

In Situ Hybridization Profiling of Brain Tumors Showed Differential Expression of miR-10b, miR-96 and miR-146b



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Background

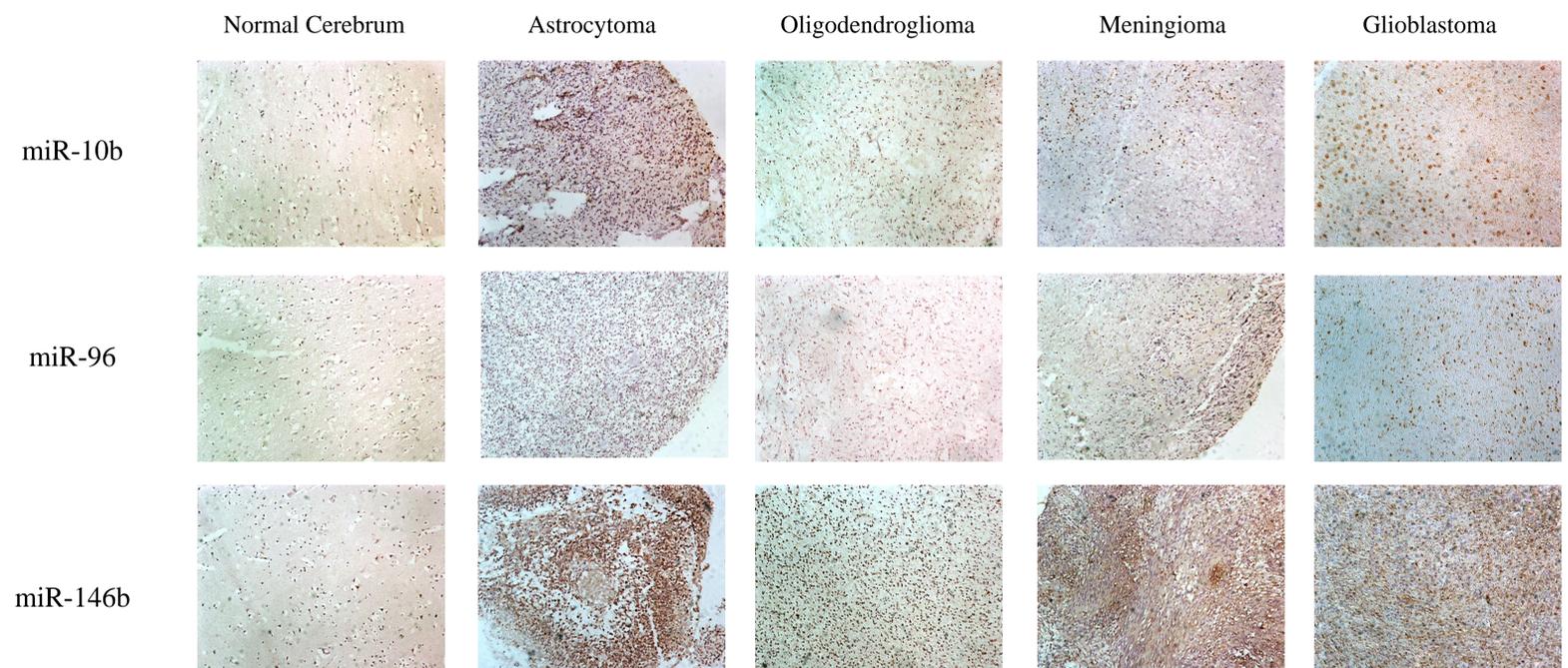
Brain tumors account for 2.4% of all cancer-related deaths and have a 5-year survival rate of 33.4 %. Gliomas make up about 80% of malignant brain tumors. Astrocytomas, a subtype of gliomas, are the most common primary brain tumors among adults and account for roughly 75% of neuroepithelial tumors.

microRNAs (miRNAs) are 22 nucleotide-long, small non-coding RNA molecules that modulate various cellular processes. Altered expressions of miRNAs have been associated with various malignancies including brain tumors. In the present study, we have carried out *in situ* miRNA expression profiling in various types of brain tumors in order to identify miRNA candidates as potential biomarkers for diagnosis of brain cancer.

Materials & Methods

A total of 35 FFPE cases of different brain tumors (astrocytoma, oligodendroglioma, meningioma and glioblastoma) were chosen for this study. *In situ* detection of 3 miRNAs was carried out using ISH probes and detection systems (BioGenex, DF400-50KE).

Results



All three miRNAs, miR-10b, miR-96 and miR-146b, were down-regulated in the Paired Normal (P N) cerebrum. miR-146b was up-regulated in 100% (13/13), of the cases of astrocytoma, and miR-10b was down-regulated in astrocytoma. All 3 miRNAs were down-regulated in oligodendroglioma and meningioma; however miR-146b showed moderate and strong staining in 2 cases of oligodendroglioma and miR-10b showed strong staining in one case of meningioma. miR-10b was down-regulated in glioblastoma.

	Paired N Cerebrum	Astrocytoma	Oligodendroglioma	Meningioma	Glioblastoma
miR-10b	Negative/weak	Moderate/Strong	Negative/weak	Negative/weak	Negative/weak
miR-96	Negative/weak	Negative/weak	Negative/weak	Negative/weak	Negative/weak
miR-146b	Negative/weak	Moderate/Strong	Weak	Moderate	Weak

Conclusion

Visualization of miRNA expression is an advantage of ISH-based techniques over the PCR and microarray based detection that lacks spatial information. A study encompassing a larger cohort is warranted to establish the up-regulation of miR-146b in astrocytoma and down-regulation in P N Cerebrum. Consistent with the high throughput screening reports, miR-10b was down-regulated in glioblastoma.