

Modulation of uPA, MMPs and their inhibitors by a novel nutrient mixture in human glioblastoma cell lines

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Glioblastoma is a highly malignant primary brain cancer, with median survival of approximately 14.6 months with treatment. The conventional medical treatment uses surgery, chemotherapy, and radiation, yet aims only for improvement in quality of life of the patient.

Glioblastoma typically has several finger-like tentacle growths. Therefore, it becomes challenging for a complete tumor removal by surgery. In addition, this aggressive cancer spreads very rapidly within the brain tissue by degrading the surrounding normal cells by collagen digesting enzymes--matrix metalloproteinase (MMP) and urokinase plasminogen activator (uPA).

We used a specific combination of micronutrients containing vitamin C, lysine, proline, green tea extract, and others, to study their effects on three different types of glioblastoma cells. Our objective of this study was to evaluate the effect of this micronutrient combination on the activity of uPA, MMP and their tissue inhibitors (TIMPs). The results demonstrated that the micronutrients were completely able to block the secretion of both, MMP and uPA, in all three types of glioblastoma cell lines. At the same time, the micronutrients also increased secretion of TIMPs, thereby attacking all the primary mechanisms responsible for the metastasis of gliomas and glioblastomas.