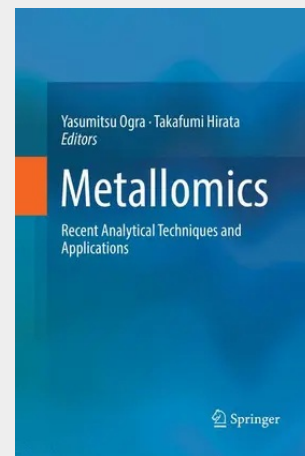


Metallomics

Recent Analytical Techniques and Applications

This book focuses on recent topics in metallomics, a study of the metallome, or metal-containing biomolecules. Metals can induce various physiological and toxicological effects in a very small amounts, in other words, the concentrations of biometals are very low in organisms. Thus, analytical techniques for a trace amount of metal are crucial to understand the biological and toxicological functions of metals. This volume begins with an overview of metallomics including the history and development of the field. Subsequent parts provide basic and advanced techniques for metallomics. Speciation and imaging of metals are basic approaches to reveal the function of the metallome. The applications of speciation using an HPLC hyphenated with inductively coupled plasma mass spectrometry (LC-ICP-MS) and flow cytometry ICP-MS are described. As advanced approaches, the applications using a micro-flow injection-ICP-MS, an ICP-triple quadrupole mass spectrometer, an ICP-sector field mass spectrometer, and an ICP-multi-collector mass spectrometer are mentioned. For the imaging of metals, basic principles and applications of several techniques such as scanning X-ray fluorescence microscopy and ICP-MS equipped with laser ablation (LA-ICP-MS) are presented. Speciation analyses using electrospray ionization mass spectrometry (ESI-MS), X-ray Absorption Spectroscopy (XAS), and nuclear magnetic resonance spectroscopy (NMR) are also introduced. The last part highlights the medical and pharmaceutical applications of metallomics. Molecular biological approaches to reveal the effects of toxic metals, metal functions in brain and neurodegenerative diseases, and metallodrugs are explained. The topic of metal transporters is also presented.

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