

CPT1

The importance of [fatty acid oxidation](#) (FAO) in the bioenergetics of [glioblastoma](#) (GBM) is being realized. Etomoxir (ETO), a [carnitine](#) palmitoyltransferase 1 ([CPT1](#)) [inhibitor](#) exerts cytotoxic effects in GBM, which involve interrupting the FAO pathway.

Shim et al. hypothesized that FAO inhibition could affect the outcomes of current standard [temozolomide](#) (TMZ) [chemotherapy](#) against GBM.

The FAO-related gene expression was compared between GBM and the tumor-free cortex. Using four different GBM [tumorspheres](#) (TSs), the effects of ETO and/or TMZ were analyzed on [cell viability](#), [Citric acid cycle](#) intermediates, and [adenosine triphosphate](#) (ATP) production to assess metabolic changes. Alterations in tumor stemness, invasiveness, and associated [transcriptional](#) changes were also measured. A [mouse orthotopic xenograft](#) model was used to elucidate the combinatory effect of TMZ and ETO.

GBM tissues exhibited overexpression of FAO-related genes, especially [CPT1A](#), compared to the tumor-free cortex. The combined use of ETO and TMZ further inhibited the [Citric acid cycle](#) and [ATP](#) production more than single uses. This combination treatment showed superior suppression effects compared to treatment with individual agents on the [viability](#), [stemness](#), and [invasiveness](#) of GBM TSs, as well as better [downregulation](#) of FAO-related [gene expression](#). The results of the [in vivo](#) study showed prolonged [survival](#) outcomes in the combination treatment group.

ETO, an FAO inhibitor, causes a lethal [energy](#) reduction in the GBM TSs. When used in combination with TMZ, ETO effectively reduces GBM cell [stemness](#) and [invasiveness](#) and further improves survival. These results suggest a potential novel [glioblastoma treatment](#) option ¹⁾.

¹⁾

Shim JK, Choi S, Yoon SJ, Choi RJ, Park J, Lee EH, Cho HJ, Lee S, Teo WY, Moon JH, Kim HS, Kim EH, Cheong JH, Chang JH, Yook JI, Kang SG. [Etomoxir](#), a carnitine palmitoyltransferase 1 inhibitor, combined with [temozolomide](#) reduces [stemness](#) and [invasiveness](#) in patient-derived [glioblastoma tumorspheres](#). Cancer Cell Int. 2022 Oct 11;22(1):309. doi: 10.1186/s12935-022-02731-7. PMID: 36221088.

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