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Effect of Antioxidant Intake on Sperm Chromatin Stability in Healthy Nonsmoking Men

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Oxidative stress is detrimental to sperm function and a significant factor in the etiology of male infertility. This report examines the association between dietary and supplementary intake of the antioxidants vitamin C, vitamin E, and beta-carotene and sperm chromatin integrity. Eighty-seven healthy male volunteers donated semen samples, completed food-frequency questionnaires, and provided information about their sociodemographic characteristics, medical and reproductive histories, and lifestyle habits. Sperm chromatin integrity was measured using the DNA fragmentation index (DFI) and related parameters, obtained from the sperm chromatin structure assay (SCSA®). SCSA measures the susceptibility of sperm DNA to acid-induced denaturation in situ. After adjusting for age and duration of abstinence, there was no dose-response association between any DFI outcome and any antioxidant intake measure. Non-dose-related associations were found between beta-carotene intake and both the standard deviation of DFI (SD DFI) and the percent of immature sperm. Participants with moderate, but not high, beta-carotene intake had an increase in SD DFI compared with participants with low intake (adjusted means 206.7 and 180.5, respectively; $P = .03$), as well as an increase in the percentage of immature sperm (adjusted means 6.9% and 5.0%, respectively; $P = .04$). If antioxidant intake in the range studied is indeed beneficial for fertility in healthy men, it does not appear to be mediated through the integrity of sperm chromatin. The results of this study do not preclude possible beneficial effects of high antioxidant intake on sperm chromatin integrity for men with fertility problems.

Key words: Fertility, spermatozoa, nutrition, oxidative stress, DNA fragmentation

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