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Anethole-Induced Regulation of T-Cell Function Through the Blocking of Mitogen-Activated Protein Kinases Signaling

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In the present study, we show the inhibitory effect of anethole, a substituted alkenylbenzene found in a variety of foods and essential oils, on T lymphocyte functions. Anethole produced an inhibition of concanavalin A-induced lymphoproliferation in B6C3F1 mouse splenocytes. In light of the fact that IL-2 is responsible for the clonal expansion of T-cells, effect of anethole on IL-2 expression was determined. PMA plus ionomycin (Io) induced IL-2 mRNA expression and protein secretion in splenocytes and EL4.IL-2 T-cells, which were inhibited by anethole as determined by real-time RT-PCR and ELISA, respectively. Electrophoretic mobility shift assay was performed to evaluate the effect of anethole on binding activity of transcription factors for IL-2 gene expression in PMA/Io-stimulated EL4.IL-2 cells, and anethole decreased the NF-AT and AP-1 binding activity. Western blot analysis showed that anethole inhibited the phosphorylation of extracellular signal-regulated protein kinases 1 and 2 (ERK1/2). These results suggest that the anethole-induced T-cell dysfunction is due to the inhibition of IL-2 expression and is mediated, at least in part, through the blocking of ERK1/2 signaling.

Keyword : Anethole, IL-2, ERK1/2