**The Role of Glutamine Metabolism in Uveal Melanoma Tumour Growth**

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**Background and aims.** Uveal melanoma (UM) is the most common primary intraocular malignancy, characterized by a high metastatic potential and poor prognosis. Currently, there are few pharmacological treatments available for UM, and no validated therapeutic targets have been identified. Metabolic reprogramming is widely recognized as a hallmark of cancer, with glutamine metabolism playing a key role in supporting tumour growth. However, the role of glutamine metabolism in UM remains poorly understood. This study investigates how the disruption of glutamine metabolism affects UM tumour growth.

**Methods.** A panel of human UM cell lines with diverse genetic profiles was cultured under glutamine-deprived conditions or treated with glutamine metabolism inhibitors. Cell viability was assessed using MTT assay, and cell proliferation was evaluated through growth curves and doubling time analysis. Cytotoxicity was measured using LDH assay, while cell cycle distribution was analysed via flow cytometry. Reactive oxygen species (ROS) and intracellular ATP levels were measured to assess oxidative stress and energy shifts resulting from glutamine metabolism disruption.

**Results.** Two UM cell lines exhibited particular susceptibility to the disruption of glutamine metabolism, showing reduced cell viability and proliferation. Similarly, treatment with glutamine metabolism inhibitors resulted in a modest decrease in cell viability. Glutamine deprivation also led to a reduction in intracellular ATP levels, although ROS levels remained unchanged.

**Conclusion.** This study suggests that a selective subset of UM tumours is sensitive to the disruption of glutamine metabolism, likely due to its impact on cellular energy production rather than redox balance. These findings highlight the previously unrecognized metabolic heterogeneity of this aggressive cancer and lay the groundwork for future mechanistic studies aimed at identifying the molecular determinants underlying differential glutamine dependence.

**References:**

1. Li X, Peng X, Li Y, Wei S, He G, Liu J, et al. Glutamine addiction in tumor cell: oncogene regulation and clinical treatment. Cell Commun Signal. 2024;22(1):12.