

How low can we go? Towards isotopocule analysis with picomolar sensitivity for hominin paleodiet studies

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In this talk I will give an overview of progress made in the past two years on developing electrospray ionization Orbitrap mass spectrometry into a widely available and useful tool for molecular and intra-molecular isotopic analysis [1]. A particular emphasis will be on extending multi-elemental isotopocule measurements of polar compounds into the low-picomolar sensitivity range. Such a jump in sensitivity gain can support a wide range of application of isotope studies across multiple scientific disciplines, from environmental chemistry to human health. Ongoing work is primarily concerned with pioneering compound-specific isotope analysis of trace amounts of amino acids preserved in million-year-old fossil tooth enamel. This project is high risk and only in its beginning. With an international team of experts, we aim in the coming years to systematically establish this research topic to provide a new window into the early periods of human evolution [2,3]. Our hope is that the resulting methods also create a bridge to bring isotopic analysis into many more biomedical research laboratories.

References

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