類胡蘿蔔素對 DMBA 誘發雄性倉鼠口腔癌之預防作用

The Preventive Effect of Carotenoids on DMBA Induced Oral Carcinoma in Male Hamsters

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摘要

本研究係以倉鼠口腔頰囊（hamster cheek pouch）爲實驗模式，探討單獨塗抹維生素 E（0.5%α-tocopherol in mineral oil）和類胡蘿蔔素（0.5%β-胡蘿蔔素、蕃茄紅素、黃體素 in mineral oil）或混合使用（各 0.125%）時對口腔癌症之預防效果。實驗組共分 6 組以 DMBA（9, 10-dimethyl-1,2-benz[a]anthracene，0.5% in mineral oil）爲誘癌物質，在 14 週實驗期間與類胡蘿蔔素和維生素 E 隔日交互塗抹於倉鼠口頰右側，並與單獨塗抹 DMBA 之對照組比較。實驗結果顯示，DMBA 致癌物所誘導出的腫瘤病灶包含乳突瘤、鱗狀細胞癌。本實驗顯示不同癌症之發生率如：乳突瘤的發生以對照組、混合組和蕃茄紅素組較低；原位癌的發生以混合組和蕃茄紅素組較低，而鱗狀細胞癌的發生以混合組和蕃茄紅素組較低，其次爲維生素 E 組。若以個體產生之腫瘤負荷（tumor burden）的數量及平均體積（mm3）而言，混合組的預防效果最好，其餘依序爲維生素 E、蕃茄紅素、β-胡蘿蔔素、黃體素等組。綜觀本實驗研究結果得知，維生素 E 和類胡蘿蔔素對口腔癌症的發生皆有明顯的抑制效果，混合投與則有協同抑癌作用；而不同類胡蘿蔔對抑制誘發腫瘤負荷的數量和平均體積（mm3）之能力略有差異。

Abstract

This study was designed to evaluate the oral cancer prevention ability and safety of single or combined carotenoids, including β-carotene, lycopene, lutein, and α-tocopherol (0.5% in mineral oil) in a hamster cheek pouch model. Forty-six hamsters were divided into six experimental groups and treated with 0.5% experimental agents. Over a 14-week experimental period, the tested groups received either DMBA or antioxidant mineral oil solutions three times per week on alternate days. At the end of the experiment, the pouches of each group were sampled, routinely processed for paraffin sections, and evaluated by a senior pathologist. The results indicated that the control group presented a 75% incidence of tumors (papilloma and squamous cell carcinoma), with ulceration on the buccal inner surface. The common phenotype of the neoplasia induced by DMBA included papilloma

and squamous cell carcinoma. In the carotenoid chemoprevention tests, the carotenoid and vitamin E mixture group presented the most effective oral cancer prevention. The lutein group demonstrated less prevention ability. The other groups presented inconsistent results for oral carcinoma prevention. According to the inhibitory number and average volume (mm3) of tumors by the treated carotenoids, the results indicated that the carotenoids and vitamin mixture group represented the most effective prevention, followed by α-tocopherol, lycopene, β-carotene, and lutein. The four different antioxidants (carotenoids & vitamin E) significantly inhibited the incidence of oral cancer when administrated alone as well in mixtures of antioxidants. The ability of different antioxidants to inhibit the amount and average volume of the induced tumors was different. This may be because the carotenoids and α-tocopherol inhibited different developmental stages of cancer