

## **Compound specific carbon isotope measurements from collagen – What can amino acids tell us?**

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Bulk stable isotope analysis of collagen has become an invaluable tool for the interpretation of human and faunal palaeodiets. Bulk carbon and nitrogen isotope signatures of bone collagen can enable the distinction between marine and terrestrial diets, the consumption of C<sub>3</sub> and C<sub>4</sub> plants, and the influence of climatic and environmental factors. Bulk carbon isotope values of bone collagen represent the average isotopic value of 18 different amino acids, which are present in differing proportions. For example, glycine, a non-essential, metabolically active amino acid is present at very high proportions in collagen. Thus, its isotope value can often dominate the bulk carbon isotope measurement and masks the isotope signal from essential amino acids, which present at lower proportions and routed directly from dietary sources. Previous research has clearly shown that compound specific analysis of individual amino acids from collagen can clearly indicate protein routing within the body. Thus, unique isotope signatures for individual amino acids have the potential to greatly expand our knowledge of metabolic routing. Preparative and instrumental methodology for the analysis of individual amino acid isotopic measurements has been undergoing development since the 1960's. GC-C-IRMS methods have been rigorously investigated however, they often require long preparative techniques involving the addition of carbon molecules, which is undesirable for carbon isotope measurements. Recent developments in isotope instrumentation, specifically Liquid Chromatography – Isotope Ratio Mass Spectrometry (LC-IRMS), now enables direct on-line carbon isotope measurement of individual amino acids. The poster illustrates results from amino acid standards which were repeatedly analysed using EA techniques and compared to LC-C-IRMS methods. Furthermore, a pilot study was undertaken which clearly demonstrated the routing of non-essential and essential amino acids from dietary sources. The understanding of isotopic information from individual amino acids has the potential to lead to a greater understanding of metabolism.