



B175 Hydrogen and Oxygen Isotope Ratios in Human Hair are Related to Geography

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The goal of this presentation is to introduce a new technology to law enforcement that can assist in tracing origins of murder victims.

This presentation will impact the forensic science community by demonstrating how applications are extensive and include reconstructing historic movements of individuals and providing region-of-origin information for unidentified human remains.

Here a model to predict the geographic region-of-origin of humans based on the stable isotope composition of their scalp hair is presented. This model incorporates hydrogen and oxygen atoms in amino acids to predict the hydrogen and oxygen isotope ratio values of scalp hair. Model predictions with stable isotope analyses of human hair from a range of cities across the U.S.A were evaluated. The model explained more than 85% of the observed variation. Based on the geographical distributions of the isotope ratios of tap waters, maps were constructed of the expected average hydrogen and oxygen isotope ratios in human hair across the contiguous 48 states of the U.S.A. These maps revealed discernable regions across which stable isotope values of human hair were isotopically distinct. Possible applications are extensive and include reconstructing historic movements of individuals and providing region-of-origin information for unidentified human remains.

Stable Isotope, Human, Geography