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 Journal of Neurochemistry 

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Cannabinoid receptors in human astroglial tumors

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Abstract

In animal models, cannabinoids are reported to inhibit the growth of tumors, including gliomas. These effects have been claimed to be mediated via cannabinoid receptors 1 and 2 (CB1, CB2). To elucidate a possible relevance for treatment of human gliomas, we investigated receptor subtype expression in surgical material of solid human astrocytomas, gliomas and cultivated glioma cells by quantitative reverse transcriptase polymerase chain reaction, western blot and immunohistochemistry and assayed their functionality. In normal brain, cultivated glioma cells and solid tumors, CB1 mRNA was expressed to a much greater extent than CB2, which in some samples was even undetectable. Expression of both receptor subtypes was unrelated to malignancy, varied between patients, and was not significantly increased in relation to normal brain tissues. In normal brain, CB1 protein was localized on astroglial and other cell types; in gliomas, it was found on astroglial/glioma cells. CB2 protein was detected on microglial cells/macrophages but rarely on astroglial cells. Functionally, CB1 receptor agonists reduced elevated cyclic AMP levels and slightly reduced proliferation of glioma cells *in vitro*, but did not induce apoptosis. We conclude that cannabinoid therapy of human gliomas targets not only receptors on tumor, but also on other cell types. Therefore, complex and potential side-effects should be considered carefully.

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