction between insulin receptor (INSR) and insulin receptor substrate 1 (IRS1)?

Further detail on the evidence of an interaction can be seen in a popup by clicking on the corresponding edge in the network. Click on the edge between INSR and IRS1 to view its popup; you may need to move the nodes to make this easier.

- Which type of evidence gives the largest contribution to the confidence score?

Click on the **Show** button to view the experimental evidence for the interaction.

- Which types of experiments support this interaction?

### 1.4 Query parameters

The **Settings** tab also allows you to modify detailed parameters for the search, such as the types of evidence to use (**active interaction sources**), the **minimum required interaction score**, and the **max number of interactors to show**.

Change the minimum required interaction score to high confidence (0.700).

- Does this change the set of proteins shown? Does it change the interactions shown?

Turn off all evidence types except experiments.

- Does this change the set of proteins shown in the network?

Increase the max number of interactors to show to 20.

- How many interaction partners of INSR do you get in the network?

Change the minimum required interaction score back to 0.400.

- How many INSR interactors do you now get?

Turn on all evidence types back on.

- Does this change the set of proteins shown in the network?