

A TUSCAN OLIVE OIL EXTRACT INHIBITS NUCLEAR FACTOR-KAPPA B ACTIVATION IN MONOCYTE/MACROPHAGES FROM HEALTHY DONORS

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Epidemiological studies demonstrate that the Mediterranean diet, in which olive oil is the major source of fat, reduces the risk of coronary heart disease and cancer. Recently, it has been proposed that the beneficial effects of olive oil not only depend on oleic acid, but are also associated with minor polar compounds (MPC). Therefore, we prepared a defatted extract from Tuscan olive oil, quantified the MPC herein and evaluated extract's ability to modulate NF- κ B activation in human monocytes and monocyte-derived macrophages (MDM) isolated from healthy donors.

In this olive oil extract, total polyphenols are about 40 mM; oleocanthal, deacetoxy-oleuropein aglycone and tyrosol are the main components (all > 6 mM), followed by secoiridoid derivatives, elenolic acid and hydroxytyrosol. In both un-stimulated monocytes and MDM, a low basal activation of NF- κ B is detected; conversely, phorbol 12-myristate 13-acetate (PMA) at 10⁻⁶M concentration potently stimulates p50 and p65 nuclear translocation. The defatted oil extract inhibits in a concentration dependent manner (1 nM – 10 μ M) the nuclear translocation of NF- κ B p50 subunit. At the highest 10 μ M concentration, PMA-induced p50 translocation is inhibited by about 70% in both monocytes and MDM; the oil extract is about as effective as the PPAR- γ agonist ciglitazone, a known inhibitor of NF- κ B activation, which has been used as a positive control. At the highest concentration evaluated, the oil extract also significantly reduces p50 (but not p65) translocation in un-stimulated cells. At the maximal 10 μ M concentration, the oil extract is even more effective than ciglitazone in reducing PMA-induced p65 translocation.

In conclusion, this olive oil extract reduces NF- κ B activation in both un-stimulated and PMA-challenged monocytes and MDM and is particularly effective on p50 subunit, the one lacking a transactivating domain but still retaining DNA-binding activity. These data provide further evidence of the beneficial effects of virgin olive oil by indicating its ability to inhibit NF- κ B activation in human monocytes and macrophages and so exert anti-inflammatory activities.