

TRACE ELEMENT IMAGING OF 6-OHDA INDUCED PARKINSON'S DISEASE IN RAT BRAINS USING LASER ABLATION ICP-MS

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Talk

Parkinson's disease (PD) is suspected to be associated with neurotoxic elements that cause oxidative stress along the dopaminergic pathway in two structures of the brain known as the substantia nigra and the striatum. Therefore, isotope-specific mapping of trace elements in neurological tissue may provide specific information on the role of various elements in neuronal degradation. This presentation details a method utilising laser ablation inductively coupled mass spectrometry (LA-ICP-MS) for the two-dimensional mapping of Mg, Al, P, Ca, V, Mn, Fe, Co, Ni, Cu, Zn and Se in neurological tissues. Rats were lesioned on one side of the brain with 6-hydroxydopamine to induce Parkinson's disease. The other side of brain remained unaffected. 10 µm thick transverse sections of the brain containing either the substantia nigra or the striatum were ablated and the elemental content measured by the ICP-MS. Two-dimensional contour maps were constructed that show isotopic concentration across the entire section. Resolution of the images was equivalent to a 40 µm pixel size. Preliminary results demonstrated a decrease in zinc expression and a corresponding increase in copper expression around the site of the lesion in the striatum. This is consistent with previous reports. Increased levels of phosphorus were also noted in the lesioned hemisphere.