QUANTIFICATION STRATEGIES FOR METALLOMICS: POSSIBILITIES AND TRENDS

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The quantification of the metallome in a given biological compartment is still a remaining challenge in the analytical community. Since the metallome, by definition, includes the entirety of metal- and metalloid species present in a biological system, the need for development of strategies to tackle the quantitative aspect of, at least, a little part of the metallome are urgently demanded. In this regard, the course will revise the ICP-MS based strategies used for bio-inorganic speciation analysis that can be then adapted to the metallomics studies and will be critically compared with other quantitative possibilities including those based on molecular MS techniques or in immunoassays. Special attention will be given to the quantification methodologies based on the use of generic standards (a unique feature of ICP-MS) and isotope dilution analysis (essential to conduct highly precise and accurate determinations).

Different scenarios will be addressed: when the aim of the metallomic study is to obtain quantitative information just on the presence of a given element/s in a biomolecule or biological fluid and when then information required is the concentration of a specific biomolecule carrying a specific metal/metalloid. The different approaches to tackle these two problems will be highlighted. Finally, some of the actual trends regarding the use of element-tagged results via ICP-MS to extract biologically relevant information such as enzymatic activities, enzymes inhibitors or DNA integrity etc. will be also illustrated.