

UNEXPECTED EFFECTS OF PHOTOTHERAPY AND PROTON THERAPY ON DIFFERENT MEDULLOBLASTOMA SUBGROUPS

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Photon therapy has been the reference treatment of most cancers for many years. Proton therapy, which allows higher precision of tumor targeting while reducing side effects and radio-induced cancers, is now emerging. In head and neck squamous cell carcinoma (HNSCC), we previously measured that induction of VEGFC (the main lymphangiogenesis factor) by irradiation was reduced under proton irradiation. This was pleading for a lower aggressiveness of HNSCC cells under proton irradiation than under photon irradiation. To demonstrate these differential biological effects of proton therapy and photon therapy on brain and pediatric tumors, we worked with medulloblastoma (MB), the main high-grade brain tumor in children. Using two cell lines derived from two MB subgroups of opposite aggressiveness and prognosis, we showed that photon irradiation, the current reference treatment of MB, indeed resulted in an increase in VEGFC production, but in a decrease in cell aggressiveness. Parallel proton and photon irradiation of MB cells demonstrated that X-rays were more damaging to the cells than proton beam. Unexpectedly, these results demonstrate that, in MB, X-rays lower cell aggressiveness via a high VEGFC-dependent mechanism, while proton beams reduce irradiation-induced cell damage.