

Dental enamel proteins reveal the sex of the ‘Lovers of Modena’

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Sex determination is crucial to accurately delineate the biological profile of skeletal remains. Although some bones are sexually dimorphic, the bad state of preservation of some archaeological materials may alter or totally hide the readability of sex in an individual. Similarly, the post-depositional context and/or the biological age may also influence the correct estimation of sex (e.g. sex of young individuals is difficult to ascertain). In these contexts, DNA may be a valid alternative, even if the analytical costs and the survival of the DNA itself may strongly limit the use of genetic markers. In 2017, Stewart et al. propose a new method to estimate the sex of skeletons from archaeological or forensic contexts, using enamel proteome. This method involves the extraction of peptides from the dental enamel and their detection by means of high-resolution mass spectrometry. In particular, the presence of protein AMELY (amelogenin isoform Y) within the enamel dental tissue is restricted to male sex only, while AMELX (isoform X) can be found in both sexes. AMELY can be rapidly detected by LC-MS/MS from the ion extracted chromatograms of the SM_(ox)IRPPY peptide. Moreover, the subsequent database search through protein identification software for mass spectrometry data may be employed to refine the interpretation and gather additional information on aminoacid sequences and post-translational modifications.

Here, we employ a modified version of the method proposed by Stewart et al., to determine the sex of the so-called ‘Lovers of Modena’, two Late Antique individuals whose skeletons were intentionally buried hand-in-hand (Vazzana et al., 2018). Since both show the presence of the AMELY isoform, we confidentially classify them as males. This method is fast, cost-effective and highly reliable, and it can be applied to permanent and deciduous teeth of different ages, contexts and states of preservation.

References

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