

9TH ANNUAL EUROPEAN PHARMA CONGRESS

June 26-28, 2017 Madrid, Spain

Chemopreventive effect of n-3 PUFAs and Atorvastatin in rats with bladder cancer

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Bladder cancer remains a huge concern for the medical community because of its incidence and prevalence rates, as well as high percentage of recurrence and progression. Omega-3 polyunsaturated fatty acids (n-3 PUFAs) and atorvastatin (ATOR) proved anti-inflammatory effects through PPAR- γ mechanism. However, their chemopreventive effect still remained to be examined and clarified. In the current study, bladder cancer was induced in rats by the chemical carcinogen BBN. n-3 PUFAs (DHA and EPA 2:3 w/w; 1200 mg/kg) and/or ATOR (6 mg/kg) were given orally daily to rats for 8 consecutive weeks concomitantly with BBN, and continued for further 4 weeks after cessation of BBN administration. The histopathological examination of rat bladder revealed presence of tumors and absence of apoptotic bodies in sections from BBN group, while tumors were absent and apoptotic bodies were clearly observed in sections from rat groups treated with n-3 PUFAs, ATOR, or both drugs. The study of the molecular mechanisms illustrated downregulation of COX-2 and P53 (mutant) genes and suppression of TGF- β 1 and the lipid peroxidation product malondialdehyde in serum of rats of the three treated groups. This chemopreventive effect was confirmed by and associated with lower level of bladder tumor antigen (BTA) in urine. However, the combined treatment with both drugs exhibited the major protective effect and nearly corrected the dyslipidemia that has been induced by BBN. Collectively, n-3 PUFAs and ATOR, besides having anti-inflammatory properties, proved a chemopreventive effect against bladder cancer, which nominates them to be used as adjuvant therapy with other chemotherapeutics.

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Characterization and wound repair potential of essential oil *Eucalyptus globulus* Labill.

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Eucalyptus species has been used for treating several diseases such as sinusitis, bronchitis, toothache, kidney disorders and rheumatism in worldwide traditional medicine. In Turkey, *E. globulus* leaves are used to treat wounds. The purpose of this study was to evaluate, for the first time, the chemical composition of the essential oil from the fruits of *E. globulus* and its wound healing activity. Since wound repair is related to inflammatory associated conditions, the supposed anti-inflammatory activity of the oil was investigated. Essential oil from *E. globulus*, isolated by hydrodistillation, was analyzed by gas chromatography-mass spectrometry. Linear incision and circular excision wound models on rats were used for the wound healing activity of the oil, and acetic acid-induced increases in capillary permeability model in mice was used for the anti-inflammatory activity. Analysis of the essential oil showed that the main components were eucalyptol, α -phellandrene, β -phellandrene, cymene, 4-terpineol, α -pinene, α -thujone, α -terpinene and γ -terpinene. The essential oil comprises 53.67 % eucalyptol. It exhibited significant wound healing activity in the models studied, and the oil revealed a significant inhibitory effect on inflammation. These findings add significant information to the wound healing and anti-inflammatory activities of *E. globulus*, therefore justifying and supporting the use of this plant in traditional folk medicine.

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