

Carotenoids enhance gap junctional communication and inhibit lipid peroxidation in C3H/10T1/2 cells: relationship to their cancer chemopreventive action.

Zhang LX, Cooney RV, Bertram JS.

Cancer Research Center of Hawaii, University of Hawaii, Honolulu 96813.

We have previously demonstrated that diverse carotenoids inhibit chemically induced neoplastic transformation in 10T1/2 cells. To address their mechanism of action, the effects of six diverse carotenoids, with or without provitamin A activity, on gap junctional communication and lipid peroxidation have been investigated. beta-Carotene, canthaxanthin, lutein, lycopene and alpha-carotene increased gap junctional intercellular communication in a dose-dependent manner in the above order of potency, whereas m-bixin was inactive at concentrations up to 10^{-5} M. alpha-Tocopherol, a potent chain-breaking antioxidant, caused a marginal enhancement of junctional communication. The enhancement of junctional communication by diverse carotenoids showed a strong statistical correlation with their previously determined ability to inhibit methylcholanthrene-induced neoplastic transformation ($r = -0.75$). All carotenoids tested inhibited lipid peroxidation, but with differing potencies. alpha-Tocopherol was the most active inhibitor followed by m-bixin. The capacity of carotenoids or alpha-tocopherol to inhibit lipid peroxidation was neither consistent with their ability to inhibit neoplastic transformation ($r = 0.30$) nor to increase junctional communication ($r = 0.12$). Since junctional communication appears to play an important role in cell growth control and carcinogenesis, we propose that in this system carotenoid-enhanced intercellular communication provides a mechanistic basis for the cancer chemopreventive action of carotenoids. These data also imply that carotenoids function in a manner analogous to retinoids in the 10T1/2 assay system. Interestingly this activity appears independent of their provitamin A status.

PMID: 1934296 [PubMed - indexed for MEDLINE]

Beta-carotene, cantaxantina, luteina, licopene e alfa-tocoferolo aumentano il gap di comunicazione giunzionale intercellulare in modalità dose dipendente.

Siccome la comunicazione giunzionale intercellulare sembra avere un ruolo importante nel controllo della crescita cellulare e nella carcinogenesi, noi proponiamo che un miglioramento della comunicazione intracellulare, favorita da livelli più elevati di carotenoidi, produce un meccanismo di base per spiegare l'azione chemiopreventiva dei carotenoidi.