

## **Proposal of Metallomics Based on Highly-Sensitive Biometal Analysis**

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The present author proposed “metallomics” as integrated biometal science in 2004 [*J. Anal. At. Spectrom.*, **19**, 5 (2004)]. Prior to the proposal of metallomics, the author also proposed another concept of “Extended All Present Theory of the Elements”, which means that all the materials including plants and animals on the earth contain all the elements in the periodic table. These two new concepts were proposed based on the recent progress in highly-sensitive analytical methods, such as ICP-AES (inductively coupled plasma atomic emission spectrometry) and ICP-MS (inductively coupled plasma mass spectrometry). Since ICP-AES and ICP-MS allow us to determine almost all elements in the concentration range from 1000 ppm down to sub-ppt level on the multielement basis, the Extended All Present Theory, whose final target is all-elements analysis of one biological cell, can be proved by applying these methods to analysis of various biological samples.

Metallomics is referred to, in another words, “biometal-assisted function science”, and so its main research subject is to elucidate physiological functions and metabolisms in biological systems, in relation with metalloproteins and metalloenzymes. Since biological functions of the elements are generally different, depending on their chemical forms, chemical speciation analysis is really important in metallomics research. Thus, multielement analysis and chemical speciation of the elements in salmon egg cell have been carried out in the present work. In addition, the metabolism of arsenic species after ingestion of seaweed (*Hijiki*) containing toxic inorganic As(V) was investigated by monitoring arsenic species excreted in urine.