



Master project 2021-2022

Personal Information

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Institution IBMB-CSIC

Website <https://www.ibmb.csic.es/en/department-of-molecular-genomics-dmg/chromatin-regulation-of-human-and-viral-gene-expression/#lab-presentation>

Group Chromatin regulation of human and viral gene expression

Project

Computational genomics

Project Title:

Occupancy of histone H1 variants genome-wide and consequences of altering H1 levels on human chromatin organization and gene expression.

Keywords:

genomics, proteomics, epigenetics, histone H1, chromatin

Summary:

We focus our research on the control of gene expression in human cells by chromatin organization, components and modifications. The degree of compaction of chromatin affecting a gene promoter dictates accessibility to transcription factors and RNA polymerase, and many chromatin modifying enzyme families act to overcome difficulties imposed by chromatin. We investigate the role and specificity of histone H1 variants in chromatin organization and gene expression control. By RNA interference of the different human H1 variants we have found that they have different involvement in cellular processes such as cell cycle progression and gene expression. Knock-down of multiple H1 variants induce the interferon response due to derepression of heterochromatic repeats and endogenous retroviruses. We have also described a differential role of H1 variants in pluripotency and differentiation. Currently, we are investigating the occupancy of H1 variants genome-wide by ChIP-seq (NGS) and the consequences of altering H1 levels on chromatin organization (ATAC-seq, DNA methylation, hiC chromosome conformation-TADs, etc), with an extensive use of Genomics and Bioinformatics. Additionally, we are performing proteomics of H1 variants specific protein complexes in chromatin and nucleoplasm to identify its interacting partners.

References:

<https://www.ibmb.csic.es/en/department-of-molecular-genomics-dmg/chromatin-regulation-of-human-and-viral-gene-expression/#selected-publications>

Expected skills::

Previous experience in molecular biology, genomics or computational will be positively considered.

Possibility of funding::

No

Possible continuity with PhD: :

To be discussed

