

十字花科蔬菜衍生物對 Lipopolysaccharide 與 Interferon- γ 所誘導之一氧化氮的影響

Suppression of Lipopolysaccharide and Interferon- γ Induced Nitric Oxide Production by Cruciferous Vegetable Derivatives

中文摘要

本研究主要以小老鼠巨噬細胞 RAW 264.7 為實驗模式，探討十字花科蔬菜衍生物 β -phenylethyl isothiocyanate (PEITC)，indole-3-carbinol (I3C) 與 indolo[3,2-b]carbazole (ICZ) 對 lipopolysaccharide (LPS) 與 interferon- γ (IFN- γ) 所誘導之一氧化氮 (NO) 生成抑制的影響。結果指出，細胞於添加 PEITC ($5 \times 10^{-11} \sim 10^{-5}$ M) 與 I3C ($10^{-10} \sim 10^{-4}$ M) 後 24 小時，可抑制因 LPS 與 IFN- γ 所誘導 NO 生成的作用 ($p < 0.05$)，且 PEITC 在高濃度下呈現劑量關係；反之，ICZ 則不具顯著抑制作用。Western blot 與 RT-PCR 分析結果顯示，PEITC 與 I3C 可抑制 RAW 264.7 細胞中 LPS 與 IFN- γ 所誘導之一氧化氮合成酶 (inducible nitric oxide synthase, iNOS) protein 及 mRNA 之合成，且隨劑量增加 PEITC 抑制作用更為顯著。總言之，十字花科蔬菜衍生物 PEITC 與 I3C 可藉由抑制 iNOS 基因之轉錄作用，而抑制 mRNA 與 protein 表現，進而抑制 RAW 264.7 細胞中因 LPS 及 IFN- γ 所誘導 NO 之生成，而 ICZ 則不具明顯抑制 NO 生成的作用。

英文摘要

Glucosinolate derivatives, including β -phenylethyl isothiocyanate (PEITC), indole-3-carbinol (I3C) and indolo[3,2-b]carbazole (ICZ), are thought to be the bioactive components in cruciferous vegetables. Pieces of evidence indicate that certain biological effect evoked by cruciferous vegetable derivatives is closely associated with nitric oxide (NO). In the present study, we investigated the glucosinolate derivatives PEITC, I3C and ICZ on the inhibition of the nitric oxide production in lipopolysaccharide (LPS) plus Interferon- γ (IFN- γ) stimulated RAW 264.7 cells. The results showed that PEITC ($5 \times 10^{-11} \sim 10^{-5}$ M) or I3C ($10^{-10} \sim 10^{-4}$ M) could inhibit LPS plus IFN- γ induced nitric oxide production in RAW 264.7 cells after 24 h treatment ($p < 0.05$), and PEITC at high concentrations showed a dose-dependent response. Whereas ICZ showed no such dose effects. Western blot and RT-PCR analysis indicated that PEITC and I3C could inhibit LPS plus IFN- γ induced expression of inducible nitric oxide synthase (iNOS) protein and mRNA, respectively. Parallel to the NO production, PEITC had a significant dose-dependent inhibition on the iNOS protein and mRNA. In conclusion, cruciferous vegetable derivatives, PEITC and I3C could suppress LPS plus IFN- γ induced NO production by

inhibiting iNOS gene transcription. However, ICZ did not have the significant inhibitory effect.