

Information

Relationship between antioxidant vitamin intake and DNA oxidative damage in young female athletes

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ABSTRACT

【Objective】

To estimate the antioxidant vitamins intake requirement in young female athletes, the present investigation examined the relationship between antioxidant vitamin intake and lymphocyte oxidative damage.

【Design】

Antioxidant vitamin intake and plasma antioxidant vitamin concentrations were evaluated in 18 female high school athletes (Exercise group) and 10 untrained female university students (Control group). Total antioxidant activity in plasma and lymphocyte chromosomal damage were determined using FRAP assay and cytokinesis-block micronucleus assay (CBMN assay), respectively.

【Results】

The plasma β -carotene concentration was significantly lower in the Exercise group than the Control group, although no significant difference in antioxidant vitamin intake was observed between the two groups. Total antioxidant activity was significantly lower in the Exercise group than the Control group ($p < 0.001$), and significantly correlated with plasma β -carotene concentrations. In the Exercise group, micronucleus frequency, an index of chromosomal damage measured with CBMN assay was significantly higher than that observed in the Control group ($p < 0.05$). Furthermore, there was a significant inverse correlation between β -carotene and micronucleus frequency ($p < 0.05$).

【Conclusion】

Physically active young female athletes have a lower plasma β -carotene concentration, resulting in diminished total antioxidant activity and elevated chromosomal damage. The β -carotene intake requirement was estimated to be approximately 2000 $\mu\text{g}/\text{day}$ for young female athletes to maintain antioxidant activity and decrease chromosomal damage.