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The Role of Dietary Patterns, Nutrient Intake, and Immune Modulation in Glioma Risk and Management

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Abstract

Glioma is the most common primary brain tumor, accounting for approximately 70% of adult brain malignancies. Although this cancer is relatively rare, it causes significant mortality. Among environmental risk factors, frequent exposure to ionizing radiation has significantly increased the risk of glioma. Special attention has been paid to diet and dietary factors in recent decades. Although the role of diet in some cancers has been confirmed in previous studies, the link between dietary intake, the immune system, and glioma is still questionable. In the current review, a higher dietary intake of vitamin C, folate, vitamin A, phytochemicals, and calcium might be associated with immune system activation and reduced risk of glioma. In addition, adherence to a high-carbohydrate diet is associated with a high risk of glioma. Despite the evidence, limited data are available for some important fatty acids, B vitamins, protein, vitamins D, E, K, magnesium, copper, zinc, iron, and selenium, and some healthy dietary patterns regarding glioma risk. In terms of clinical outcomes, the ketogenic diet might play a role in the management of glioma and might be used as an adjunctive therapy in these patients. Although observational studies have shown that a higher dietary intake of folate, vitamin C, calcium, and vitamin A was associated with the activation of the immune system and reduced risk of glioma, the complex interactions between diet, immune system, and glioma on the clinical outcomes of patients with glioma have not been investigated. Therefore, further studies are needed in this regard.