

IDH-dependent Effects of *Boswellia Sacra* in Glioma Cells

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ABSTRACT

Glioblastoma is an aggressive and lethal brain tumor with limited treatment options. The current standard therapy includes surgical resection followed by radiotherapy and temozolomide, which offers only a modest survival benefit. A key molecular marker in gliomas is the IDH1 mutation, commonly Arg132His, which is linked to better prognosis compared to IDH wild-type tumors [1]. This mutation triggers metabolic reprogramming and oxidative stress due to NADPH depletion, impairing antioxidant defenses like glutathione recycling. Consequently, reactive oxygen species (ROS) accumulate, partly driven by the production of the oncometabolite R-2-hydroxyglutarate (R-2-HG) [2]. While this increases tumor vulnerability to oxidative damage, R-2-HG also promotes tumor progression and alters the epigenetic and metabolic microenvironment. Given this altered redox balance in IDH-mutant gliomas, exploring cellular responses to oxidative stress becomes highly relevant. Nutraceuticals, known for their antioxidants and anti-inflammatory properties, are promising tools in this context. Our study investigates the effects of *Boswellia sacra* resin, a natural compound with strong anti-inflammatory potential, on glioma cells. Boswellic acids have shown efficacy in reducing oxidative stress and inhibiting proliferation of glioblastoma stem-like cells [3]. Preliminary results indicate that *Boswellia sacra* reduces cell viability, with IDH1-mutant cells showing greater sensitivity, even at lower concentration when combined with temozolomide (1 µg/ml). Further studies will explore cell survival and molecular pathways, focusing on IDH1 status and O6-methylguanine-DNA methyltransferase (MGMT) expression.

