

Selenium and Brain Tumors

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The evidence shows that selenocysteine (one of the most prevalent among the 25 selenoproteins encoded by the human genome) exerts a regulatory role in the growth of cancer cells, triggering apoptosis mediated by oxidative damage,¹ attacking the topoisomerase enzymes and the microtubular apparatus² and altering the expression of metalloproteinases in the matrix.³ Spengler et al,² in their study published in 2019, showed that selenoproteins have a great capacity to interact with anticancer drugs, especially vincristine, affecting, among other targets, the formation of microtubules and enzymatic action of topoisomerases blocking tumor cell growth. Clark et al,⁴ in a randomized, double-blind, multicenter, placebo-controlled study, proposed to determine whether supplementation with selenium decreases the incidence of cancer. They established, as a primary point, the incidence of squamous cell carcinoma in conjunction with the administration of selenium and as a secondary endpoint, the incidence and total mortality of cancer. From this study, we highlight that after 8 years of follow-up, it was demonstrated that selenium, although it does not protect specifically against the development of squamous cell carcinoma, does exert a protective

effect against the incidence and mortality from cancer in general.⁴

Malignant gliomas (WHO Grade IV) represent the most common tumor in the brain with a survival between 12 and 16 months^{1,3} and are considered as one of the most highly invasive and chemotherapy-resistant tumors. Search has been encouraged for new alternatives with low side effects,¹ that concomitant with chemical treatment, provide higher quality and life expectancy.² The current literature suggest that selenium and its compounds can serve as a promising alternative as add-on to chemotherapy in the treatment of these cases. Also, it can help to check the progression of the disease and could be associated with substantial reduction in short- and long-term side effects of chemotherapy agents and thus can enhance the quality of life.

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