

### Investigation of iron and zinc oxidation state in different grades of human brain gliomas using XAFS spectroscopy

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Brain glioma is the most common form of brain cancer. The aim of this study was to investigate iron and zinc oxidation state of different grades of human brain gliomas. Seven different samples of brain tissue were examined using X-ray absorption near-edge structure (XANES) and extended X-ray absorption fine structure (EXAFS) methods. We have investigated one abscess sample and samples of II, III and IV grade gliomas (two of each grade). The position of zinc absorption edge suggested that in all samples zinc exist in bounded form Zn (II). Position of iron absorption edge suggested that gliomas tissue contains mixture of Fe (II) and Fe (III). A shift of about 1.2-1.5 eV was noticed between iron absorption edge for II grade gliomas and for III or IV grade gliomas. This difference suggested higher Fe (II) content in III or IV grade gliomas than in II grade gliomas. Iron absorption edge for abscess sample was very similar to absorption edge in Fe<sub>2</sub>O<sub>3</sub>, used as a standard sample. Preliminary EXAFS studies showed small differences between spectra for iron absorption edge for samples of different grade gliomas. This could suggest change in distance to neighboring atoms between different samples.

This work was supported by the following grants: the Ministry of Science and High Education, Warsaw, Poland (N N518 377537), HASYLAB experimental grants (I-20090047 EC and I-20100040 EC) and the European Community's Seventh Framework Programme (FP7/2007-2013) under grant agreement n<sup>o</sup> 226716.

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