



University of Naples Federico II
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International PhD course in
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**INHIBITORY ROLE OF NATURAL POLYPHENOLS ON THE CELLULAR TOXICITY INDUCED BY
A-SYNUCLEIN AGGREGATION.**

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The aberrant aggregation of α -synuclein (α S) into amyloid fibrils is associated with a range of highly debilitating neurodegenerative conditions including Parkinson's disease (PD). Although the properties of mature α S amyloid structures are currently understood, there is still poor knowledge about the structures and mechanisms of toxicity of transient species appearing during the process of α S aggregation. These transient aggregates are considered the most pernicious species in the mechanisms leading to neuronal death in PD. It is therefore critical to define new multidisciplinary approaches at the interface between molecular and cellular biology to characterise the effects of α S aggregation on the neuronal anatomy. In this project we will employ techniques of molecular biology to generate transient α S aggregates that induce significant levels of neurotoxicity when incubated with neuronal cells or when infused in vivo. The study will be based on state-of-the-art cellular neurobiology in association with cryogenic-electron tomography and optical super-resolution microscopy to characterise the effects induced by toxic α S aggregates on neuronal cultures. This study will therefore generate a research platform to elucidate the mechanisms by which natural compounds such as polyphenols from wine and green tea are able to mitigate the neuronal toxicity of α S aggregates.

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