Inhibition of inflammatory nitric oxide production and epidermis damages by Saccharomycopsis Ferment Filtrate

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Abstract

BACKGROUND: Yeast extracts have been shown to perform anti-inflammatory and cytoprotective activities. However, the effects of yeast extracts on lipopolysaccharide (LPS)-induced nitric oxide (NO) production and epidermal damages are still unclear. OBJECTIVE: To investigate the effect of Saccharomycopsis Ferment Filtrate (SFF) on LPS-induced NO production in RAW264.7 macrophages and epidermal damages. METHOD: RAW264.7 cells are incubated with LPS (25 ng/mL) and different concentrations of SFF. The amount of NO production is detected by Griess reaction. Additionally, the expression of inducible nitric oxide synthase (iNOS) and heme oxygenase-1 (HO-1) are detected by Western blotting. Artificial epidermis is also used to mimic the in vivo condition to investigate the protective effects of SFF on LPS- or ultraviolet radiation (UVR)-induced damages by histology and electron microscopy. RESULTS: The results show that SFF addition inhibits LPS-induced NO production and iNOS protein expression in a concentration-dependent manner without notable cytotoxicity in RAW264.7 cells, and induction of HO-1 protein expression by SFF was observed. Interestingly, both HO-1 inducers, hemin and CoCl2, significantly attenuated LPS-induced NO production and iNOS protein expression. The addition of CoCl2 potentiated the inhibitory effect of SFF on LPS-induced NO production. It seems that HO-1 protein participates in SFF inhibition of LPS-induced NO production. Furthermore, SFF exhibits significant protective effect on LPS- or UVR-induced damages in the artificial epidermis via histological and electron microscopic observations. CONCLUSION: This study provided the first evidence to indicate the beneficial effects of SFF in preventing NO production in macrophages and damages in epidermis, respectively. It suggests that SFF possesses potential to be further developed.