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Biochemical links between Oxidative Stress and Pain by Modulation of Natural Compound *in VIVO*

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Many studies have shown the positive effects of natural food phytocomponents and a Mediterranean diet in oxidative and painful diseases. In particular, one of the main components of the Mediterranean diet is olive oil, and Hidrox® is an aqueous extract of olive pulp. Hydrox® contains 40–50% hydroxytyrosol and presents antioxidant, antimicrobial, anti-inflammatory, and neuroprotective properties. Due to the biological properties of containing hydroxytyrosol, the focus of our study was to investigate whether Hydrox was able to modulate nociception, inflammation and oxidative stress, using an experimental of endometriosis. Endometriosis was induced by intraperitoneal injection of uterine fragments, and Hidrox® was administered daily for 7 days. At the end of the 14-day treatment, behavioral alterations were assessed, and the endometrial implants and brain tissues were collected for histological and biochemical analysis. Hidrox® treatment was able to reduce endometriotic implant area, diameter and volumes. Hidrox® treatment reduced angiogenesis and hyperproliperation. Moreover, it reduced mast cell recruitment into the lesions, myeloperoxidase activity and lipid peroxidation and increased superoxide dismutase (SOD) activity and glutathione levels in the endometrial explants. In the peritoneal fluid, Hidrox® treatment reduced pro-inflammatory cytokines increased by the disease. Hidrox® administration also reduced peripheral and visceral sensibility as shown by the behavioral tests. Animals treated with Hidrox® also showed reduced blood–brain barrier permeability and mast cell infiltration in the hippocampus, as well as astrocyte and microglia activation and brain oxidative status restoring brain-derived neurotrophic factor (BDNF) protein expression and increasing Nuclear factor erythroid 2-related factor 2 (Nfr2) nuclear translocation. In conclusion, Hidrox® displayed potential ameliorative effects on endometriotic implants and related pain-induced behaviors due to its potent antioxidative properties.

Keywords: endometriosis; oxidative stress; pain; natural compound.

Biography:

Ramona D'Amico has completed PhD in Applied Biology and Experimental Medicine in 2020 at the University of Messina. She worked as researcher for studies on preclinical pharmacology activities (in vitro primary cultures and in vivo experimental models), for the Epitech Group. Additionally, she worked at Health Science Research Centre, University of Roehampton in London (UK) and now she performs postdoctoral studies at University of Messina. She has published more than 60 articles in reputed journals about biochemistry, oxidative stress and pharmacology. Dr. Ramona D'Amico have knowledge about animals research, biochemical and molecular biology, immunohistochemical and immunofluorescence analysis.

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