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Non-coding RNAs (ncRNAs) as therapeutic targets and biomarkers in oligodendroglioma

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Abstract

Oligodendrogliomas (ODGs) are neuroepithelial tumors that need personalized treatment plans because of their unique molecular and histological features. Non-coding RNAs form an epigenetic class of molecules that act as the first steps in gene regulation. They consist of microRNAs, long non-coding RNAs, and circular RNAs. These molecules significantly participate in ODG pathogenesis by regulating ODG initiation, progression, and treatment response. This review is designated to analyze the literature and describe the genomic profile of ODGs, the complex actions of ncRNAs in ODGs pathogenesis and treatment, and their roles as appropriate biomarkers and as one of the precision mechanisms action targets, such as antisense oligonucleotides, small interfering RNAs, gene therapy vectors, peptide nucleic acids, and small molecule inhibitors. Overall, ncRNAs considerably alter the pathological spectrum of ODGs by influencing fundamental processes in tumor biology. Applying ncRNAs in a clinical context exhibits promise for enhanced diagnosis and individualized therapeutic interventions. Nevertheless, the delivery efficacy and potential adverse "off-target" sequels retain the main obstacles undermining clinical potential. Continuous research and technological advancements in ncRNAs offer new insights and promising prospects for revolutionizing oligodendroglioma care, leading to better, personalized treatment outcomes.

Keywords: NcRNAs; Oligodendrogliomas; Precision medicine; Therapeutic strategies; Treatment response.

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