

Lead in Human Bones and Teeth Reflecting Historical Changes in Lead Production: Rome and the Levant

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This paper marks the culmination of two research journeys, one that began 35 years ago while I was studying with Clair C. Patterson at Caltech, and the other prompted by several studies of ancient humans involved in metalwork. It follows a paper I co-authored recently, demonstrating that the rates of worldwide lead production since the discovery of cupellation, some 5,000 years ago (first outlined by Patterson and co-workers) are chronicled in the Pb/Ca of humans buried in Rome. In the current work, the Roman Pb/Ca record is compared with that found in individuals from the Levant. The Pb/Ca records from both locations are then compared with Co/Ca, Cu/Ca, Ba/Ca and Zn/Ca. It emerges that, whereas Ba/Ca and Zn/Ca are not affected by metal mining, production and use, and reflect homeostatic processes and the addition of Ba to many samples after burial, Pb/Ca and to a lesser extent Co/Ca do offer evidence of these metal-related activities. Cu/Ca values display an equivocal record. The use of a Ba/Ca threshold to detect the post-mortem addition of Ba and Pb allows to construct a clearer record of Pb/Ca in both locations. The central position of Rome, especially during the Roman period, is revealed in a pronounced difference in Pb/Ca records, where the Roman values are two to three orders of magnitude higher than the Levantine values. This highlights the close association between lead production rates and human pollution, and leads me to reiterate the warning that the expected escalation in the worldwide production of lead and other toxic metals may well jeopardize human health in the near future.