
The possibilities of proteomics in archaeology: A case study from ancient Mongolia

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Résumé

Developments in proteomic analyses of dental calculus and bone collagen (ZooMS) have created new ways to explore prehistoric economies and dietary intake. These methods are especially useful in regions with a paucity of material culture and sparse zooarchaeological evidence, adding lines of direct and indirect evidence of subsistence strategies. From dental calculus, extracted peptides are sent through a tandem mass spectrometer (MS/MS) and can tell us what types of plant and animal tissues were consumed, as well as the species of each. Bone collagen is also species specific, and with ZooMS, we can determine the species of small, non-diagnostic bone fragments. This paper will detail the possibilities of proteomic methods in archaeology, as well outline a recent example from Bronze Age Mongolia. In our case study, we present how proteomic analyses have revealed the introduction of dairying into a region that suffers from a dearth of occupation sites and non-ritually associated faunal remains. Until now, pastoral economies were assumed across the early Eurasian steppe, however, unequivocal evidence the antiquity of this lifeway in Mongolia was lacking. The ephemerality of domestic mobile pastoralist sites, combined with severe wind deflation across the steppe, has left little household material culture behind. However, many ritual burials sites have been easily located and thoroughly excavated, and under these monumental stone structures human skeletal remains were preserved. Within the dental calculus of these individuals we discovered numerous peptides from dietary proteins derived from a range of species, demonstrating a strong reliance on dairy in Bronze Age Mongolian pastoral economies. Importantly, our results were combined with established archaeological evidence in order to properly contextualize the data and make inferences about human behavior in the ancient northern steppe.

Mots-Clés: Mongolia, Proteomics, Dairy, Central Asia, Steppe, Bronze Age

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