Potential anti-inflammation effects of lipophilic extract of Chlorella through a nitric oxide (NO)-dependent blocking pathway

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Key words: Inflammation, iNOs

Inflammation is a host response to tissue injuries and is characterized by movement of leukocytes. Bacterial lipopolysaccharide (LPS)-induced NO production in macrophage has been used as a simple screen method for anti-inflammatory components. Chlorella and its hydrophilic extracts have been shown to posses many physiological functions, including immune system improvement, hypoglycemic effects, lowering hyperlipidemic state in high fat-fed animals etc. However, lipophilic extract of Chlorella (LEC) is less appreciated in term of its physiological actions. Since Chlorella has been shown to improve immune function in animals, we then used the lipophilic extract to investigate the possibility of anti-inflammation activity.

Chlorella powder was extracted by dichloromethanol (1:20) three times and then evaporated by a rotary vaccum evaporatorat up to dryness. Indomethacin (0.25mM) was used as a positive control. RAW 246.7 cells were stimulated in the presence of LPS (1μg/ml) with or without the extracts. NO production was measured as nitrite (suing Griess reagent), iNOS protein and mRNA were also investigated using western blotting and RT-PCR.

In the concentration ranges that were devoid of cytotoxicty, LEC produced a dose dependent (between 0.25 and 0.0315mg/mL) inhibition on LPS-induced NO production. Protein and mRNA expressions of iNOS were also blocked by 0.25mg/mL of LEC. This study shows LEC effectively block LPS-induced NO production, is through blockage of expression of iNOS mRNA.