Journal article

Köritzer, J; Boxhammer, V; Schäfer, A; Shimizu, T; Klämpfl, TG; Li, YF; Welz, C; Schwenk-Zieger, S; Morfill, GE; Zimmermann, JL; Schlegel, J

Restoration of sensitivity in chemo-resistant glioma cells by cold atmospheric plasma.

Glioblastoma (GBM) is the most common and aggressive brain tumor in adults. Despite multimodal treatments including surgery, chemotherapy and radiotherapy the prognosis remains poor and relapse occurs regularly. The alkylating agent temozolomide (TMZ) has been shown to improve the overall survival in patients with malignant gliomas, especially in tumors with methylated promoter of the O6-methylguanine-DN A-methyltransferase (MGMT) gene. However, intrinsic and acquired resistance towards TMZ makes it crucial to find new therapeutic strategies aimed at improving the prognosis of patients suffering from malignant gliomas. Cold atmospheric plasma is a new auspicious candidate in cancer treatment. In the present study we demonstrate the anti-cancer properties of different dosages of cold atmospheric plasma (CAP) both in TMZ-sensitive and TMZ-resistant cells by proliferation assay, immunoblotting, cell cycle analysis, and clonogenicity assay. Importantly, CAP treatment restored the responsiveness of resistant glioma cells towards TMZ therapy. Concomitant treatment with CAP and TMZ led to inhibition of cell growth and cell cycle arrest, thus CAP might be a promising candidate for combination therapy especially for patients suffering from GBMs showing an unfavorable MGMT status and TMZ resistance.