

March 1999 (Volume 40, Number 3)

Histological Analysis and Ancient DNA Amplification of Human Bone Remains Found in Caius Iulius Polybius House in Pompeii

Marilena Cipollaro, Giovanni Di Bernardo, Amalia Forte, Giovanni Galano, Luigi De Masi, Umberto Galderisi, Fabio M. Guarino¹, Francesco Angelini¹, Antonino Cascino

Istituto di Farmacologia e Tossicologia and C.R.I.S.C.E.B., 2.a Università degli Studi di Napoli, Naples and Soprintendenza Archeologica di Pompeii, Pompeii; and ¹Dipartimento di Biologia Evolutiva e Comparata, Università degli Studi di Napoli "Federico II", Naples, Italy

Thirteen skeletons found in the Caius Iulius Polybius house, which has been the object of intensive study since its discovery in Pompeii 250 years ago, have provided an opportunity to study either bone diagenesis by histological investigation or ancient DNA by polymerase chain reaction analysis. DNA analysis was done by amplifying both X- and Y-chromosomes amelogenin loci and Y-specific aliphoid repeat locus. The von Willebrand factor (vWF) microsatellite locus on chromosome 12 was also analyzed for personal identification in two individuals showing alleles with 10/11 and 12/12 TCTA repeats, respectively. Technical problems were the scarcity of DNA content from osteocytes, DNA molecule fragmentation, microbial contamination which change bone structure, contaminating human DNA which results from mishandling, and frequent presence of Taq DNA polymerase inhibiting molecules like polyphenols and heavy metals. The results suggest that the remains contain endogenous human DNA that can be amplified and analyzed. The amplifiability of DNA corresponds to the bone preservation and dynamics of the burial conditions subsequent to the 79 A.D. eruption.

Key words: anthropology, forensic; base sequence; dental enamel; DNA fragmentation; human identification; polymerase chain reaction; satellite DNA; sex determination (genetics); von Willebrand factor