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OLEUROPEIN AND COPPER: A NEW OPPORTUNITY AGAINST LIVER DISEASE

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Introduction: Diet significantly affects health. Incorrect feeding results in overweight or obesity that are associated with liver steatosis, a pathological condition that affects about 30% of the world's population. This pathology, characterized by accumulation of fat in the liver, inflammation and balloning, can progress toward cirrhosis and hepatocarcinoma (HCC). In such processes, transition metals (copper, zinc, Fe etc,) play a key role. Accordingly, altered copper homeostasis has been observed in various stages of Nonalcoholic fatty liver disease (NAFLD). Mediterranean diet has beneficial effects on health, and olive oil is one of the main actors. Oleuropein (Ole), a phenolic compound derived from green olives and olive leaves, is able to bind copper. Hence, we evaluated the correlation between Ole and intracellular copper concentration and its role in counteracting liver damage related to high fat diet intake (HFD).

Methodology: Real-time PCR, atomic absorption, BioPlex multiplex biometric ELISA-based immunoassays, adipoRed and Western blots were performed for *in vitro* and *in vivo* experiments.

Results: *In vitro*, fatty acids induce intracellular copper modulation. Oleuropein leads to a significant reduction in both the intracellular content of Cu and lipid accumulation. In a HFD mouse model treated with Ole, we highlighted a significant reduction in levels of Cu in liver tissue, hepatic steatosis and related inflammatory conditions. In particular, the levels of chemokines MCP1 and CXCL1, both correlated with the progression of liver disease, were significantly reduced. The involvement of genes (e.g. tp53, Myc etc.) in the control of the entry and efflux of copper in cells, is under investigation.

Discussion: Our results demonstrate that Ole has inhibitory effects on the progression of liver disease that correlates with its ability to modulate copper.

Biography

Balsano Clara was the Director of the Institute of Molecular Biology and Pathology (IBPM) of Cancer National Research (CNR) till last year June. She has a great research expertise on liver diseases, as highlighted by her scientific publications: author of more than 100 scientific papers. IF > 562; H-index: 33 (WOS); G-index: 60 (WOS); Citations > 3500 (WOS); orcid.org/0000-0002-9615-7031. In the last period, her research interest was dedicated in understanding of the molecular bases of the pathogenesis of Non-Alcoholic Fatty Liver Disease (NAFLD) to find new targets to develop new opportunities for a target therapy. NAFLD affects about 1.8 billion of people, the 25% of world population. Its prevalence is growing rapidly, along with the associated risk of worsening, in fact, the related cardiovascular risk cannot be underestimated. Currently, NAFLD should be considered one of the most important problems for National Health burden.

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