

## Hydroxytyrosol Decreases LPS- and $\alpha$ -Synuclein-Induced Microglial Activation In Vitro

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### Abstract

Neuroinflammatory mechanisms are associated with many neurodegenerative diseases such as Parkinson's disease. Therefore, regulating these mechanisms would be a possible tool to control the onset and progression of these diseases. Neuroinflammatory processes involve the microglia, a cell of the central nervous system that is able to polarize into different phenotypes, which can trigger pro-inflammatory, anti-inflammatory and/or neurodegenerative effects.

There are a growing number of studies that support the benefits of the Mediterranean diet, highlighting the reduction of cognitive impairment in neurodegenerative diseases. These benefits can be associated with the presence of polyphenols in foods such as extra virgin olive oil, fruits and vegetables, fish and red wine. Among these polyphenols is hydroxytyrosol.

In our study we have shown that hydroxytyrosol reduces inflammation induced by different stimuli such as lipopolysaccharide and  $\alpha$ -synuclein. We also investigated the possible molecular mechanisms involved in this anti-inflammatory effect. Thus, we analyzed the nuclear factor Kappa B (NF $\kappa$ B), mitogen-activated protein kinases (MAPK), nicotinamide adenine phosphate oxidase dinucleotide (NADPH) oxidase and inflammatory pathways.

Our findings support the use of hydroxytyrosol to prevent the inflammation associated with Parkinson's disease, and thus shed light on the relationship between the Mediterranean diet and this neurological disorder.

Keywords—*hydroxytyrosol, microglia, inflammasome,  $\alpha$ -synuclein.*

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Graduated in Pharmacy from the University of Seville. Postgraduate studies in Physiology and Neuroscience from the International Postgraduate School of the University of Seville. Pre-doctoral student in the Department of Biochemistry and Molecular Biology of the Faculty of Pharmacy of the University of Seville in the BIO113 group of neurodegenerative diseases. 3 international publications, several oral presentations and posters at international neuroscience conferences.

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