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| Perspectives of paleogenomics  in the eastern Mediterranean region  **Koursioti Stevasti**1,2, **Nafplioti Argyro**1, **Papadopoulou Aggeliki**1, **Pavlidis Pavlos**3, **Psonis Nikolaos**1, **Stamatakis Alexandros**1,4,5, **Tabakaki Eugenia**1, **Vassou Despoina**1 and **Poulakakis Nikos** 1,2,6,#,\*  1 Ancient DNA Lab, Institute of Molecular Biology and Biotechnology , Foundation for Research and Technology – Hellas , Irakleio, Greece  2 Department of Biology, School of Sciences and Engineering, University of Crete, Irakleio, Greece  3 Institute of Computer Science, Foundation for Research and Technology-Hellas , Irakleio, Greece  4 Computational Molecular Evolution Group, Heidelberg Institute for Theoretical Studies, Heidelberg, Germany  5 Institute for Theoretical Informatics, Karlsruhe Institute of Technology, Karlsruhe, Germany  6 Natural History Museum of Crete, School of Sciences and Engineering, University of Crete, Irakleio, Greece  # Presenting author: Poulakakis Nikos, email: [poulakakis@imbb.forth.gr](mailto:poulakakis@imbb.forth.gr)  \* Corresponding author: Poulakakis Nikos, email: [poulakakis@imbb.forth.gr](mailto:poulakakis@imbb.forth.gr) |

abstract

Ancient DNA (aDNA) refers to the preserved, but often highly degraded genetic material, recovered from remains found at paleontological and archaeological sites, in museums and other archival collections. This genetic material can be between less than 100 and up to hundreds of thousands of years old. Over the last decades, advances in high-throughput DNA sequencing technologies coupled with radiocarbon dating and isotopic analyses have revolutionized aDNA research, enabling the molecular investigation of ancient populations and tracing their changes through the time and space (evolution as it happens!).

The Paleogenomics and Evolutionary Genetics (PEG) group of the IMBB-FORTH is housed at the Ancient DNA Infrastructure for heritage science. Οur research interests are in the broad area of evolutionary biology, spanning from the study of human evolution to the investigation of the evolutionary history of extinct or nearly extinct species (museomics) of the eastern Mediterranean region, emphasizing on the genomic profile of emblematic and endangered species (conservation genomics) of this region. . To achieve these, we apply state-of-the-art genomic and multi-isotope techniques and computational approaches to address a wide range of intriguing evolutionary questions pertaining to biology, palaeontology, anthropology, and archaeology, shedding more light into the past. Currently our research focuses on:

a) the study of the Second Greek Colonization (APOIKIA project), focusing on the genetic interaction between the migrating populations of the Metropolis with the local communities,

b) the genetic profiling of individuals from diverse prehistoric archaeological Greek sites who appear culturally differentiated (e.g., Mesolithic, Neolithic, Bronze Age populations) [1],

c) the investigation of the Neolithic expansion across the Mediterranean around 8 millennia ago (NEOMATRIX project) and the interaction between the Neolithic newcomers and pre-existing populations, by applying integrated ancient DNA and multi-isotope analyses of human and animal (e.g. sheep and cattle) archaeological skeletal remains from Anatolia and Europe,

d) the analysis of ancient microbiomes and pathogens in order to identify causes of ancient epidemics, trace extinct microbial lineages, and explore the evolutionary history of microorganisms relevant to public health,

e) the investigation of the evolutionary history of extinct, such as the Cypriot pygmy hippopotamus or the Aegean elephantoids [2] or nearly extinct, endangered, emblematic species of Greece (museomics),

f) the molecular species identification of organisms found in sediments and residues (e.g., within amphorae) or from single specimens, such as human-made hard-tissue artifacts (e.g., elephant ivory) [3], and

g) the development of spectroscopic techniques as pre-screening indicators linked to DNA preservation levels and determine thresholds for identifying dental samples suitable for archaeogenomic analysis (Spectra-Gen project).

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