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# Predominant CB2 receptor expression in endothelial cells of glioblastoma in humans.

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### Abstract

**BACKGROUND AND OBJECTIVES:** The most abundant malignant brain tumor in human is glioblastoma and patients with this type of tumor have a poor prognosis with high mortality. Glioblastoma are characterized particularly by fast growth and a dependence on blood vessel formation for survival. Cannabinoids (CBs) inhibit tumor growth by inducing apoptosis of tumor cells and impairing tumor angiogenesis. The distribution of CB1 and CB2 receptors in glioblastoma and associated endothelial vessels is still unknown.

**METHODS:** Tissue samples were collected consecutively after neurosurgery of 19 patients suspected glioblastoma and examined immunohistochemically for CB1 and CB2 receptor expression. Vessel endothelial cells of the sections were immunocytochemically identified by using a primary antibody against PECAM-1. Double labelling was performed for CB receptors and endothelial cells of the vessels by DAPI staining.

**RESULTS:** In endothelia of control tissue, about 24% and 45% of the cells were positive for CB1 and CB2 receptors. In glioblastoma endothelial cells, CB1 and CB2 receptors were present in about 38% and 54% of the cells respectively. In comparison to CB1, an elevated CB2 receptor expression was identified in glioblastoma.

**CONCLUSIONS:** The abundant expression and distribution of CB2 receptors in glioblastoma and particularly endothelial cells of glioblastoma indicate that impaired tumor growth in presence of CB may be associated with CB2 activation. Selective CB2 agonists might become important targets attenuating vascular endothelial growth factor (VEGF) signalling and thereby diminishing neoangiogenesis and glioblastoma growth.

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