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Immunomodulatory activity of the lignan 7-hydroxymatairesinol potassium acetate (HMR/lignan™) extracted from the heartwood of Norway spruce (*Picea abies*)

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Abstract

The pharmacological profile of the lignan 7-hydroxymatairesinol (HMR/lignan™, HMR) includes chemopreventive effects, antioxidant properties, and mild proestrogenic activity. The present study was devised to investigate the effects of HMR on THP-1 cells, an established model of human monocytes, and on human polymorphonuclear leukocytes (PMNs). In THP-1 cells, HMR concentration-dependently reduced LPS-stimulated tumor necrosis factor (TNF)-α secretion in the supernatant. HMR at low, sub-μM concentrations also reduced TNF-α mRNA, which was however enhanced by supra-μM concentrations of HMR. In human PMNs, HMR concentration-dependently reduced ROS production induced by either N-formyl-Met-Leu-Phe, phorbol myristate acetate or angiotensin II, as well as interleukin-8 production induced by either N-formyl-Met-Leu-Phe or angiotensin II. Results indicate that HMR is an effective inhibitor of both monocytic THP-1 cells and of human PMNs and warrant further studies to assess their relevance for the prevention and treatment of several conditions characterized by chronic systemic inflammation.

Keywords

7-Hydroxymatairesinol; Polymorphonuclear leukocytes; Reactive oxygen species; Interleukin-8; THP-1 cells; Tumor necrosis factor-α

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> ...We found that treatment with 7-HMR did not affect cell viability at concentrations below 200 μM. It has been reported that 7-HMR is sufficient to decrease LPS-stimulated TNF-α secretion in THP-1 cells in a concentration-dependent way (Cosentino et al., 2010). It is well established TNF-α acts as a pro-inflammatory cytokines in vascular inflammation....

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> …In literature, the lignan 7-hydroxymatairesinol extracted from the heartwood of Picea abies was reported to reduce LPS-stimulated TNF-α secretion in THP-1 cells in a dose-dependent manner as well as TNF-α mRNA. In human polymorphonuclear leukocytes this compound concentration dependently reduced ROS and IL-8 production (Cosentino et al., 2010). On the other hand, Maeaettae et al. (2006) showed that hardwood and softwood dusts induced TNF-α, CCL2, CCL3, CCL4 and CXCL2/3 chemokine expression and inhibited IL-1β and CCL24 expression in RAW 264.7 cells (Maeaettae et al., 2006)….

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