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ONLINE ISSN : 1880-1404

PRINT ISSN : 0916-717X

Biomedical Research on Trace Elements

Vol. 19 (2008) , No. 1 34-42

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Development of Miniaturized HPLC-ICP-MS for Speciation of Bio-Trace Elements

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(Received: January 29, 2008)

(Accepted: March 10, 2008)

Abstract:

The advent of miniaturized HPLC techniques, *i.e.*, narrow bore, capillary, and nano HPLC, hyphenated with an inductively coupled plasma-mass spectrometer(ICP-MS)in speciation is expected to pave the way to new applications in metallome analyses. In this review, the author introduces recent applications of narrow bore and capillary HPLC-ICP-MS to speciation of bio-trace elements. In particular, our recent results using these miniaturized techniques were introduced. First, the application of the narrow bore system to minute amounts of tissue supernatants from mouse neonates bearing a mutation in a Cu-regulating gene was discussed. Second, combination of the gene modification technique and the miniaturized hyphenated technique were introduced, *i.e.*, the application of on-line two-dimensional(2D)capillary HPLC-ICP-MS to a sample obtained from gene-modified cells was shown. The isoform-specific suppression of metallothioneins(MTs)induced by RNA interference was observed with the capillary system. On-line 2D capillary HPLC-ICP-MS showed some advantages over reverse transcription polymerase chain reaction in the specific detection of MT isoforms. New biological applications of the miniaturized hyphenated techniques combined with the gene modification technique are expected to contribute significantly to metallomics research.

Key words: hyphenated technique, HPLC, ICP-MS, metallothionein, RNAi, speciation

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Yasumitsu Ogra, "Development of Miniaturized HPLC-ICP-MS for Speciation of Bio-Trace Elements", Biomedical Research on Trace Elements, Vol. **19**, pp.34-42 (2008) .

JOI JST.JSTAGE/brte/19.34

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