Computational
&
Systems Biology

Gene Ontology

Yazdan Asgari
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Gene Ontology & Functional enrichment analysis

❖Gene Ontology is

A hierarchy of roles of genes and gene products independent of any organism.

❖Composed of three independent ontologies:

- Molecular Function
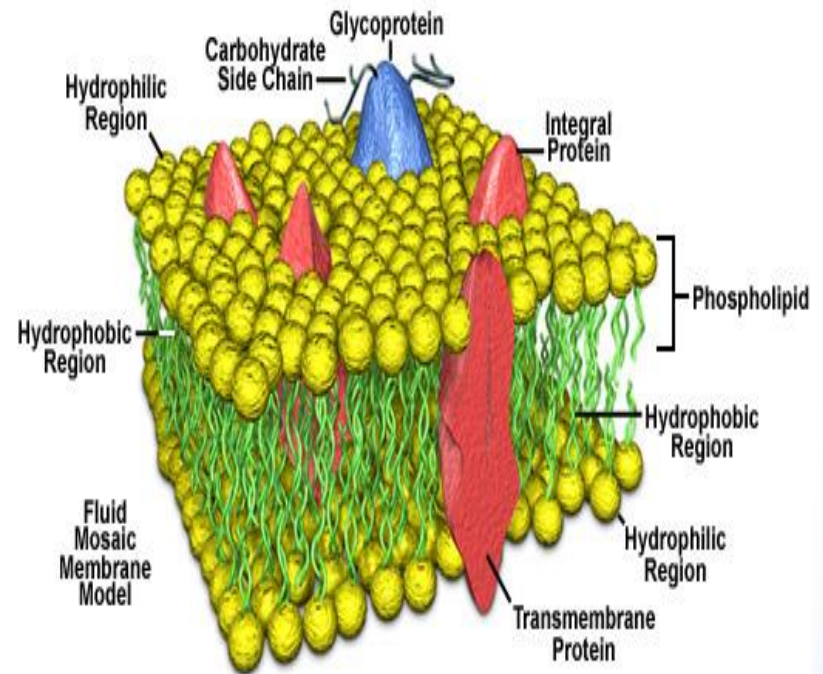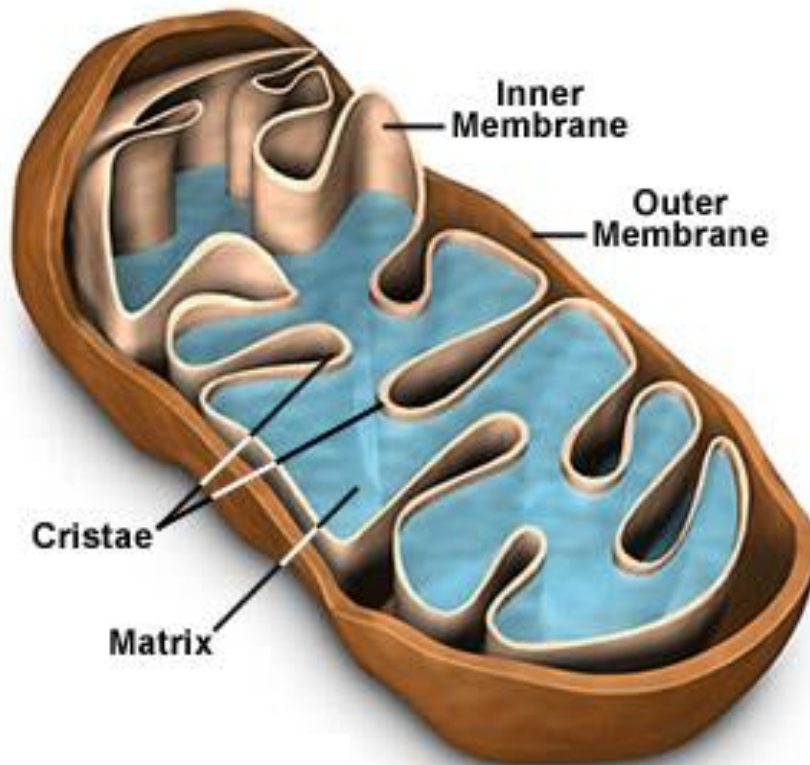- Biological Process
- Cellular Component

How does GO work?

