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GENE EXPRESSION OF MANGANESE SUPEROXIDE DISMUTASE IN HUMAN GLIOMA CELLS: CORRELATION WITH OXIDATIVE STRESS AND TUMOR GRADE

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Background:

To analysis the correlation of MnSOD expression in human glioma cells with tumor grade and oxidative stress, hence would explore the role of MnSOD as a tumor suppressor in human glioma.

Method:

Samples were 21 brain tumors and 5 normal brain tissues from glioma patients. The relative expression of MnSOD mRNA was quantitatively determined using Real Time RT-PCR. The enzyme activity of MnSOD was analyzed using xantin oxidase inhibition assay (RanSOD kit). Oxidative stress was analyzed by measuring Malondialdehyde (MDA) for lipid damage and carbonyl substances for protein damage, as well as 8-hydroxy-2'-deoxyguanosine/8-OHdG for DNA damage. Tumor grade was determined by histopathologic examination. Data was statistically analyzed using t-test and Pearson correlation.

Result:

Relative expression of MnSOD mRNA and specific activity in human glioma cells were significantly higher than in normal brain cells. The relative expression of MnSOD mRNA significantly increased in accordance with the tumor grade. Surprisingly, specific activity of MnSOD enzyme in high grade glioma was significantly lower than in low grade glioma, therefore there might be a discrepancy between mRNA synthesis and its enzyme specific activity. MDA, carbonyl and 8-OHdG level reflected oxidative stress in glioma cells were significantly higher than in normal brain cells. The MDA and carbonyl level were significantly correlated with tumor grade. Furthermore, there were positive correlation between MnSOD mRNA and MDA level.

Conclusion:

The high level of MnSOD mRNA and spesific activity in human glioma cells were correlated with the high level of oxidative damage. We found a strong correlation of human glioma tumor grade with MnSOD mRNA expression, but not with its enzyme spesific activity.

Keywords:

Glioma, MnSOD expression, oxidative stress, tumor grade