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The Effect of Carrot Juice Supplementation on Plasma Antioxidant Status and Lymphocyte DNA Damage in Korean Male Smokers.

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Cigarette smoke is a complex mixture of thousands of compounds, many of which are known or suspected human carcinogens. A preventive effect of the consumption of vegetables or fruits on various types of cancer has been confirmed from numerous studies. Carrot contains β -carotene with antioxidant properties that are believed to be protective against various diseases. One of the mechanisms behind the protective role may be by reducing the release of free radical and thereby defending the cellular DNA from oxidative damage. The purpose of this study was to evaluate whether a daily regimen of carrot juice supplementation to smokers can be protective against endogenous lymphocyte DNA damage and the effect of tocopherol on plasma antioxidant levels. Eighteen smokers aged 24-51 were given 300ml of freshly squeezed carrot juice everyday for 4 weeks in addition to their normal diet. Lymphocyte DNA damage was determined using the COMET assay under alkaline condition and the damage was quantified by measuring tail length(TL), tail moment(TM), and percent DNA in tail. Plasma tocopherol levels were determined using HPLC. There was a significant decrease in lymphocyte DNA damage in all three measurements; TL(0wk: $71.0 \pm 2.77 \mu\text{m}$, 4wks: $55.54 \pm 1.08 \mu\text{m}$, $P=0.000$), TM(0wk: 17.70 ± 1.11 , 4wks: 11.67 ± 0.47 , $P=0.000$) and percent DNA in tail(0wk: 23.86 ± 0.71 , 4wks: 19.95 ± 0.52 , $P=0.000$). Plasma level of α -tocopherol was significantly increased after 4 weeks of carrot juice supplementation, but plasma level of γ -tocopherol was not. This result suggest that the carrot juice, high in β -carotene, exert a beneficial effect on cytogenetic DNA damage and may be acting on sparing body tocopherol pool.

Keyword : carrot juice, DNA damage, comet assay, tocopherol