PBEF1/NAmPRTase/Visfatin: A potential malignant astrocytoma/glioblastoma serum marker with prognostic value


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Malignant astrocytomas comprise anaplastic astrocytoma (AA; grade III) and Glioblastoma (GBM; grade IV). GBM is the most malignant with a median survival of 10-12 months in patients. Using cDNA microarray based expression profiling of different grades of astrocytomas, we identified several fold increased levels of PBEF1 transcripts in GBM samples. Pre-B-cell colony enhancing factor 1 gene (PBEF1) encodes Nicotinamide phosphoribosyltransferase (NAmPRTase), which catalyses the rate limiting step in the salvage pathway of NAD metabolism in mammalian cells. Further validation using real time RT-qPCR on an independent set of tumor samples (n=91) and normal brain samples (n=9), GBM specific higher expression of PBEF1 was confirmed. Immunohistochemical staining for PBEF1 on a subset of the above samples largely reinforced our finding. We carried out ELISA analysis on serum samples of astrocytoma patients to determine whether this protein levels would correlate with the presence of tumor and tumor grade. PBEF1 serum levels were substantially elevated in many of the AA and GBM patients. Statistical analysis of these data indicates that in patients with astrocytoma, serum PBEF1 levels correlate with tumor grade and is highest in GBM. Immunohistochemical analysis of an independent set of 51 retrospective GBM cases with known survival data revealed that PBEF1 expression in the tumor tissue along with its co-expression with p53 was associated with poor survival. Thus, we have identified PBEF1 as a potential malignant astrocytoma serum marker and prognostic indicator among GBMs.