

BEYOND OSTEOLOGY: MULTI-OMIC ANALYSIS OF A COMPLEX EARLY MEDIEVAL BURIAL FROM LETONICE, CZECH REPUBLIC

*Eva Chocholova^{1,2}, Katerina Semnicka¹, Eva Drozdova¹, Klara Vlckova^{2,3},
Petr Gintar^{2,3}, Ondrej Sedo and Zbynek Zdrahal^{2,3}*

¹Masaryk University, Faculty of Science, Department of Experimental Biology, Laboratory of Biological and Molecular Anthropology, Brno, Czech Republic; ²Masaryk University, Central European Institute of Technology, Proteomics Core Facility, Brno, Czech Republic; ³Masaryk University, Faculty of Science, National Centre for Biomolecular Research, Brno, Czech Republic

Background: A complex burial deposited in a storage pit and dated to the 9th–10th centuries CE was re-examined using biomolecular archaeological approaches, integrating ancient DNA, palaeoproteomics, and previous palaeopathological analyses. The burial contained two adult women and two children, accompanied by animal remains and artefacts, with limited contextual information regarding the circumstances of deposition.

Objective: The study aimed to apply multi-omic analysis of dental calculus and enamel proteomics to refine biological sex estimation and to provide insights into diet, health, and lived experience.

Materials and methods: The assemblage included two adult females (37–46 years) and two subadults (~7 and 12 years old). Skeletal indicators of stress or pathology, such as cribra orbitalia and enamel hypoplasia, were observed. Sex was estimated using amelogenin peptides from dental enamel, and dental calculus was analysed for ancient DNA and proteins.

Results: Proteomic analysis identified dietary proteins consistent with consumption of legumes (e.g. *Pisum sativum* and other Fabaeae), *Cucumis sativus*, dairy, and wheat. Both proteomic and genetic data provided low-confidence signals potentially attributable to *Beta vulgaris*. Microbial proteins associated with oral pathogens were also detected. All individuals were identified as female, consistent with osteological assessment of the adults and enabling sex determination of the subadults. Dietary evidence suggests the consumption of plant-based and dairy resources typical of Early Medieval Central Europe, potentially including processed cereal- and legume-based foods.

Conclusions: This study demonstrates the value of integrating biomolecular and osteological approaches in reconstructing aspects of diet, health, and identity in archaeologically ambiguous burial contexts, contributing to a more nuanced understanding of past human lifeways.

Keywords: Biomolecular anthropology; Diet; Palaeoproteomics; Metabarcoding; Early Middle Ages.

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