



Title: Radiation as a therapeutic tool against neurodegeneration: pilot studies in cellular and animal models of Huntington's disease

MSc em Bioquímica e Biomedicina

Place of work: Departamento de Química e Bioquímica, FCUL; ITQB-NOVA

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Abstract

Radiotherapy (RT) is a relatively safe and established treatment for cancer, where the goal is to kill tumoral cells with the lowest toxicity to healthy tissues. Using it for neurodegenerative disorders involving cell loss is counterintuitive. However, ionizing radiation has a hormetic nature: it can have deleterious or beneficial effects depending on how it is applied. For example, low-dose RT can trigger antioxidant, anti-inflammatory and tissue regeneration responses. RT has been used to treat peripheral amyloidosis, which is very similar to neurodegenerative disorders from a molecular perspective. Although some hypotheses have been formulated, the mechanism of action of RT on systemic amyloid deposits is still unclear, and its impact in the central nervous system remains uncertain. We want to explore the potential of RT to treat neurodegenerative disorders using cellular, fly and worm models of Huntington's disease, where mutated huntingtin aggregates and produces pathological phenotypes. The student will be trained in methods to work with *Drosophila* flies and mammalian cell cultures, as well as classic cell and molecular biology methods (western blotting, cloning,...) and advanced bioimaging, especially widefield and confocal microscopy. The student should have her/his own means of transportation, as the experiments will require driving between three locations: Lisbon (FCUL, Campo Grande, cell culture experiments), Oeiras (ITQB NOVA, fly experiments) and Sacavém (CTN, for irradiation). Students selected for this project, after thesis registration, are eligible to apply to the BioISI Junior Programme (supporting 8 students with a 6-month Scholarship(BII), being the selection criterium the academic merit of the candidates.