

POSTER

BIOLOGICAL ACTIVITIES OF CITRUS LIMON-, VITIS VINIFERA- AND ACTINIDIA DELICIOSA-DERIVED EXTRACELLULAR VESICLES ON HUMAN CACO-2 CELLS

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Extracellular vesicles (EVs) are nano-sized, membrane-enclosed particles naturally released by all living cells as a conserved mechanism of intercellular communication. Originally characterised in mammalian systems, EVs have been identified across the plant kingdom, where they participate in stress responses and contribute to plant immunity. In recent years, have been demonstrated that plant-derived vesicles (P-EVs) can modulate inflammatory signalling pathways, influence intestinal epithelial integrity, and reshape gut microbiota composition in experimental models. In this study, we evaluated the capability of Citrus limon (lemon), Vitis vinifera (grape) and Actinidia deliciosa (kiwi)-derived EVs in modulating inflammation and oxidation in Caco-2 cells, a human colon epithelial cancer cell line used as a model of human intestinal absorption of drugs and other compounds. Cells were treated with LPS and TNF- α , or H₂O₂ to induce inflammation. The modulation of inflamma-

tion was evaluated by analysing pro- and anti-inflammatory gene expression with RT-qPCR; the antioxidant activity was analyzed by MTT assay. In both cases, the treatment with P-EVs precedes or follows that with inflammatory or oxidative stress inducers. Both the antioxidant and anti-inflammatory effects are mainly mediated by molecules carried by extracellular vesicles; this is strictly related to the experimental conditions and the fruit considered. Fruit-derived extracellular vesicles reduce the levels of pro-inflammatory cytokines, and the anti-inflammatory effect involves the cytokine IL-10, rather than TGF- β . The most highly expressed pro-inflammatory cytokine in all experimental conditions is IL-8. In conclusion, EVs extracted from lemon, kiwi, and grape exhibit the ability to modulate the expression levels of key cytokines involved in intestinal inflammatory states. Due to their capacity to be effectively internalized by intestinal epithelial cells, these vesicles represent highly promising candidates for use as functional foods.