

Indole-3-Carbinol

Breast, colon and prostate cancer are among the most common neoplasms afflicting our population. Pancreatic and liver cancer are among the most deadly. The abstracts below speak for themselves. Indole-3-Carbinol may help to maintain normal health of breast, colon, prostate, pancreas and liver.

Related Abstracts

Breast

Nutr Cancer. 2004;48(1):84-94.

Inactivation of akt and NF-kappaB play important roles during indole-3-carbinol-induced apoptosis in breast cancer cells.

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We have previously shown that I3C induces apoptosis in breast cancer cells and found that the induction of apoptotic processes was partly mediated by dysregulation of anti- and pro-apoptotic molecules. However, the precise molecular mechanism(s) by which I3C induces apoptosis in breast cancer cells has not been fully elucidated. For the present study, we focused our investigation on important cell signaling molecules such as Akt and NF-kappaB during I3C-induced apoptosis in breast cancer cells. **We found that I3C induces apoptotic processes in MCF10A-derived cell lines with premalignant (DCIS.com) and malignant (MCF10CA1a) phenotypes but not in nontumorigenic parental MCF10A cells.** Immunoprecipitation, kinase assays, and Western blot analysis showed that I3C specifically inhibits Akt kinase activity and abrogates the EGF-induced activation of Akt in breast cancer cells. NF-kappaB DNA-binding analysis and transfection studies with Akt cDNA and NF-kappaB-Luc reporter constructs revealed that Akt gene transfection directly activates NF-kappaB, and this activation was completely abrogated by I3C treatment. In addition, I3C also abrogated the EGF-induced activation of NF-kappaB, which was mediated via the Akt signaling pathway. From these results, we conclude that there is a direct cross-talk between Akt and NF-kappaB pathways and that **the inactivation of Akt and NF-kappaB activity plays important roles in mediating I3C-induced apoptosis in breast cancer cells. These results also suggest that I3C may be a potential chemopreventive agent by virtue of its selective apoptosis-inducing ability in premalignant and malignant breast epithelial cells.**

Colon

Colorectal Dis. 2002 May;4(3):205-207.

Inhibition of proliferation of a colon cancer cell line by indole-3-

carbinol.

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Discipline of Surgical Science Faculty of Medicine and Health Sciences The University of Newcastle.

OBJECTIVE: To observe the effect of Indole-3-carbinol (I3C), a naturally occurring component of cruciferous vegetables, on cell proliferation of a colon cancer cell line. **METHODS:** Cell proliferation was measured using three different methods; ³H-thymidine incorporation, cell count and colourimetric assay. **RESULTS:** Each method of measurement revealed that **I3C significantly reduced cell proliferation at concentrations of > 0.1 mM.** **CONCLUSION:** **The present study demonstrates for the first time the capacity of indole-3-carbinol to inhibit cell proliferation of a colon cancer cell line.**

Prostate

ANZ J Surg. 2003 Mar;73(3):154-6.

The effect of indole-3-carbinol and sulforaphane on a prostate cancer cell line.

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BACKGROUND: Cruciferous vegetable consumption is inversely related to the incidence of prostate cancer. We examined the effect of indole-3-carbinol (I3C) and of sulforaphane (constituents of cruciferous vegetables) on cell proliferation of a PC-3 prostate cancer cell line, in order to observe if an inhibitory effect might be detected in vitro. **METHODS:** **PC-3 prostate cancer cells were cultured in 96-well microtitre plates. Indole-3-carbinol concentrations ranging from 0.1 mmol/L to 0.8 mmol/L or sulforaphane concentrations ranging from 0.01 mmol/L to 0.06 mmol/L were added to the wells.** Cell proliferation was measured by colorimetric assay and results were based on the mean value of triplicate experiments. Data are presented as medians and interquartile ranges and were analysed using the Mann-Whitney U-test. **RESULTS:** **Cell proliferation in PC-3 prostate cancer cells was significantly inhibited by I3C and sulforaphane at media concentrations of 0.2 mmol/L and 0.02 mmol/L, respectively.** **CONCLUSION:** **Both compounds inhibited the proliferation of prostate cancer cells in a dose-dependent manner.** These findings may help explain the observed protective effect of cruciferous vegetables in relation to prostate cancer.

Liver

Carcinogenesis. 1990 Aug;11(8):1403-6.

Inhibitory effect of sinigrin and indole-3-carbinol on diethylnitrosamine-induced hepatocarcinogenesis in male ACI/N rats.

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The modifying effects of sinigrin (Sin) and indole-3-carbinol (I3C) on the hepatocarcinogenesis induced by diethylnitrosamine (DEN) were investigated in male ACI/N rats. Rats were divided into six groups: group 1 was given DEN (40 p.p.m.) in the drinking water for 5 weeks, starting at 7 weeks of age; group 2 was treated with DEN and diet containing 1200 p.p.m. Sin; **group 3 received DEN and diet containing 1000 p.p.m. I3C**; group 4 was given Sin diet alone; group 5 was given I3C diet alone; and group 6 served as controls. The diet containing Sin or I3C was fed to the rats starting at 6 weeks of age until 1 week after the carcinogen exposure. **At termination of the experiment (week 29), the incidences of iron-excluding altered foci (11.22 +/- 3.22/cm²) and liver cell tumors (6/12, 50%) and the tumor multiplicity (0.9/rat) in rats of group 2 were significantly smaller than those of group 1 (foci incidence, 48.33 +/- 6.34/cm², tumor incidence, 10/10, 100%; multiplicity, 9.5/rat) (P less than 0.02). Similarly, the incidence of iron-excluding hepatocellular foci (17.65 +/- 4.67/cm²) and tumor multiplicity (2.4/rat) with a slight reduction of tumor incidence (9/12, 75%) in rats of group 3 were significantly lower than those of group 1 (P less than 0.001). There were no liver cell neoplasms in rats of groups 4, 5 and 6. Thus, Sin and I3C inhibited the hepatocarcinogenesis induced by DEN when they were administered concurrently with the carcinogen.**

Pancreas

Anticancer Res. 2004 Jan-Feb;24(1):133-7.

Modulation of the constitutive activated STAT3 transcription factor in pancreatic cancer prevention: effects of indole-3-carbinol (I3C) and genistein.

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BACKGROUND: The signal transducer and activator of transcription 3 (STAT3) is a latent transcription factor required in proliferation and differentiation. STAT3 is activated constitutively in a number of cancers. **MATERIALS AND METHODS:** This study was conducted to assess the possible involvement of STAT3 activation in pancreatic cancer and the potential for this pathway as a target in chemopreventive strategy. **RESULTS: STAT3 was shown for the first time to be constitutively activated in human pancreatic carcinoma specimens but not in normal pancreatic tissues.** Constitutively activated **STAT3** was also

found in pancreatic tumor cell lines (Panc-1 and MIA PaCa-2) which **could be modulated by indole-3-carbinol (13C) and genistein. At concentrations higher than 10 microM, STAT3 constitutive activation is inhibited by both agents. Induction of apoptosis by 13C was also demonstrated.**

CONCLUSION: Given its critical role in tumorigenesis, our results suggest that STAT3 activation provides an important and appropriate target for chemoprevention in pancreatic cancer treatment.