

Title Multi-elemental analysis of human archaeological bone

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Tasneem Bashir is the analytical chemist currently involved in the Ballyhanna Research Project. She is currently completing her MSc in the *Multi-elemental analysis of human archaeological bone*, at the Institute of Technology, Sligo (ITS), with a view to elucidating the past diet consumed by the population of medieval Donegal over 800 years ago. Prior to commencing her Master's, she also lectured at ITS and was involved in a variety of multidisciplinary scientific areas. She obtained her degree in analytical chemistry from Dublin City University.

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The primary function of this presentation is to provide an insight into the use of elemental analysis to probe nutritional status and any subsequent effects on human health. One of the approaches involved in determining palaeodiet involves the use of multi-elemental analysis. The elements chosen for dietary interpretation are used because of their presumed ability to successfully distinguish between plant and animal based resources. Palaeodietary reconstruction was initially based on the basic principle that elemental concentrations in skeletal bone would reflect the quantities in which they were originally consumed. However, elemental abundances in skeletal bone can be attributed to a multitude of factors, including being subject to the influence of a host of metabolic and physiological processes once ingested. Not only can trace elemental analysis be used to investigate nutritional status, but it can also be used to monitor effects on human health. For instance, zinc deficiencies are recognised as having various negative effects. Sodium and potassium if their bone levels reflect in any way total body stores could provide certain indications regarding foraging strategies.

In review chemical analysis of archaeological bone is capable of providing much more than dietary information. In specific contexts it may help us to unravel the cultural and biological stresses, which influenced earlier societies. Use of bone chemistry data toward this end requires a detailed understanding of such factors as the physiological functions and metabolic requirements of individual elements as well as a thorough evaluation of diagenetic activity. In this context diagenesis refers to the post-mortem alterations to the chemical components of bone, including both the loss of and increase to the chemical elements of the inorganic fraction of bone.

In conclusion, multi-elemental analysis can be used to potentially elucidate palaeodiet and any adverse health conditions provided the extent of diagenesis can be accounted for.