



PERSONA CIÈNCIA EMPRESA  
UNIVERSITAT RAMON LLULL

## CHARACTERIZATION OF EXTRACELULAR VESICLES OF MOUSE MODELS OF LAFORA DISEASE AS BIOMARKERS

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### Offer

Master research project (6-9 months)

### Summary

Lafora disease is an inheritable neurodegenerative condition affecting children. The onset of the disease is in adolescence, in apparently healthy teenagers, with headaches, seizures, and insidious decline in cognitive function. No effective treatment is known, and the disease progresses rapidly with amplification of seizures, loss of neurologic functions and dementia, inevitably leading to the death of the patient 5-10 years after the onset (1,2). The diagnostic and the study of the progression of the disease are complicated and require the development of new tools.

Extracellular vesicles (EVs) are lipid bound vesicles, loaded with proteins and RNAs, secreted by cells into the extracellular space with communication functions (3–5). The use of EVs as biomarkers in extracellular spaces has been well demonstrated. During this master thesis you will develop a new non-invasive diagnostic method based on the analysis of biomarkers in EVs of mouse models of Lafora disease. Thus, you will 1) isolate EVs from tissues of mouse models of the disease; 2) characterize the presence of these biomarkers in the purified EVs.

You will use, among others, the following techniques: western blot, ELISA, confocal microscopy, flux cytometry, characterization of EVs size by light dispersion, dot blots. The work will be 80% experimental.

### References

1. Duran J, Gruart A, López-Ramos JC, Delgado-García JM, Guinovart JJ. Glycogen in Astrocytes and Neurons: Physiological and Pathological Aspects. *Adv Neurobiol.* 2019;23:311–29.
2. Duran J, Hervera A, Markussen KH, Varea O, López-Soldado I, Sun RC, et al. Astrocytic glycogen accumulation drives the pathophysiology of neurodegeneration in Lafora disease. *Brain J Neurol.* 2021 Sep 4;144(8):2349–60.
3. Giacobino C, Canta M, Fornaguera C, Borrós S, Cauda V. Extracellular Vesicles and Their Current Role in Cancer Immunotherapy. *Cancers.* 2021 May 10;13(9):2280.
4. Zaborowski MP, Balaj L, Breakefield XO, Lai CP. Extracellular Vesicles: Composition, Biological Relevance, and Methods of Study. *Bioscience.* 2015 Aug 1;65(8):783–97.
5. Almansa D, Peinado H, García-Rodríguez R, Casadomé-Perales Á, Dotti CG, Guix FX. Extracellular Vesicles Derived from Young Neural Cultures Attenuate Astrocytic Reactivity In Vitro. *Int J Mol Sci.* 2022 Jan 25;23(3):1371.

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