Using the Ketone Body Beta-hydroxybutyrate as a Radiosensitizer for Malignant Glioma Cells

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Glioblastoma (GB) is the most common and aggressive primary malignant brain tumor. Despite aggressive treatment, including maximum surgical resection followed by both chemotherapy and radiotherapy, median survival for patients remains at approximately 1.5 years after diagnosis. Even with this dismal prognosis, there has been a scarcity of novel therapeutic approaches developed in recent years. However, one novel approach being considered is the adjuvant use of high fat ketogenic diets (KD) to potentiate the standard of care. Recent preclinical studies examining the potential of the KD as an adjuvant therapy for the treatment of malignant gliomas demonstrated that animals fed a KD and treated with chemotherapy or radiation survived significantly longer than those treated with chemotherapy or radiation and fed a standard diet. One of the key results of the KD is an increased production of the ketone body, β-hydroxybutyrate (BHB), which is a water-soluble fatty acid that serves as an alternative energy source to glucose in times of starvation. Though the KD has demonstrated promising effects in preclinical radiotherapy studies, the molecular basis of its therapeutic benefits has yet to be elucidated. With an understanding of how BHB is able to exploit the aberrant metabolism of glioma cells, we may not only be able to more effectively utilize the KD in the clinic, but we would gain mechanistic insights into the KD.

Awards Won:

Third Award of $1,000