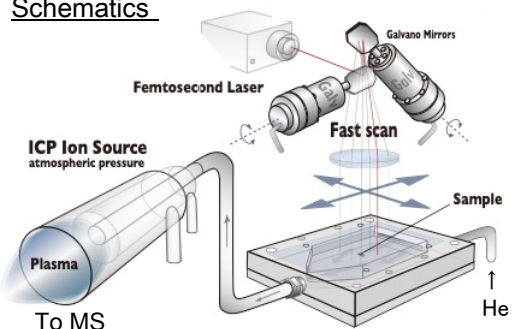


Quantitative Imaging of Trace Elements in Mouse Spinal Cord using fsLA-ICP-MS

Femtosecond (fs) LA-ICP-MS is a powerful technique for the trace element quantification in hydrous samples due to the under atmospheric pressure measurement. Moreover, isolated sampling and ionization processes, which eliminate the influence of coexisting component, are capable of high sensitivity and accuracy.

Principle of fsLA-ICP-MS

Schematics*



Inorganic elements in aerosol which generated by irradiating laser on a solid sample are analyzed by ICP-MS.

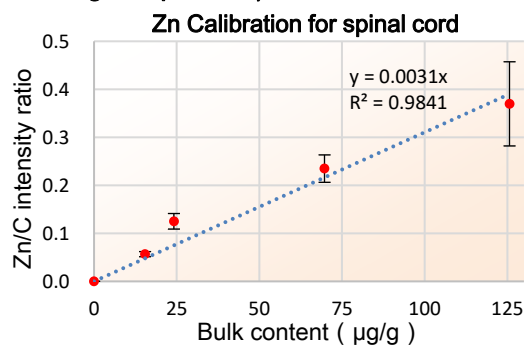
*) Courtesy of Prof. Hirata, University of Tokyo.

Advantages of fsLA-ICP-MS

	fsLA-ICP-MS	NanoSIMS	TOF-SIMS
Sensitivity	ppb - sub ppm	ppm	ppm
Spatial Resolution	10 μ m	50 nm	300 nm
Atmosphere	Atmospheric pressure, He (Available for Hydrous Samples)	Ultra high vacuum (< 10^{-7} Pa)	Ultra high vacuum (10^{-6} - 10^{-7} Pa)
Sampling Area	~mm - 2 cm	10 - 50 μ m	10 μ m - 5 cm
Sampling Depth	~50 μ m	< 10 nm	< 3 nm

- Trace elemental imaging with **High Sensitivity** in **Biological Tissue**
- Quantitative analysis** with isolated sampling and detection region (Less influence of coexisting components)

Homogenized Biological Standard Preparation & Calibration

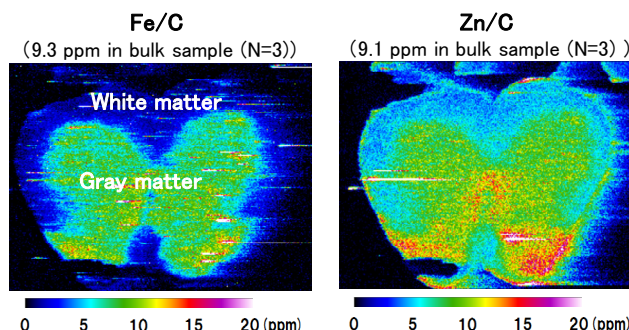
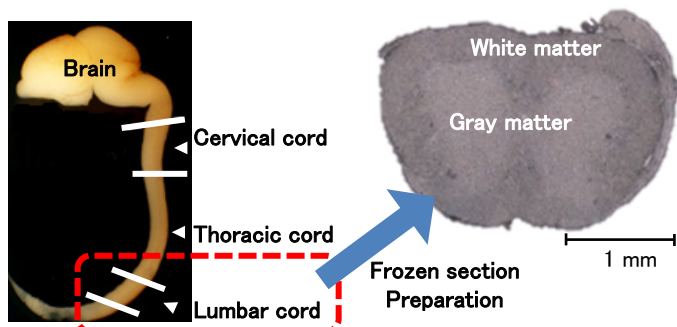


Calibration for Spinal Cord

- 1st : Fe/Zn concentrations of ③ determined by ICP-MS, Fe/Zn/C Intensities of ④ measured by fsLA-ICP-MS.
- 2nd : Matrix corrections between brain and spinal cord are provided on the basis of carbon concentrations.

- Standard with Targeted Concentration can be prepared.

Quantitative Imaging of Fe/Zn in Lumbar Cord



- Fe/Zn are more highly concentrated in **Gray matter** (10-15 ppm) than **White matter** (3-5 ppm).

fsLA-ICP-MS & reliable standard preparation make **Quantitative Element Imaging** possible with **High Sensitivity** and **Accuracy**.

Candidate method for **Drug Efficacy Assessment**, **Pathological Mechanisms** analyses, etc.