Ganoderma lucidum mycelium and spore extracts as natural adjuvants for immunotherapy.

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Source

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Abstract

OBJECTIVES:

Ganoderma lucidum (GL) is one of the most commonly used Chinese herbs in the oriental community, with more than 30% of pediatric cancer patients taking GL. The immunomodulating and anticancer effects exerted by GL extracts have been demonstrated by in vitro and in vivo studies. There was, however, no comparison between the immunomodulating effects of GL mycelium extract (GL-M) and spore extracts on human immune cells. Dendritic cells (DCs) are professional antigen-presenting cells and their role in DC-based tumor vaccine has been well defined. The possibility of GL as natural adjuvant for human DCs remains unknown.

DESIGN:

This study explored the differential effect of GL-M and GL spore extract (GL-S) on proliferation and Th1/Th2 cytokine mRNA expression of human peripheral blood mononuclear cells (PBMCs) and monocytes. Their effects on the phenotypic and functional maturation of human monocyte-derived DCs were also investigated.

RESULTS:

GL-M induced the proliferation of PBMCs and monocytes, whereas GL-S showed a mild suppressive effect. Both extracts could stimulate Th1 and Th2 cytokine mRNA expression, but GL-M was a relatively
stronger Th1 stimulator. Different from GL-S, GL-M enhanced maturation of DCs in terms of upregulation of CD40, CD80, and CD86, and also reduced fluorescein isothiocyanate-dextran endocytosis. Interestingly, GLM-treated DCs only modestly enhanced lymphocyte proliferation in allogenic mixed lymphocyte culture with mild enhancement in Th development.

CONCLUSION:

These findings provide evidences that GL-M has immunomodulating effects on human immune cells and therefore can be used as a natural adjuvant for cancer immunotherapy with DCs.

PMID: 16398597