Multielement analysis of biological samples by inductively coupled plasma-mass spectrometry. I. Preliminary considerations and analysis of rat liver and serum.

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Interest in the biological behavior of a growing number of elements, along with increasing recognition of the importance of interactions among them, demands a versatile and reliable technique for multielement analysis of biological samples. Significant improvements over the sensitivity achieved with conventional inductively coupled plasma (ICP) optical emission spectrometries have been realized with the introduction of quadrupole mass spectrometry (MS) for detection of ions in the plasma. The hybrid technique of ICP-MS promises to be a method of rapid multielement analysis, at detection limits that approach or surpass those of other technologies. However, the application of ICP-MS to analyses of biological interest is truly in its infancy. Here we report the use of ICP-MS for the determination of more than 30 elements of biological interest in a tissue and a biological fluid (rat liver and serum, respectively). Experimental values of the elements serve as a basis for discussion of analytical protocols, performance criteria, and certain problems peculiar to ICP-MS.