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Transcranial photosensitizer-free laser treatment of glioblastoma in rat brain

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Glioblastoma is the most lethal form of brain cancer with very limited treatment options and a poor prognosis. In this rat study, we have shown that glioblastoma (GBM) growth can be suppressed by photosensitizer-free laser therapy using a 1267 nm quantum dot laser diode. This wavelength, which is strongly absorbed by oxygen, is capable of converting triplet oxygen into singlet oxygen. Application of 1267 nm laser irradiation over a 4-week course with a total dose of 12.7 kJ/cm^2 reliably suppresses GBM growth and increases survival from 34 to 64%.

In this in vivo and ex vivo study in rats and on C6 glioma cells in in vitro experiments, we demonstrated that a course of non-invasive transcranial laser therapy without photosensitizer can significantly suppress GBM growth in the rat brain and positively affect survival through laser-induced oxidative stress, induction of cancer cell apoptosis, reduction of GBM cell proliferation and reduction of intracranial pressure by stimulating lymphatic drainage and cleansing functions.

Key words: glioblastoma, phototherapy, lymphatic system.

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