

## **Exposure assessment and disease detection: How metal stable isotopes offer unique insights**

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Our body's isotope metallome is the fingerprint of our health. Metal isotopic signatures in our body can vary depending on endogenous and environmental factors such as redox reactions, adsorption, and ligand coordination of metalloproteins. Metabolic reaction rates or binding strength of lighter isotopes differ from that for heavier isotopes. This difference is reflected in the metal isotopic composition of blood, urine and tissue. Thus, natural metal isotope biomarkers have a vast potential to help characterize sources of exposure, pharmacokinetics of metals in the human body, mechanisms of toxicity, and minute changes of metabolic processes caused by disease development and progression. Thanks to recent rapid technological and instrumental progress, metal isotope ratio analysis is 100 times more sensitive than concentration measurements.

In this keynote, I will review examples of how metal stable isotopes, such as zinc, can be used as diagnostic and prognostic tool for cancer or to monitor nutrition status. Further, I will discuss future potential of isotope metallomics in environmental health sciences.