J HerbMed Pharmacol. 2014; 3(1): 67-68.

Journal of HerbMed Pharmacology

Journal homepage: http://www.herbmedpharmacol.com

Ganoderma lucidum: A promising anti-inflammatory medicinal plant

Sajjad Ahmadi-Renani[1], Mahdi Fasihi-Ramandi[2], Kazem Ahmadi[2*]

[1]Tehran University of Medical Sciences, Tehran, Iran
[2]Molecular Biology Research Center, Baqiyatallah University of Medical Sciences, Tehran, Iran

ARTICLE INFO

Article Type:
Letter to Editor

Article History:
Received: 1 March 2014
Accepted: 19 March 2014
ePublished: 1 June 2014

Keywords:
Ganoderma lucidum
Anti-inflammation
Anti-inflammatory medicinal plant
Immune-modulator

ABSTRACT

Inflammation is a complex process and part of the host immune defense against invading micro-organism or trauma. Over production of some pro-inflammatory mediators can lead to chronic diseases of the inflammatory origin. Medicinal Plants which are used as anti-inflammatory agents, mainly act affecting various stages of the process of inflammation. In general they can inhibit formation of a wide of mediators such as cytokines by immune cells to prevent the inflammatory reaction cascade from starting. The use of most of the medicinal plants in treatment of chronic disease of the inflammatory origin is based on clinical and pharmacological trials. Meanwhile, the use of most of them is based on their longstanding traditional use in folk medicine. In this review, we report some of anti-inflammatory effects of G. lucidum as an ancient Chinese herbal medicine.

Implication for health policy/practice/research/medical education:
Ganoderma lucidum seems to be useful as an anti-inflammatory medicinal plant. Therefore, more preclinical and clinical studies are recommended to elucidate its beneficial and risk effects in different conditions.

Please cite this paper as: Ahmadi-Renani S, Fasihi-Ramandi M, Ahmadi K. Ganoderma lucidum: A promising anti-inflammatory medicinal plant. J HerbMed Pharmacol. 2014; 3(1): 67-68.

Introduction

Inflammation is an unpleasant process familiar to everyone. It occurs in response to a wide range of sunburn, wounds, trauma, infection and auto immune conditions. Inflammation is characterized by four physical clear signs of warmth, redness, pain and swelling (1-3). Indeed, an immunological mechanism which plays an important role in the pathogenesis of diseases of the inflammatory origin, is related to activation and interactions of different immune cells, resulting to over production of mediators (4). Therefore, the main gold in treatment with medicinal plant is looking for those of them with inhibitory effect on the production of pro-inflammatory mediators by immune cells.

Many plants have been known with inhibitory effects on inflammation and anti-arthritic properties. In general, medicinal plants as whole reduces much of inflammation (5,6). Ganoderma lucidum (G. lucidum), a traditional Chinese medicinal herb, has been studied in many area during last two decades. Different compounds of G. lucidum extracts exert variable immunological effects. Selenium nano-particles decorated by sulfated Ganoderma lucidum polysaccharides has been shown to inhibit LPS-stimulated nitric oxide (NO) production by macrophages and down regulated mRNA gene expressions of pro-inflammatory cytokines including inducible NO synthase (iNOS), interleukin-1(IL-1) and TNF-α in a dose dependent manner. On the other hand, the anti-inflammatory cytokine IL-10 has been markedly increased under Selenium nano-particles treatment (7,8).

***Corresponding author**: Kazem Ahmadi, Email: kazahmadi@yahoo.com, k.ahmadi@bmsu.ac.ir

In this regard some scientist believed that polysaccharides compounds of G. lucidum is responsible for anti-inflammatory and anti-tumor activities (9). There is also reports showing that polysaccharide from G. lucidum can increase the release of tumor necrosis factor and interferon (IFN) from macrophages and lymphocytes (10). Another compound named water-insoluble B 1,3 D-glucan extracted from the fruit body of G. lucidum has been shown to significantly down regulate the inducible nitric oxide synthetase and TNF-α mRNA gene expression (11). In addition to anti-iflammatory effects G. lucidum, there are some reports demonstrating its adjuant effects. Chan *et al.* (12) reported that G. lucidum enhanced maturation of DC by upregulating CD40, CD80, and CD86 markers. Lin *et al.* (13), also showed that costimulatory molecules CD40, CD54, CD80, and CD86 of human dendritic cells increased in response to G. lucidum. In support of above mentioned adjuvant effect of G. lucidum, Ahmadi and Riazipour (14), demonstrated the up expression of CD40/CD86 on peripheral blood monocytes.

