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## Identification of microRNAs in the cerebrospinal fluid as biomarker for the diagnosis of glioma.

Baraniskin A, Kuhnhen J, Schlegel U, Maghnouj A, Zöllner H, Schmiegel W, Hahn S, Schroers R.

Department of Medicine, Hematology and Oncology, Ruhr-University of Bochum, Germany (A.B., W.S., S.H., R.S.); Center of Clinical Research, Ruhr-University of Bochum, Germany (A.B., A.M., H.Z., S.H.); Department of Neurology, Ruhr-University of Bochum, Germany (J.K., U.S.).

### Abstract

Malignant gliomas are the most common and lethal primary intracranial tumors. To date, no reliable biomarkers for the detection and risk stratification of gliomas have been identified. Recently, we demonstrated significant levels of microRNAs (miRNAs) to be present in cerebrospinal fluid (CSF) samples from patients with primary CNS lymphoma. Because of the involvement of miRNA in carcinogenesis, miRNAs in CSF may serve as unique biomarkers for minimally invasive diagnosis of glioma. The objective of this pilot study was to identify differentially expressed microRNAs in CSF samples from patients with glioma as potential novel glioma biomarkers. With use of a candidate approach of miRNA quantification by reverse-transcriptase polymerase chain reaction (qRT-PCR), miRNAs with significant levels in CSF samples from patients with gliomas were identified. MiR-15b and miR-21 were differentially expressed in CSF samples from patients with gliomas, compared to control subjects with various neurologic disorders, including patients with primary CNS lymphoma and carcinomatous brain metastases. Receiver-operating characteristic analysis of miR-15b level revealed an area under the curve of 0.96 in discriminating patients with glioma from patients without glioma. Moreover, inclusion of miR-15b and miR-21 in combined expression analyses resulted in an increased diagnostic accuracy with 90% sensitivity and 100% specificity to distinguish patients with glioma from control subjects and patients with primary CNS lymphoma. In conclusion, the results of this pilot study demonstrate that miR-15b and miR-21 are markers for gliomas, which can be assessed in the CSF by means of qRT-PCR. Accordingly, miRNAs in the CSF have the potential to serve as novel biomarkers for the detection of gliomas.

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