

Iodine as an elemental marker for imaging of single cells and tissue sections by laser ablation inductively coupled plasma mass spectrometry

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Abstract

A new laser ablation (LA)-ICP-MS method for single cell and cell nucleus imaging was developed. Therein, iodine was employed as an elemental dye for fibroblast cells and for thin tissue sections. At an incubation time of 60 s, iodine is located mainly within the cell nuclei. This effect was illustrated in fibroblast cells, and iodine signal within the cell nucleus was as high as 5×10^4 cps at 4 μm laser spot size. The surrounding cytoplasm was iodinated as well, but to a lesser extent. The spatial resolution attained was sufficient to detect even smaller cell nuclei within a liver biopsy tissue. Furthermore, iodine was successfully employed for biomolecule labeling and we demonstrated that iodine signal increased with increasing thickness of a palatine tonsil tissue. Thus, the use of iodine as an internal standard to correct for tissue inhomogeneities in LA-ICP-MS was investigated for the simultaneous detection of two tumor markers (Her 2 and CK 7) in breast cancer tissue. Additionally, lanthanide background resulting from glass ablation can be corrected for by Eu standardization.

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