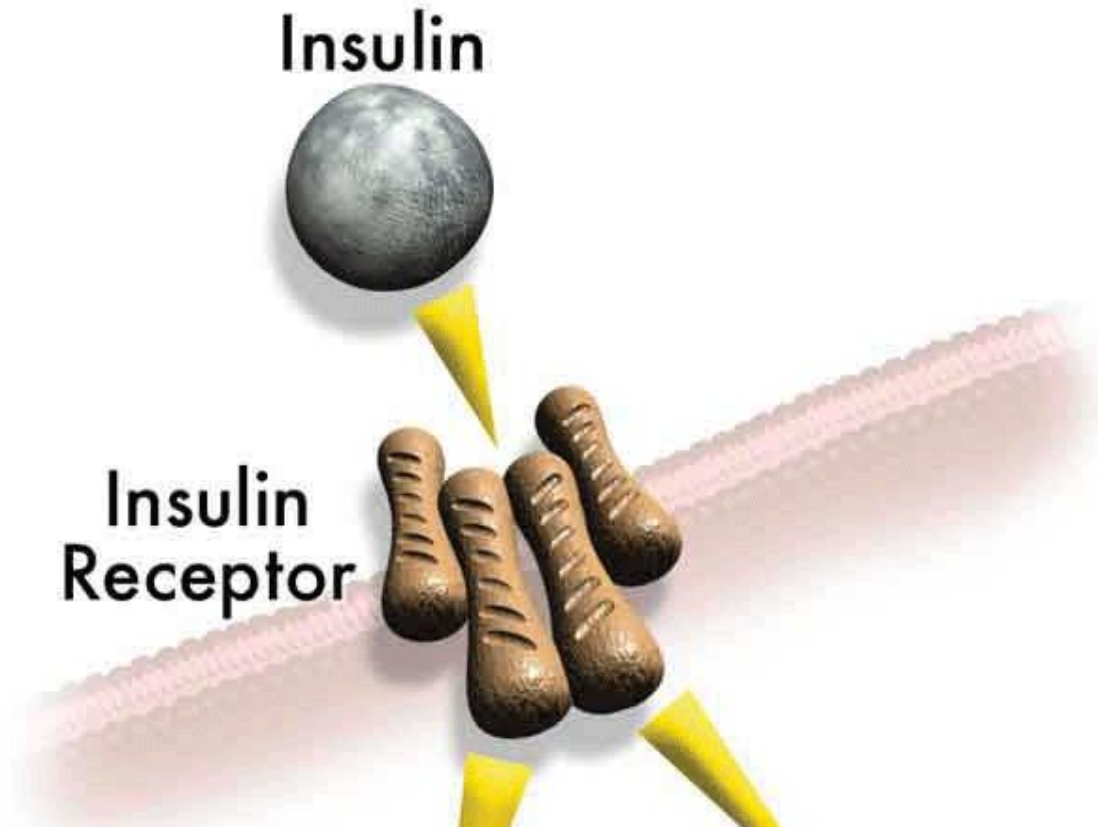What information might we want to capture about a gene product?

- What does the gene product do?
- Where and when does it act?
- Why does it perform these activities?

