

Function and mechanism of a novel SUMO protease

<https://www.neurodegenerationresearch.eu/survey/function-and-mechanism-of-a-novel-sumo-protease/>

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Country

USA

Title of project or programme

Function and mechanism of a novel SUMO protease

Source of funding information

NIH (NINDS)

Total sum awarded (Euro)

€ 1,087,706.42

Start date of award

01/12/2012

Total duration of award in years

1

The project/programme is most relevant to:

Parkinson's disease & PD-related disorders

Keywords

Ubiquitin, Peptide Hydrolases, Parkinson Disease, Nerve Degeneration, human disease

Research Abstract

DESCRIPTION (provided by applicant): Sumoylation, the covalent attachment of small ubiquitin-like modifier (SUMO) to cellular proteins, has emerged as an important signaling mechanism for regulating protein activity, stability/degradation, subcellular localization, and protein-protein

interaction. Like ubiquitination, sumoylation is a dynamic and reversible post-translational modification that is controlled by opposing actions of sumoylating enzymes and SUMO proteases (also known as desumoylating enzymes). Sumoylation plays a critical role in regulation of numerous cellular processes, from transcriptional regulation and DNA repair to protein trafficking, mitochondrial dynamics, and apoptosis. Dysregulated sumoylation has been implicated in a variety of human diseases, including cancer, diabetes, heart disease, and neurodegenerative disorders such as Alzheimer and Parkinson diseases. Despite increasing evidence supporting the importance of sumoylation to human health and disease, our knowledge about the sumoylation/desumoylation machinery components and their cellular functions is limited. In this project, the applicant's team will use a combination of biochemical, proteomic, cell biological, and mouse genetic approaches to study a novel SUMO protease and its signaling role in cellular defense against oxidative stress and apoptosis. The results of the proposed studies should advance our knowledge of the fundamental mechanisms governing SUMO signaling in all eukaryotic cells and provide a molecular basis for understanding and treating a diverse array of human diseases that involve dysregulated sumoylation.

Lay Summary

PUBLIC HEALTH RELEVANCE: The importance of proper sumoylation to human health is highlighted by the evidence linking dysregulated sumoylation to a variety of human diseases, including cancer, diabetes, heart disease, and neurodegenerative disorders such as Alzheimer, Parkinson, and Huntington diseases. The goal of the proposed research is to understand, at the molecular level, how sumoylation is controlled in normal physiology and how this process becomes dysregulated in disease states. The results of the proposed studies will provide fundamental information needed for the development of effective therapeutics to treat diverse human diseases in which protein sumoylation is disturbed.

Further information available at:

Types:

Investments > €500k

Member States:

United States of America

Diseases:

Parkinson's disease & PD-related disorders

Years:

2016

Database Categories:

N/A

Database Tags:

N/A