

Evaluation of Olive Oil Polyphenols' Properties on Ex Vivo Models: Results from Preliminary Studies

Calabrò, A.^{a*}; Aiello, A.^a; Accardi, G.^a; Zarcone, R.^a; Caruso, C.^a; Pera, A.^{b,c} & Candore, G.^a.

^a Department of Biomedicine, Neurosciences and Advanced Diagnostics, Laboratory of Immunopathology and Immunosenescence, University of Palermo, 90134 Palermo, Italy (anna.calabro@unipa.it; anna.aiello@unipa.it; giulia.accardi@unipa.it; rosa.zarcone@community.unipa.it; calogero.caruso@unipa.it; giuseppina.candore@unipa.it)

^b GC01 Immunology and Allergy Group, Maimonides Biomedical Research Institute of Cordoba (IMIBIC), 14004 Cordoba, Spain (alejandra.pera@imibic.org).

^c Department of Cell Biology, Physiology and Immunology, University of Cordoba, 14004 Cordoba, Spain (alejandra.pera@imibic.org).

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Abstract

Oleuropein (OLE) and its derivative, hydroxytyrosol, along with other polyphenols, like oleocanthal (OLEo), are found in leaves and fruits of *Olea europaea* Linn and exhibit potent anti-inflammatory and antioxidant effects both *in vivo* and *in vitro* [1-4]. OLEo, in particular, mimics the action of ibuprofen on cyclooxygenase I and II, conferring significant anti-inflammatory benefits [5]. Our studies aim to evaluate these compounds as capable of counteracting the low-grade inflammation, called inflamm-aging, oxidative stress and cellular senescence associated with aging [6]. For this reason, the immunomodulatory effects of OLE have been evaluated on peripheral blood mononuclear cells (PBMCs) from young (<65 years) and older (>65 years) adults as part of the Improved Vaccination Strategies for Older Adults (ISOLDA) project. PBMCs were obtained from healthy individuals before (T0) and after (T1) influenza vaccination with Flucelvax® Tetra and treated *in vitro* with different concentrations of OLE, with or without the addition of BIRB796, an inhibitor of p38MAPKs. The results about T-cells producing cytokines (TNF- α , IFN- γ , IL-10) suggested significant OLE immunomodulatory properties, which may enhance the immune response and reduce inflammation in older adults, post-vaccination. Furthermore, it has been shown a possible antioxidant activity of these compounds in the reduction of Reactive Oxygen Species in the supernatant of the cell cultures treated with OLE alone or in combination with BIRB796 in terms of Relative Fluorescence Units. The immunomodulatory role of OLEo on monocyte-derived dendritic cells (mo-DCs) is under study, to understand the capacity of this compound to modulate the immune response directly. OLEo in pure form and dissolved in emi-NADES is tested on mo-DCs derived from PBMCs of healthy donors and analysed in cell cultures, at different concentrations. Mo-DCs are analysed for immunophenotype through flow cytometry and for gene expression related to the NF- κ B pathway through qPCR. The first findings about OLE and OLEo support the potential of these olive oil bioactive compounds as boosters for immune function, in contrast to age-related decline.

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