Cellular Component
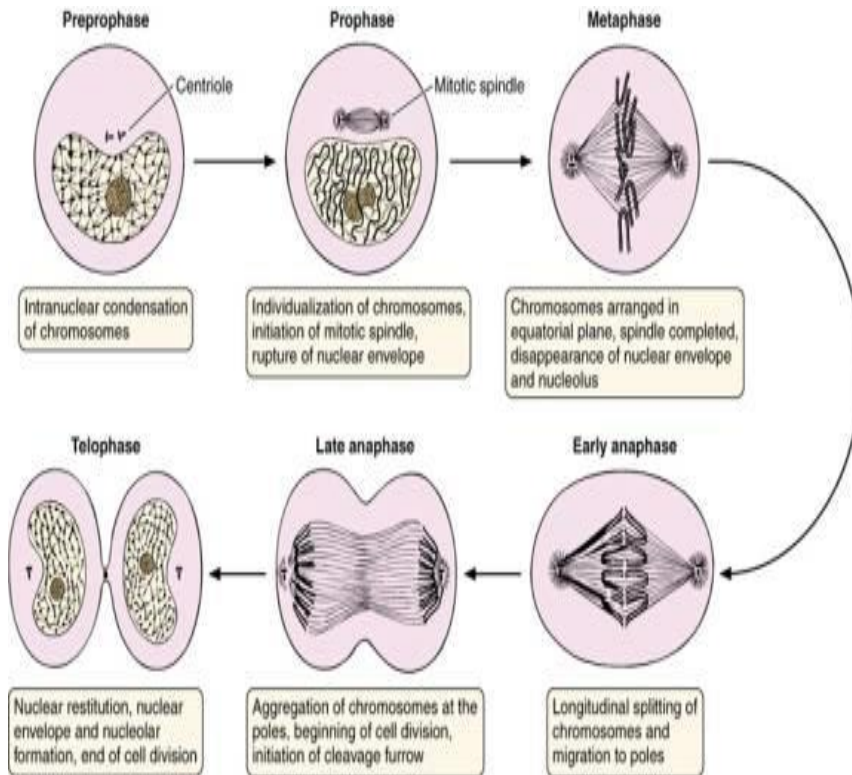
- where a gene product acts

http://www.geneontology.org/
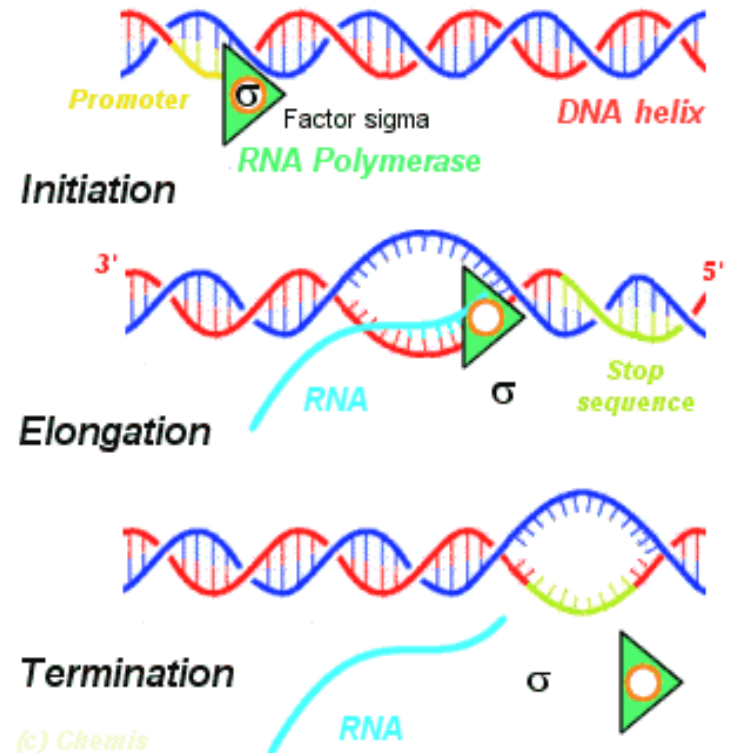
Molecular Function

