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Application of Quercetin and its Novel Formulations in the Treatment of Malignancies of Central Nervous System: An Updated Review of Current Evidence Based on Molecular Mechanisms

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Abstract

Quercetin, a naturally occurring polyphenolic compound found in abundance in vegetables and fruits, has emerged as a compelling subject of study in cancer treatment. This comprehensive review delves into the significance and originality of quercetin's multifaceted mechanisms of action, with a particular focus on its application in various brain tumors such as glioblastoma, glioma, neuroblastoma, astrocytoma, and medulloblastoma. This review scrutinizes the distinctive facets of quercetin's anti-cancer properties, highlighting its capacity to modulate intricate signaling pathways, trigger apoptosis, impede cell migration, and enhance radiosensitivity in brain tumor cells. Significantly, it synthesizes recent research findings, providing insights into potential structure-activity relationships that hold promise for developing novel quercetin derivatives with heightened effectiveness. By unraveling the unique attributes of quercetin's anti-brain tumor effects and exploring its untapped potential in combination therapies, this review contributes to a deeper comprehension of quercetin's role as a prospective candidate for advancing innovative treatments for brain cancer.

Keywords: Apoptosis; Brain tumors; Cancer; Glioblastoma; Natural compound; Quercetin.

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