In conclusion, G. lucidum seems to be useful as an anti-inflammatory medicinal plant. Therefore, more preclinical and clinical studies are recommended to more elucidate its beneficial and risk effects in different conditions.

Authors' contributions

All the authors wrote the manuscript equally.

Conflict of interests

The authors declared no competing interests.

Ethical considerations

Ethical issues (including plagiarism, misconduct, data fabrication, falsification, double publication or submission, redundancy) have been completely observed by the authors.

Funding/Support

None.

References

1. Ikeda Y, Murakami A, Ohigashi H. Ursolic acid: an anti- and pro-inflammatory triterpenoid. Mol Nutr Food Res 2008;52:26–42.
2. Choy EHS, Panayi GS. Cytokine Pathways and Joint inflammation in rheumatoid arthritis. N Engl J Med 2001;344(12):907-16.
3. Guo LK, LUO SZ, Liao QH, Lai RG, Liu XL, Liu LJ, et al. Correlation study of auto-immune antibodies and rheumatoid arthritis patients of shen deficiency syndrome. Zhongguo Zhong Xi Yi Jie He Za Zhi 2013;33(5);619-22.
4. Aries MF, Vaissiere C, Fabre B, Charveron M, Gall Y. Avena rhealba inhibits arachidonic acid cascade, CPLA2 and COX expression in human keratinocytes. Interest in cutaneous inflammatory disorders. J Invest Dermatol 2003; 121 JID abstract 0046.
5. Skrovankova S, Misurcova L, Machu L. Antioxidant activity and protecting health effects of common medicinal plants. Adv Food Nutr Res 2012;67:75-139.
6. Recio MC, Andujar I, Rios JL. Anti-inflammatory agents from plants: progress and potential. Curr Med Chem 201219(14):2088-103.
7. Ding H, Zhou M, Zhang RP, Xu SL. Ganoderma lucidum extract protects dopaminergic neurons through inhibiting the production of inflammatory mediators by activated microglial. Sheng Li Xue Bao 2010;62(6):547-54.
8. Wang J, Zhang Y, Yuan Y, Yue T. Immunomodulatory of Selenium nano-particles decorated by sulfated Ganoderma Lucidum polysaccharides. Food Chem Toxicol 2014;14:120-3.
9. Joseph S, Sabulal B, George V, Antony KR, Janardhanan KK. Antitumor and anti-inflammatory activities of polysaccharides isolated from Ganoderma lucidum. Acta Pharm 2011; 61(3):335-42.
10. Lee SS, Wei YH, Chen CF, Wang SY, Chen KY. Anti tumor effects of Ganoderma lucidum . J Clin Med 1995; 6:1-12.
11. Wang J, Yuan Y, Yue T. Immunostimulatory activities of B-d-glucan from ganoderma lucidum. Carbohydr Polym 2014; 102: 47-54.
12. Chan WK, Lam DT, Law HK, Wong WT, Koo MW, Lau AS, *et al.* Ganoderma lucidum mycelium and spore extracts as natural adjuvants for immunotherapy. J Altern Complement Med 2005;11:1047-57.
13. Lin YL, Lee SS, Hou SM, Chiang BL. Polysaccharide purified from Ganoderma lucidum induces gene expression changes in human dendritic cells and promotes T helper 1 immune response in BALB/c Mice. Mol Pharmacol 2006;70:637–44.
14. Ahmadi K, Riazipour M. Ganoderma lucidum induces the expression of CD40/CD86 on peripheral B lood monocytes. Iran J Immunol 2009; 6(2): 87-91.