insulin binding

insulin receptor activity

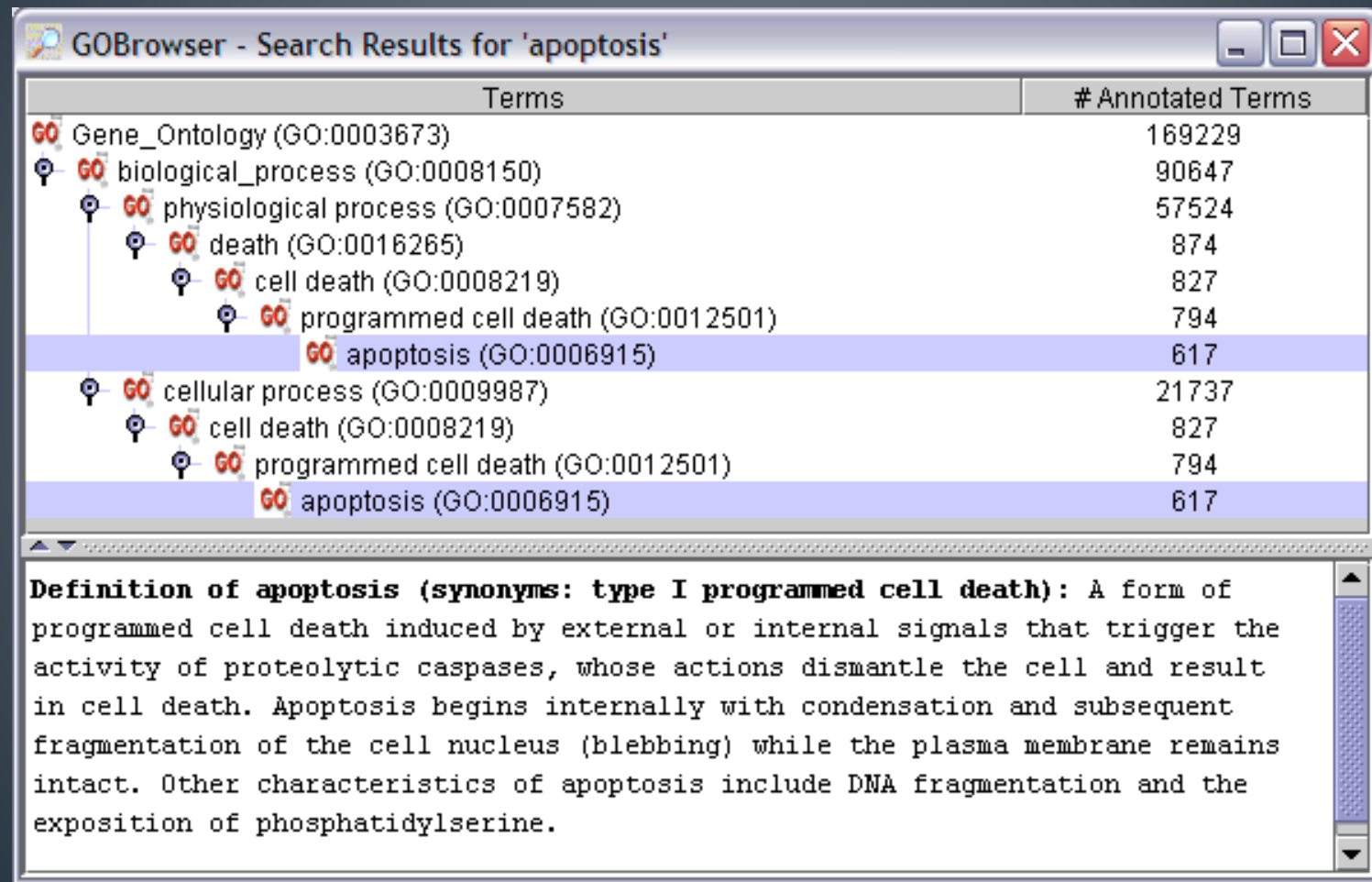# Biological Process

a commonly recognized series of events

cell division

transcription

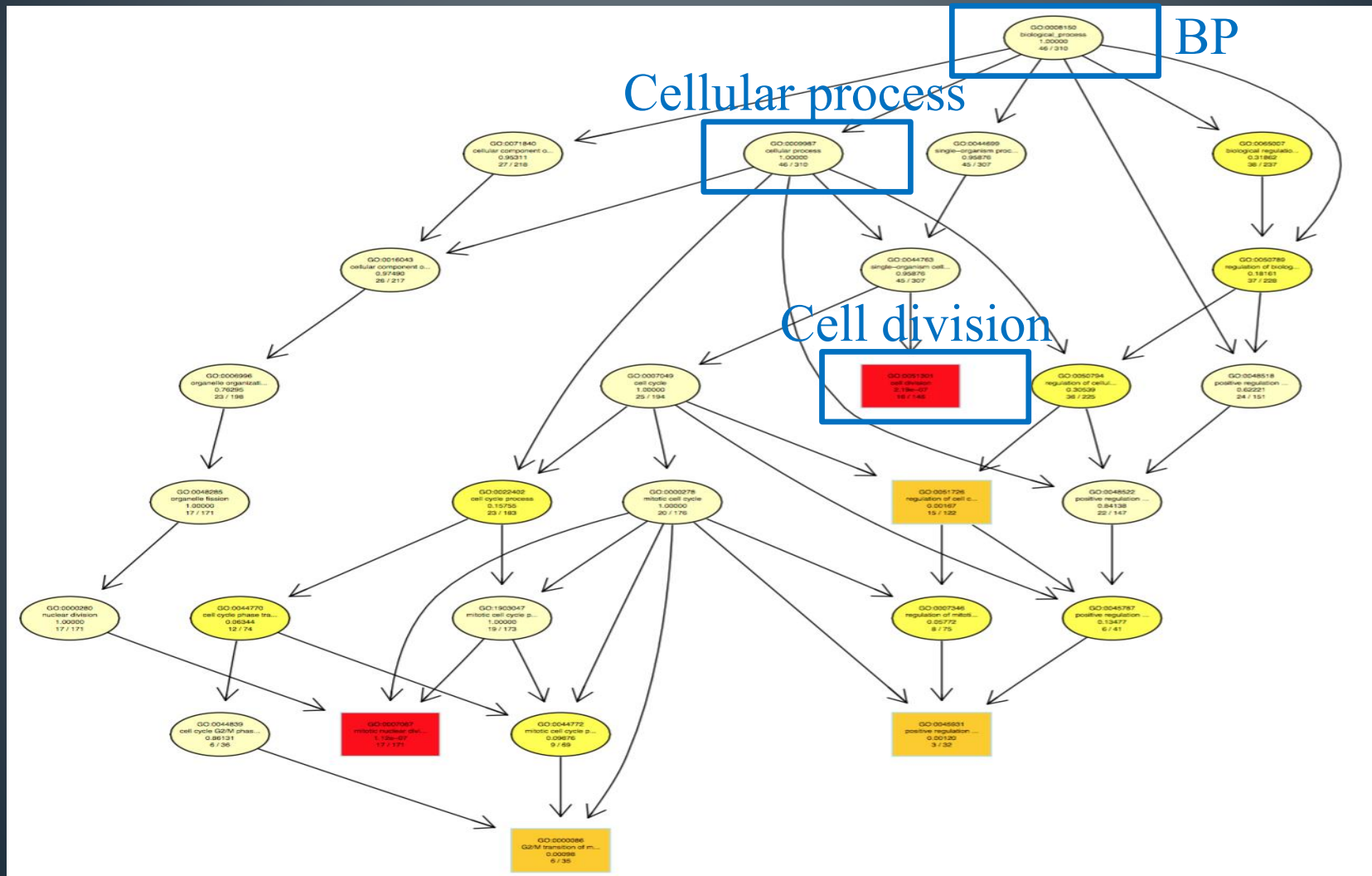# Gene Ontology & Functional enrichment analysis

Gene Ontology & Functional enrichment analysis

http://www.geneontology.org/

Functional enrichment analysis

Transcription and RNA biosynthesis

Chromatin organization and modification

GO: RNA Metabolism
GO: Primary Metabolism
GO: Protein Biosynthesis
GO: DNA Metabolism
GO: Transcription
GO: Cell Cycle
GO: Other
GO: Biological Process
GO: Signal Transduction
GO: Transport

