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Dendritic Cells Maturation Promoted by M1 and M4, End Products of Steroidal Ginseng Saponins Metabolized in Digestive Tracts, Drive a Potent Th1 Polarization

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Abstract

Ginseng is a medicinal herb widely used in Asian countries, and many of its pharmacological actions are attributed to the ginsenosides. Dendritic cells (DCs) play a pivotal in the initiation of T-cell-mediated immune responses, making them an attractive cellular adjuvant for use in cancer vaccines. In this study, we investigated whether M1 and M4, end products of steroidal ginseng saponins metabolized in digestive tracts, can drive DCs maturation from human monocytes in vitro. Human monocytes were cultured with GM-CSF and IL-4 for 6 days, followed by another 2 days in the presence of M1, M4 or TNF-alpha as a maturation stimulus. Stimulation with 20 microM of M1 or M4 increased expression level of CD80, CD83 and CD86 as expressed by mean fluorescence intensity (MFI) and decreased endocytic activity. M4-primed mature DCs also displayed enhanced T cells stimulatory capacity in a MLR, as measured by T cell proliferation. Mature DCs differentiated with M1 or M4 induced the differentiation of naïve T cells towards a helper T cell type 1 (Th1) response at DC/T (1:5) cells ratio depending on IL-12 secretion. In CTL assay, the production of IFN-gamma and 51Cr release on M4-primed mature DCs was more augmented than of immature DCs or TNF-alpha-primed mature DCs. These results suggest that M4 may be used on DC-based vaccines for cancer immunotherapy.

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