Journal of Neuroscience and Neuropharmacology
ISSN 2155-9562
2020
Vol.6 No.2

EVOO polyphenols can relieve autophagy dysregulation in Alzheimer's disease

Manuela Leri[1,2], Massimo Stefani[1], Monica Bucciantini[1]

[1] Dipartimento di Scienze Biomediche Sperimentali e Cliniche "Mario Serio", Università degli Studi di Firenze

[2] NEUROFARBA Dipartimento di Neuroscienze, Psicologia, Area del Farmaco e Salute del Bambino, Università degli Studi di Firenze

Abstract

Autophagy is a key process involved in the control of cell proteostasis, in the regulation of lipid metabolism and organelle turnover and in the clearance of materials of endogenous or exogenous origin. Autophagy efficiency declines with age, leading to accumulation of harmful protein aggregates and damaged mitochondria, with increased ROS production. These modifications contribute to several pathophysiological conditions, including Alzheimer's disease (AD). Indeed, several studies have reported that the maturation of autophagolysosomes and the inhibition of their retrograde transport creates favourable conditions for the accumulation of the A peptide, whose aggregation into extracellular plaques is considered a key responsible of neuronal damage in AD.Recent data have shown that oleuropein aglycone (OleA), a key component of olive oil (EVOO), interferes with Aaggregation, stimulates cell defences against plaque-induced neurodegeneration and triggers autophagy. After ingestion, OleA is metabolized to hydroxytyrosol (HT), the most powerful antioxidant compound in the olive tree. Based on these premises and considering that about 30% of OleA is converted to HT during digestion, we aimed to investigate the molecular mechanisms involved in autophagy activation by a mixture of OleA and HT. Therefore, we performed a set of *in vitro* experiments to extend and to deepen the knowledge on the molecular determinants of the beneficial properties of olive polyphenols. Our results show that a mix of OleA/HT activates the autophagic pathway more than the same amounts (in molar terms) of OleA or HT taken alone. Moreover, a reduction of ROS production with a significant recovery of cell viability was observedin cells exposed to toxic A$_{1-42}$ oligomers following treatment with the mixture. These studies extend previous data and provide the rationale to consider these molecules as promising candidates for prevention and long-term nutraceutical treatment of neurodegeneration or as molecular scaffolds for further pharmacological development.

Keywords—*Four key words or phrases in alphabetical order, separated by commas*

Autophagy, Alzheimer's disease, Oleuropein aglycone, Hydroxytyrosol

Biography:

Manuela Leri has completed his PhD at the age of 29 years at the University of Florence and is carrying out her PostDoc training at the sameuniversity by a grant of theAiralzh-ONLUS. She has dedicated her efforts to the study of biophysical and molecular biology issues of protein folding, misfolding and amyloid aggregation and to the investigation of the molecular mechanisms underlying aggregate cytotoxicity to living systems. She has also focused her attention to the molecular and cellular basis of the protection by plant polyphenols against amyloid aggregation, cytotoxicity, and dysfunctional autophagy in models of neuro- and cardio-degenerative diseases. She has published 20 papers in international peer-reviewed journals.

14th International Online Congress on Alzheimers & Dementia ; October 05, 2020.