

Internship Bioinformatics

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Topic: Multi-omics analyses to identify druggable targets for rare neurological, neurometabolic and neuromuscular disorders.

Summary:

Patient-derived induced pluripotent stem cell (iPSC) models are gaining momentum as preclinical models for studying disease mechanisms, drug screening and validation of disease mechanisms and biomarkers. They may eventually largely replace animal studies. The group of Nadif Kasri at Radboudumc has previously established the NGN2 transduction protocol for fast and robust differentiation of human iPSCs into functional excitatory neurons in 2D culture dishes, showing electrophysiological phenotypes that are relevant to neurodevelopmental disorders (Mossink et al. Stem Cell Reports, 2021). Within the context of the [X-omics initiative](#), we have generated a unique multi-omics dataset profiling NGN2 neurons from three different neurodevelopmental disorders with a range of omics platforms (whole exome sequencing, methylation sequencing, RNA-seq, proteomics, metabolomics and lipidomics). We have identified differentially expressed features across all omics layers across all three disorders, but now need to identify biological pathways and druggable targets that are supported by multiple different omics layers. For these multi-omics analyses, we need to explore different tools and methods.

Required:

- A Master student Bioinformatics, Computer Science, Data Science with interest in analysis of biological pathways OR a Master student Molecular Life Sciences, Human Biology, Medical Epigenomics, Molecular Mechanisms of Disease or similar with interest in data science.
- An explorative, creative and analytical mind
- Basic R or python skills (project preferably performed in R)
- Knowledge of statistics (preferably a bit more advanced than just the basics)

What we offer:

- A unique and rich dataset, where innovative analyses may lead to scientific publications on the topic
- An inspiring research environment where students are treated as regular employees and are fully engaged in scientific and social activities
- Training in modular programming, versioning and documentation of code using git, FAIRification of data

Duration:

36EC (6 months) – 60 EC (10 months)

Start:

January 2026