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Aptamers: ushering in new hopes in targeted glioblastoma therapy

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Abstract

Glioblastoma, a formidable brain cancer, has remained a therapeutic challenge due to its aggressive nature and resistance to conventional treatments. Recent data indicate that aptamers, short synthetic DNA or RNA molecules can be used in anti-cancer therapy due to their better tumour penetration, specific binding affinity, longer retention in tumour sites and their ability to cross the blood-brain barrier. With the ability to modify these oligonucleotides through the selection process, and using rational design to modify them, post-SELEX aptamers offer several advantages in glioblastoma treatment, including precise targeting of cancer cells while sparing healthy tissue. This review discusses the pivotal role of aptamers in glioblastoma therapy and diagnosis, emphasising their potential to enhance treatment efficacy and also highlights recent advancements in aptamer-based therapies which can transform the landscape of glioblastoma treatment, offering renewed hope to patients and clinicians alike.

Keywords: Glioblastoma; SELEX; aptamers; blood-brain barrier; targeted delivery; tumor penetration.

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