十字花科蔬菜中　　衍生物對於解毒酵素　還原　的調節作用

Regulation of quinone reductase by indole derivatives from cruciferous vegetables

中文摘要

由於國人腫瘤發生率日益增高, 因此近幾年來研究的方向主要著眼於飲食成份與抑制腫瘤形成之間的相關性。 本實驗主要以小老鼠肝癌細胞株(Hepa1)及人類肝癌細胞株(HepG2)爲實驗模式, 探討十字花科蔬菜中　　衍生物 indole-3-carbinol (I3C)及 indolo[3,2-b]carbinol (ICZ)對於調節解毒酵素 QR 活性所扮演的角色以及調節之機轉。 結果顯示 ICZ 之前驅物質 I3C 在兩種肝癌細胞中皆不具有誘導 QR 之效果； 反之, ICZ 具有誘導 QR 酵素活性之作用,且誘導能力隨 ICZ 劑量增加而增加, 同時 Hepa1 細胞之表現較 HepG2 細胞敏感； 時間效應之結果顯示細胞於添加 ICZ 48 小時後有最大的誘導活性; RT-PCR 結果指出 ICZ 誘導 QR 酵素活性之機轉乃經由增加 QR 酵素之轉錄作用, 經由 QR mRNA 含量之增加而達到促進 QR 酵素之表現的效果。 總言之, I3C 對於 QR 活性於兩種細胞株中皆不具誘導作用, 反之 I3C 之酸性產物 ICZ 則具有調節 QR 酵素活性之作用。 除此之外, 於兩種肝癌細胞中以 Hepa1 細胞爲研究 Indole 誘導 QR 機制之較佳之實驗模型。

英文摘要

The indoles, such as indole-3-carbinol (I3C) and indolo[3,2-b]carbazole (ICZ), are thought to be the bioactive components in cruciferous vegetables. The induction of detoxification enzymes, such as quinone reductase (QR), is closely associated with the chemopreventive effect of various phytochemicals. The present study was aimed to study the role of I3C and ICZ on the regulation of QR in both murine (Hepa1) and human (HepG2) hepatoma cells. The results showed that ICZ is a potent QR inducer, but its parent compound, I3C, had no significant effect on the induction of QR activity. Dose-response experiments indicated that QR activity increased with increasing concentrations of ICZ in both cell lines, and the Hepa1 cells had a higher response than the HepG2 cells. RT-PCR analyses showed that the increased QR activity was due to the increased expression of QR mRNA. In conclusion, ICZ, the acidic polymer of I3C, may increase the expression of QR mRNA, and which then cause the increase of the QR activity. Besides, the Hepa1 cells seems to be a better model to study the ICZ induced QR expression than the HepG2 cells.