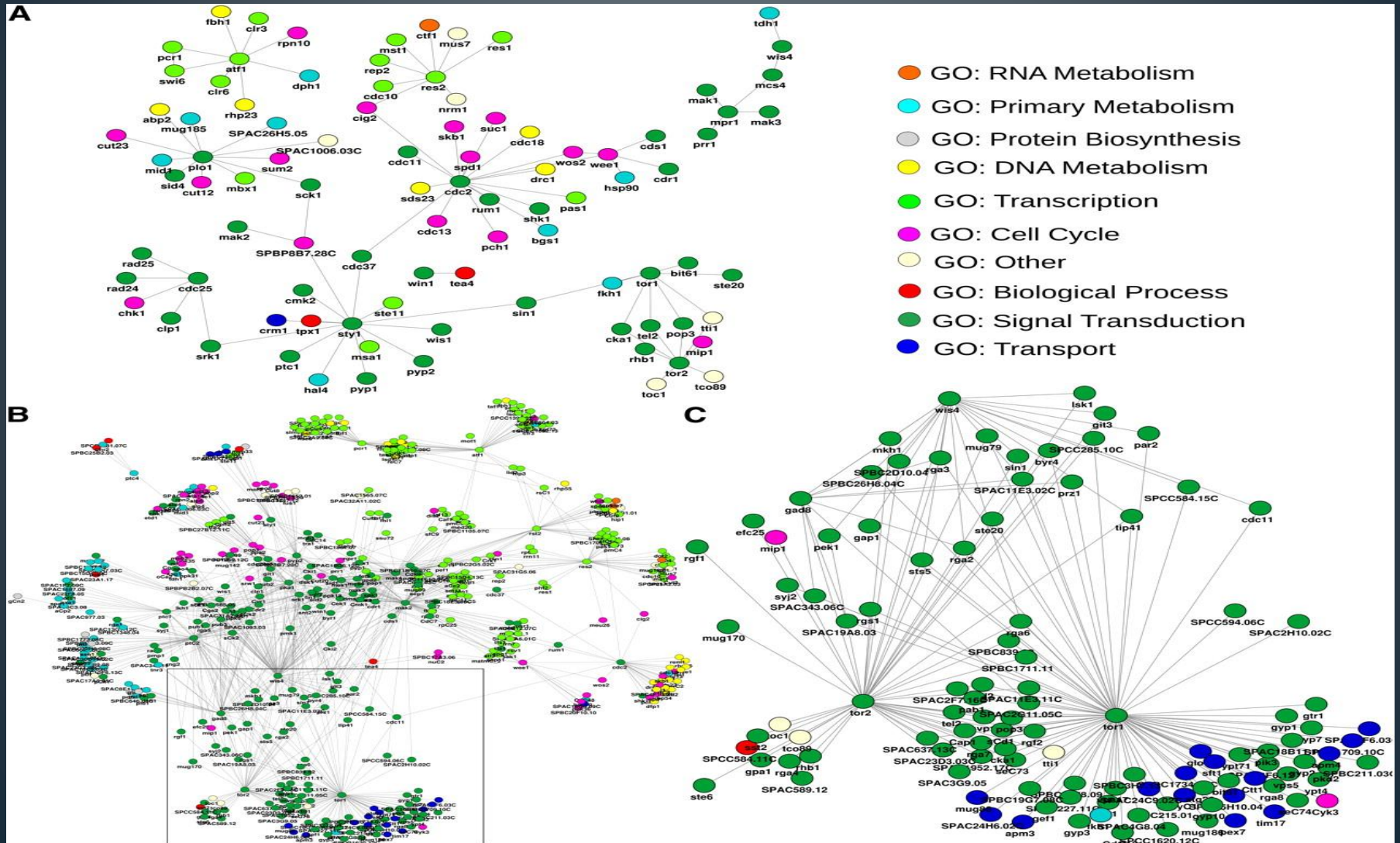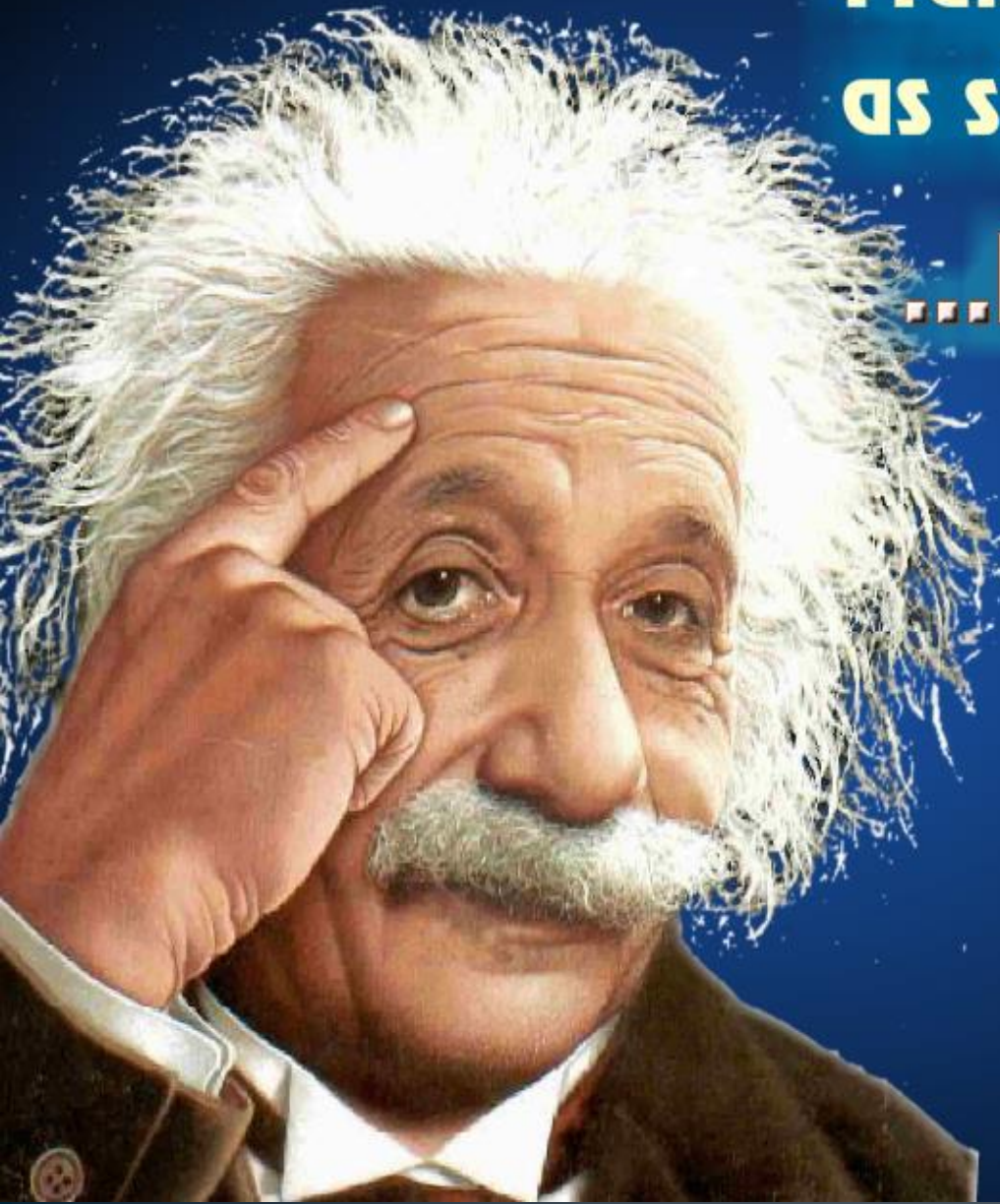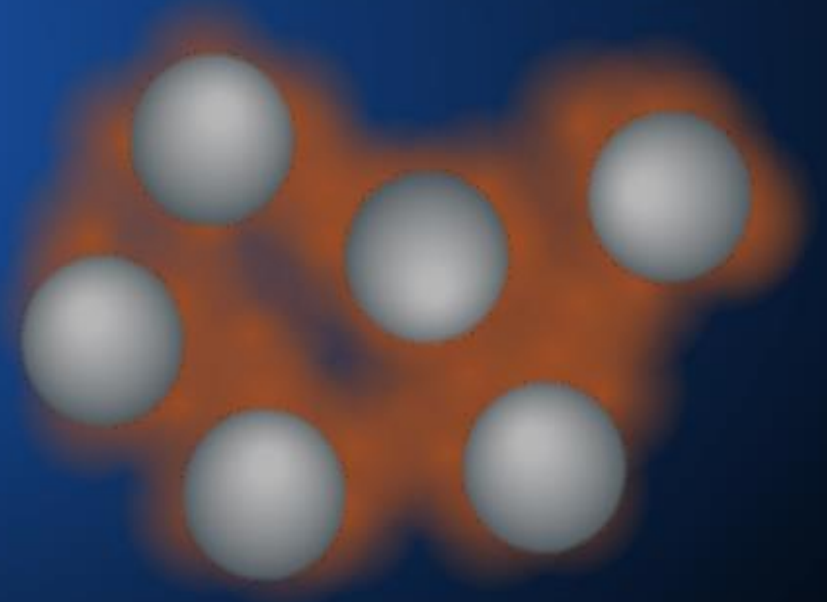