

Master project 2020-2021

Personal Information

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Project

Web development & bioinformatic tools

Project Title:

Integration of omics data related to retinal dystrophies

Keywords:

Interaction networks, retinitis pigmentosa, interologs mapping, web interface, graph databases

Summary:

Inherited retinal dystrophies (IRDs) comprise a highly heterogeneous group of disorders caused by over 200 causative genes. The prevalence of IRDs is 1:3000 worldwide, which make these blinding disorders a health relevant target. The implementation of massive sequencing approaches has greatly facilitated genetic testing and, as a result, the number of IRD genes and mutations is constantly increasing. Nonetheless, a substantial number of cases remain to be accurately diagnosed, as the average yield in IRD genetic diagnosis is roughly 50%. Our lab has contributed to the implementation of the RPGeNet (<https://compngen.bio.ub.edu/RPGeNet>) network and the curation of RNA-seq data to project differential gene-expression over that interaction network. The main goal is to perform computational analyses, integrating further omics data, to explore and pinpoint novel candidate genes and pathways that can be associated to molecular components of the disease. We plan to extend the current interaction network based on human genes/proteins, into further model organisms, such as mouse and zebrafish, in a way that the network of interologs can facilitate the integration of expression data from the three organisms.

References:

RPGeNet2 publication: <https://academic.oup.com/database/article/doi/10.1093/database/baz120/5618821>

Expected skills::

Student should master Unix/bash, python/C/perl, R, and perhaps some SQL. We will introduce the student into graph databases and django to provide interactive access to the data.

Possibility of funding::

To be discussed

Possible continuity with PhD: :

To be discussed

Comments:

If applicant is interested in doing a PhD, there is the possibility to apply for a Generalitat FI or Ministerio FPU PhD grants on the next announcement.
