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MicroRNAs in Brain Tumors : A New Diagnostic and Therapeutic Perspective?

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Abstract

MicroRNAs (miRNAs, miRs) are small, non-coding RNA molecules that regulate gene expression posttranscriptionally. Although discovered only recently in the early 1990s, this relatively new group of molecules has already been proven to play an essential role in the regulation of many physiological and, most importantly, pathological processes such as cancer. A large number of miRNAs has been found to be involved in the pathogenesis of various human malignancies, and expression of miRNAs has been demonstrated to correlate with clinic and outcome. In tumors of the brain, however, the investigations on the role of miRNAs are still in its infancy, and most publications refer to the most common primary brain tumor, the glioma (mostly glioblastoma). But despite the fact that there is only limited data available so far, these first results are very promising and implicate that miRNAs might open a new perspective for diagnostics and treatment of this disease. With this review article, we aim to provide a short overview of miRNA biogenesis, function and regulation in general. Thereafter, the clinical relevant data about miRNAs in the two most common primary malignant brain tumors in adults (glioblastomas) and children (medulloblastomas) will be summarized, and their potential impact on diagnostics and treatment will be highlighted.

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