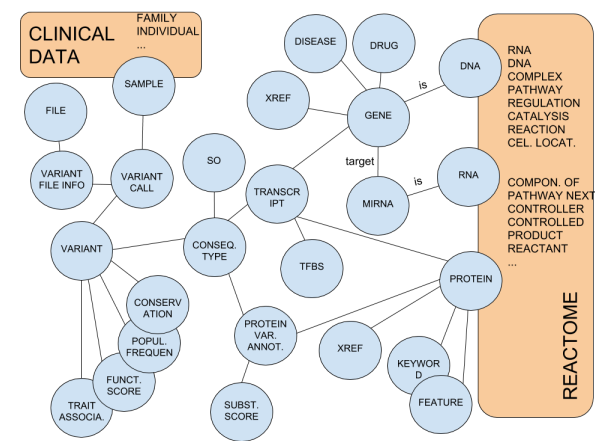


Data Model

BioNetDB models biology data as a network of nodes and relations. Biology data comes from different formats and sources it comprises system biology data from [Reactome](#), annotation data from [CellBase](#) and human genetic variations from healthcare centers' clinical data. BioNetDB relies on [Neo4j](#) graph database that allows users to access biological data using the [Cypher](#) query language (similar to SQL in relational databases).

The figure below shows BioNetDB nodes with their labels. for clarity, some labels have been shortened:



Shortened labes in the previous figure:

Shortened label	Node label
¹ POPUL. FREQUEN	POPULATION_FREQUENCY
² FUNCT. SCORE	FUNCTIONAL_SCORE
³ TRAIT ASSOCIA.	TRAIT_ASSOCIATION
⁴ CONSEQ. TYPE	CONSEQUENCE_TYPE
⁵ PROTEIN VAR. ANNOT.	PROTEIN_VARIANT_ANNOTATION
⁶ SUBST. SCORE	SUBSTITUTION_SCORE
⁷ KEYWORD	PROTEIN_KEYWORD
⁸ FEATURE	PROTEIN_FEATURE

Modelling

This section lists the main nodes of the BioNetDB network data model and for each of them, its properties and relationships are shown.

Genes

Gene node properties:

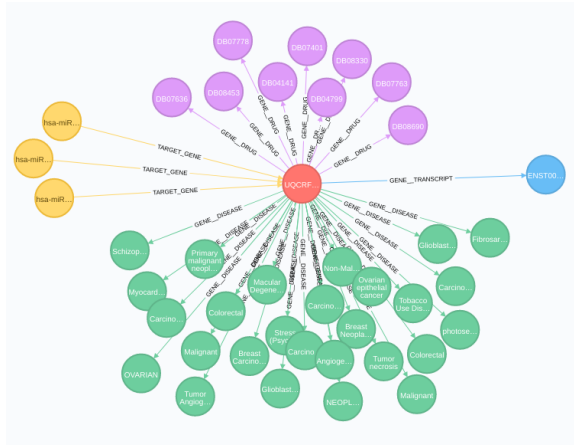
- uid
- id
- name
- chromosome
- start
- end
- strand
- biotype

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 - [Proteins](#)
 - [Protein complex](#)
 - [Variants](#)
 - [Regulation](#)
 - [Pathway](#)

- description:
- source
- status

Gene relationships:

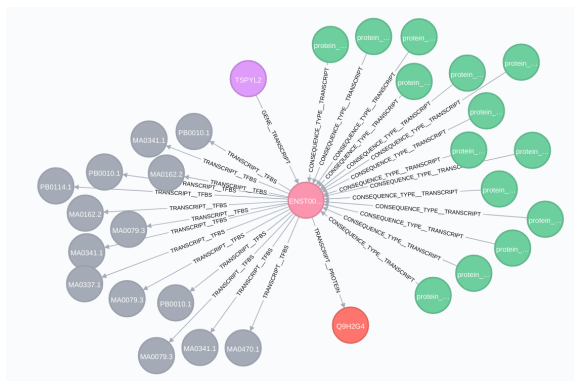


Transcripts

Transcript node properties:

- uid
- id
- name
- biotype
- chromosome
- start
- end
- strand
- proteinId
- genomicCodingEnd
- genomicCodingStart
- annotationFlags
- cdnaCodingEnd
- cdnaCodingStart
- cdsLength
- description
- status

Transcript relationships (transcript node in pink):



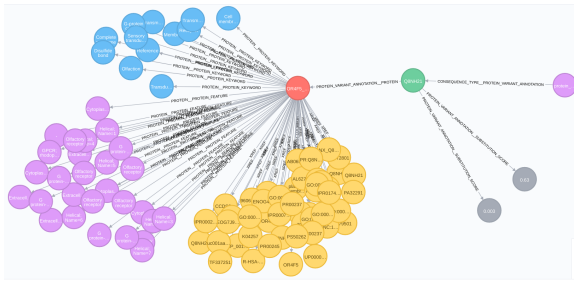
Proteins

Protein node properties:

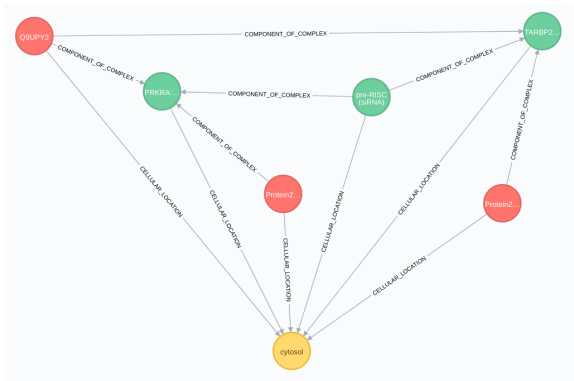
- uid
- id
- name
- accession
- dataset

- evidence
- proteinExistence

Protein relationships:



Protein complex

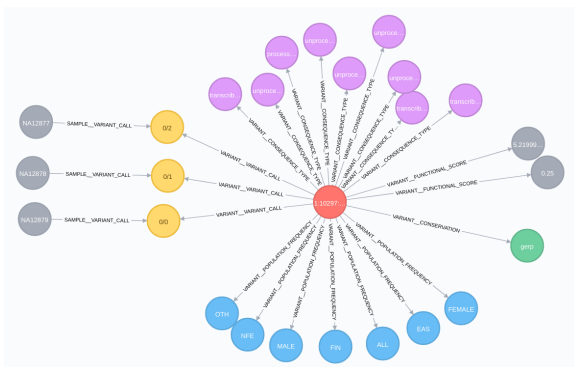


Variants

Variant node properties:

- uid
- id
- name
- chromosome
- start
- end
- strand
- type
- alternate
- reference
- alternativeNames

Variant relationships:

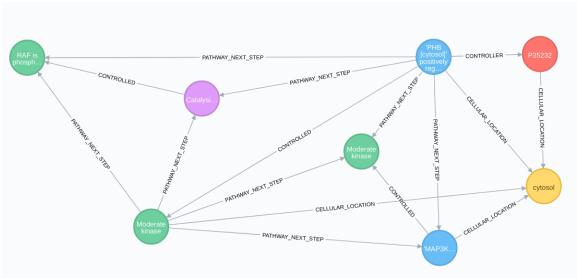


Regulation

Regulation node properties:

- uid
- id
- name

Regulation relationships:



Pathway

Pathway node properties:

- uid
- id
- name

Pathway relationships (pathway nodes in yellow):

