

Maslinic acid, minor compound of virgin olive oil, promotes antitumoral M1 macrophage response.

Cristina Sánchez-Quesada, Alicia López-Biedma, J.J. Gaforio

Center for advanced studies in olive grove and olive oils. Immunology Division, Department of Health Sciences, Faculty of experimental Sciences, University of Jaen, Campus Las Lagunillas s/n, 23071, Jaen. Spain. e-mail contact: csquesad@ujaen.es

Introduction

The inflammatory process is involved in several diseases like cancer [1]. Macrophages play a central role in the whole inflammation process.

→ Macrophages can polarize into M1 or M2 state. M1 macrophages play a central role in tumorigenesis, acting against tumor appearance through Th1 cytotoxic response, while M2 promotes cancer development [2].

→ Maslinic acid (MA), a triterpene presents in virgin olive oil, possesses anti-inflammatory activity and antitumor properties [3].

→ **For these reasons, maslinic acid could protect against tumor appearance by modulating immune system.**

Materials and Methods

→ THP-1 cells were maintained at 37°C in a humidified atmosphere with 5% CO₂ in MEM supplemented with FBS.

→ THP-1 cells were differentiated to macrophages by adding 50 nM PMA along 24h. And polarized to M1 after 24 h of LPS treatment.

→ M1 macrophages were treated with MA in a range of concentrations.

Cell survival (after 24h treatment) and M1 polarization related cytokines such as macrophages recruitment-related cytokines (after treatment with 1 and 10uM of MA for 4h) were studied.

Results

→ MA decreased cell survival only at the maximum concentration assayed (100 uM).

→ IFN-gamma, which leads to M1 polarization, was increased respect to control at MAS 1 and 10uM. Furthermore, MA decreased IL-4 production, which leads to M2 polarization.

→ IL-8, IL-1 alpha and IL-1 beta, related to macrophages recruitment increased their levels after MA treatments.

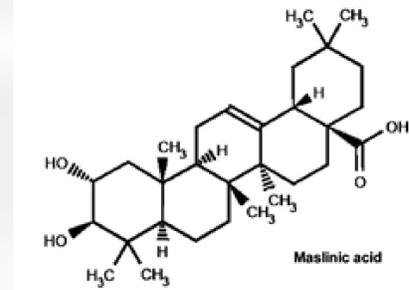
Conclusions

Maslinic acid possesses two principal actions on M1 macrophages:

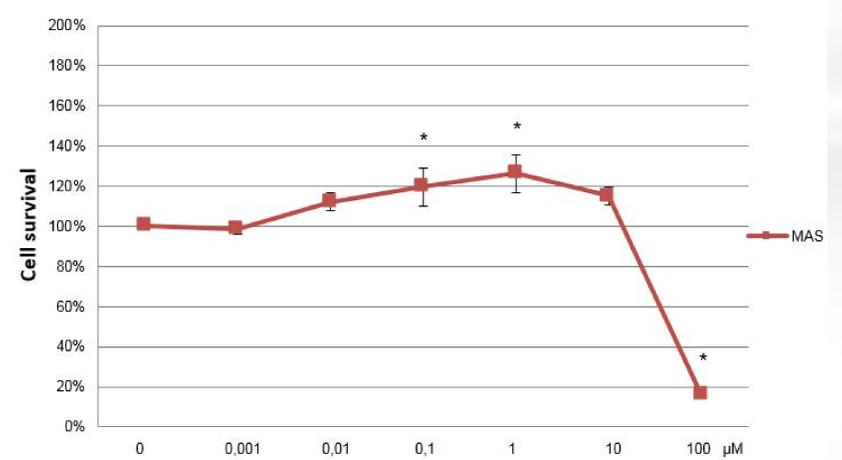
- It enhanced recruitment of macrophages by production of cytokines related to macrophages recruitment.
- It promoted M1 response through the synthesis of INF-gamma.

Figures

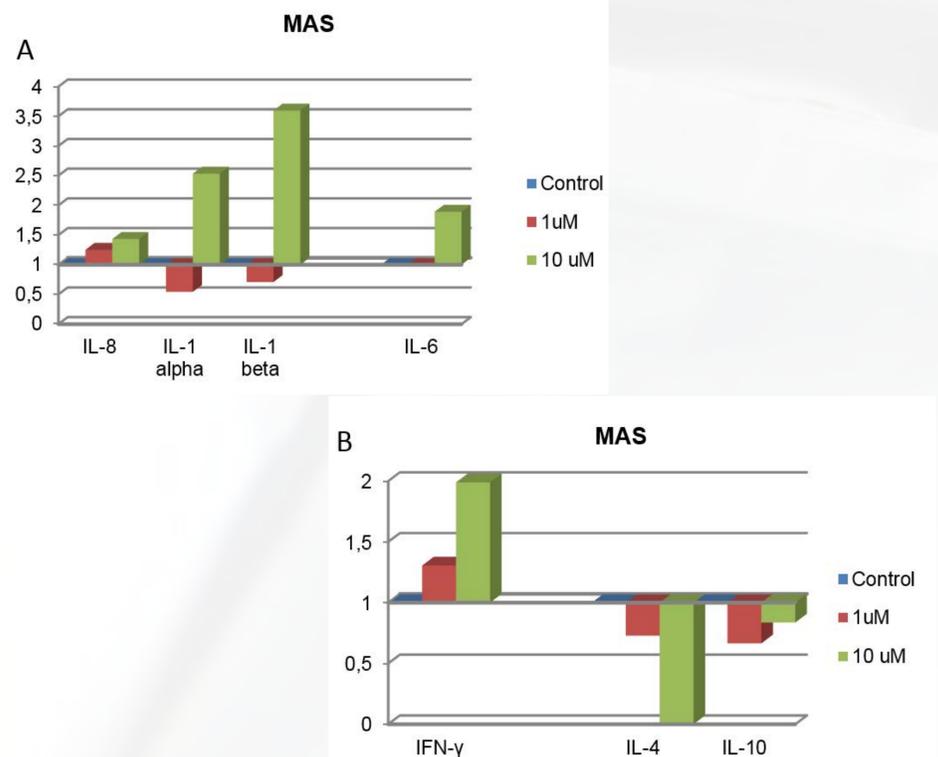
Chemical structure of maslinic acid



Citotoxicity after MA treatments at 24h



Production of macrophage-recruitment related cytokines (A) and production of M1 polarization-related cytokines (B)



[1]. D. Laoui, K. Movahedi, E. Van Overmeire et al. (2010) The International Journal of Developmental Biology. 55:(7-9),889-896.
[2] SK. Biswas, A. Mantovani. (2010) Nature Immunology. 11:(10), 889-896.
[3] Y. Allouche, F. Warleta, M. Campos et al. (2011) Journal Of Agricultural and Food Chemistry, 59:1, 121-130.

