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Epilepsy in glioblastoma multiforme: correlation with glutamine synthetase levels.

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Purpose The hypothesis addressed by this study is that a glutamine synthetase (GS) deficiency in neoplastic astrocytes is a possible molecular basis associated with seizure generation in glioblastoma multiforme (GBM). **Methods** Quantitative Western blot analysis of GS was performed in 20 individuals operated for malignant glioma. **Results** The levels of GS in patients with GBM and epilepsy were significantly lower (range 0.04-1.15; mean 0.35 +/- 0.36; median 0.25) than in non-epileptic GBM individuals (range 0.78-3.97; mean 1.64 +/- 0.99; median 1.25; P = 0.002). No relationship has been found between histological features (i.e. necrosis, gliosis, stroma, inflammatory cells, giant cells, and haemosiderine) and GS expression or epilepsy. **Discussion** Even though the epileptogenesis in glioma is multifactorial, it is conceivable that a down-regulation of GS may have an important pro-epileptogenic role in GBM, through the slowing of glutamate-glutamine cycle. This study suggests that seizures in GBM are coupled with a highly localized enzyme deficiency. The manipulation of GS activity might constitute a novel principle for inhibiting seizures in patients with glioma epilepsy.

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