Targeted miRNA Delivery via Self-Assembled Nanoparticles to Enhance Radiotherapy Sensitivity in Glioblastoma

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Glioblastoma (GBM) is an aggressive and difficult-to-treat brain cancer, known for its resistance to standard therapies and the challenges in effectively delivering treatments across the blood-brain barrier (BBB). In this research, we are developing a self-assembled nanoparticle (NP) designed to deliver miRNA directly to glioblastoma cells, targeting tumour growth and improving therapeutic outcomes. These nanoparticles are specifically engineered to cross the BBB, allowing for precise delivery of the treatment while minimizing potential side effects. To enhance the efficacy of this approach, we will also examine how GBM cells respond to different types of radiotherapy, including photon, proton, and particle ion radiation. Although radiotherapy is a common treatment for GBM, the tumour's ability to resist radiation remains a significant barrier to its effectiveness. By combining our miRNA-based therapy with various radiation methods, we aim to make the glioblastoma cells more sensitive to these treatments, improving their potential to shrink or eliminate the tumour. Our goal is to offer new insights into more effective and personalized treatment options for glioblastoma patients, potentially paving the way for breakthroughs in cancer therapy