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Immunomodulatory and anti-tumor activities of conjugated linolenic acids

Conjugated linolenic acids (CLN) refer to a group of positional and geometrical conjugated trienoic isomers of linolenic acid (C18:3), which can be isolated from various plant seed oils. Recent studies have shown that CLN isomers possess diverse biological and pharmacological activities, including anti-inflammatory, anti-oxidative, hypolipidemic and anti-tumor properties. However, their immunomodulatory activities on macrophages and anti-tumor action mechanisms on human myeloid cells remain poorly understood. In this study, Jacaric acid (8Z, 10E, 12Z-octadecatrienoic acid), a CLN isomer that is present in jacaranda seed oil, was found to inhibit the *in vitro* and *in vivo* growth of human eosinophilic leukemia EoL-1 cells, while exhibiting no significant cytotoxicity to normal murine cells. Mechanistic studies showed that Jacaric acid triggered cell cycle arrest at G^0/G^1 phase and induced apoptotic events in EoL-1 cells, including DNA fragmentation, phosphatidylserine externalization and mitochondrial membrane depolarization. Moreover, Jacaric acid-treated EoL-1 cells also underwent eosinophilic differentiation as determined by morphological and phenotypic criteria. Interestingly, Jacaric acid exhibited no significant cytotoxicity on the thioglycollate-induced peritoneal macrophages but stimulated their cytostatic activity towards tumor cells and increased their endocytic ability and production of nitric oxide and several pro-inflammatory cytokines such as IFN-γ, IL-1β and TNF-α *in vitro*. Collectively, our results indicate that Jacaric acid can activate murine macrophages and exerts its direct anti-tumor effects on human myeloid leukemia cells *via* induction of apoptosis and differentiation of the leukemia cells. Therefore, Jacaric acid might be a potential candidate for the treatment of some forms of myeloid leukemia.

Biography

Leung K N has received his BSc in Biochemistry from The Chinese University of Hong Kong (CUHK) and obtained his PhD in Microbiology and Immunology from The Australian National University. After two years of Postdoctoral work at the Pathology Department of the University of Cambridge, he returned to the CUHK as a Lecturer in the Department of Biochemistry in 1983. He was the former Dean of General Education in Chung Chi College, the Associate Dean of Science (Education) of CUHK and the Chairman of the Hong Kong Society for Immunology. He is currently an Adjunct Professor in the School of Life Sciences, CUHK and the School of Science and Engineering, CUHK (Shenzhen). His main research interests include immunopharmacological studies of natural products and Chinese medicinal herbs, cancer immunotherapy, nutrition, immunity and cancer.

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