An in silico Analysis of Glioblastoma Patients for the Identification of a miRNA Signature as a Diagnostic Biomarker

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Glioblastoma Multiforme (GBM) is the most common and aggressive malignant brain tumor, accounting for 52% of all primary brain tumors. Studies show that earlier diagnosis can lead to a better prognosis and so, the accurate and early diagnosis of glioblastoma is integral to treat the tumor and to ensure life longevity. microRNAs(miRNA) are small non-coding RNA fragments (about 22 nucleotides in length) implicated in glioblastoma development, indicating their potential as diagnostic and therapeutic targets. This project analyzes different miRNA expression levels in glioblastoma patients and cell lines to determine candidate biomarkers in glioblastoma. Using data from online miRNA expression databases in glioblastoma patients, miRNA expression levels were recorded and compared to glioblastoma patients and a healthy control to determine which miRNAs were up and downregulated, using The Cancer Genome Atlas (TCGA) database. This project intended to validate the use of miRNAs as candidate biomarkers and identify a glioblastoma-specific miRNA signature to aid in earlier diagnosis. The project identified a 5-miRNA signature as diagnostic biomarkers, with 3 of them being identified as novel biomarkers. As further research into miRNA profiling of various pathological conditions continues, this research implicates miRNAs in gliomagenesis. Early diagnosis could be the difference between life and death, as the prognosis and treatment of glioblastoma patients is vastly different depending on the time of detection.

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