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## Is the restricted ketogenic diet a viable alternative to the standard of care for managing malignant brain cancer?

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### Abstract

Malignant brain cancer persists as a major disease of morbidity and mortality. The failure to recognize brain cancer as a disease of energy metabolism has contributed in large part to the failure in management. As long as brain tumor cells have access to glucose and glutamine, the disease will progress. The current standard of care provides brain tumors with access to glucose and glutamine. The high fat low carbohydrate ketogenic diet (KD) will target glucose availability and possibly that of glutamine when administered in carefully restricted amounts to reduce total caloric intake and circulating levels of glucose. The restricted KD (RKD) targets major signaling pathways associated with glucose and glutamine metabolism including the IGF-1/PI3K/Akt/Hif pathway. The RKD is anti-angiogenic, anti-invasive, anti-inflammatory, and pro-apoptotic when evaluated in mice with malignant brain cancer. The therapeutic efficacy of the restricted KD can be enhanced when combined with drugs that also target glucose and glutamine. Therapeutic efficacy of the RKD was also seen against malignant gliomas in human case reports. Hence, the RKD can be an effective non-toxic therapeutic option to the current standard of care for inhibiting the growth and invasive properties of malignant brain cancer.

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