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Can Dietary Antioxidants Reduce the Incidence of Brain Tumors?

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Abstract

The incidence of brain tumor and other types of cancer are markedly increased during the last few decades. There are many etiological and environmental factors involved in the initiation of different types of cancers including brain tumors. Mutations in tumor suppressor gene p53 and its expression are associated with shorter survival and higher mortality rate of patients with brain tumors. Another factor, N-nitrosamines have received much attention as a potential risk factor for brain tumor. These compounds are potent carcinogens and occur widely in the environment, and also can be formed endogenously in the stomach from the interaction of ingested nitrate or nitrite with secondary amines. Free radicals are another etiological factor of brain tumor and are removed by cellular antioxidants in the human body. Brain tissue is vulnerable to the damaging effects of free radicals as a result of low antioxidant levels. Interestingly, there is an inverse correlation between the total antioxidant levels and oxidative DNA damage in transitional meningioma compared with normal brain tissues. Also, an inverse relationship between antioxidant levels and grades of malignancy has been found after histopathological examination of brain tumors. Moreover, high intake of vitamin E is correlated with greater survival for all patients diagnosed as Grade III malignant glioma. Dietary supplementation with antioxidants [e.g. vitamins C & E] was found to reduce the incidence of brain tumors in children whose mothers took these vitamins throughout pregnancy. On the other hand, decreases in antioxidant levels were correlated with the severity of malignancy of brain tumors, and also with accumulation of considerable amounts of oxidative stress products including free radicals which damage this tissue. The mechanisms of protection of these antioxidants against brain tumors might be due to inhibition of the nitrosation process, decreasing of tumor necrotic factor, scavenging of free radicals, inhibition of telomerase activity which facilitates telomere attrition. It is concluded that administration of antioxidants could reduce the incidence of brain tumors and probably other types of cancer.

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