# Functional enrichment analysis
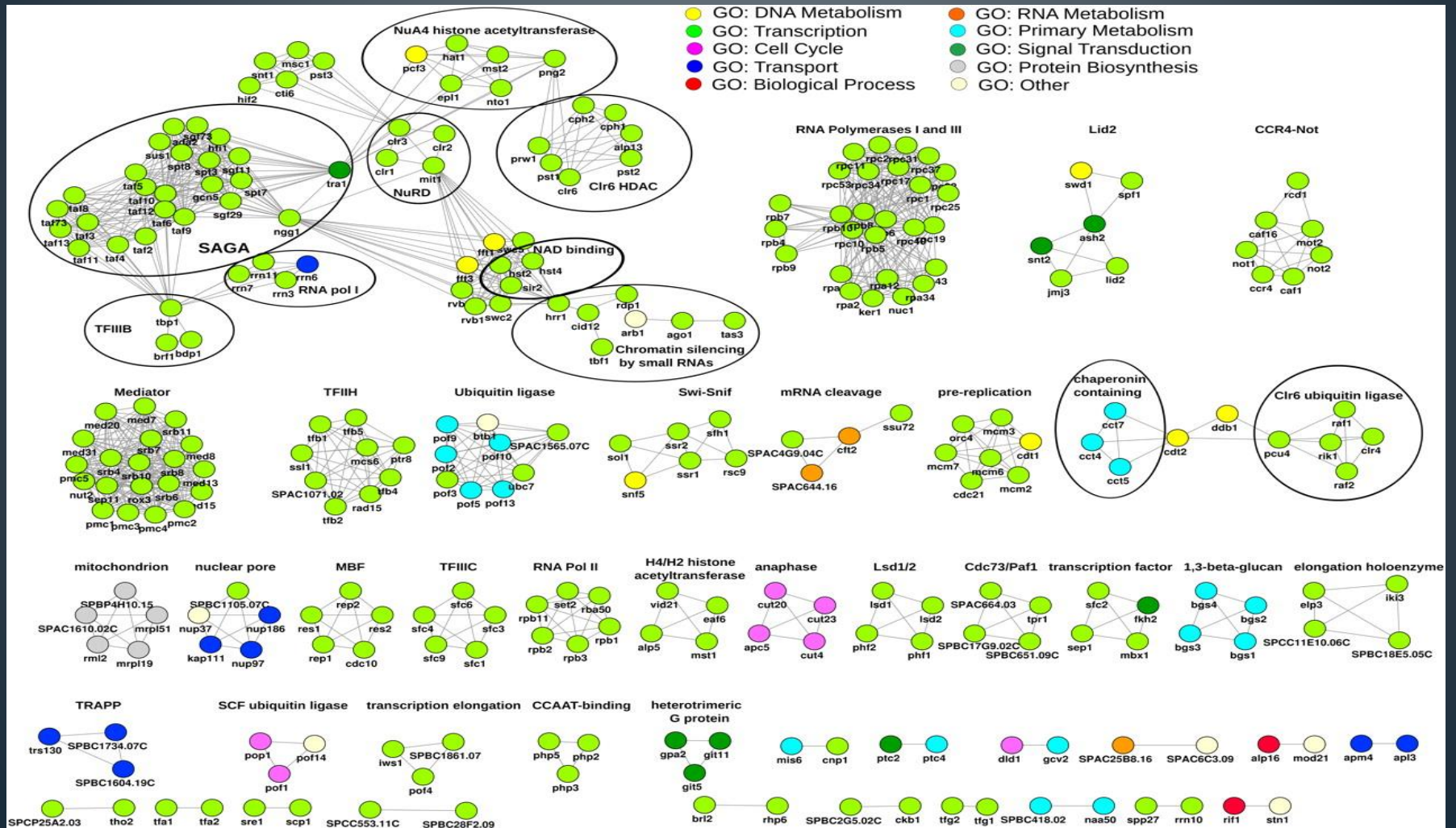
Functional enrichment analysis

Make everything as simple as possible.

...but not simpler.

Systems biology