

**MA Thesis – Human Skeletal Biology Track, Physical Anthropology – New York University
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**INCORPORATION OF DIETARY ISOTOPIC DATA ($\delta^{15}\text{N}$ AND $\delta^{13}\text{C}$) IN THE
ANALYSIS OF FORENSIC SKELETAL CASES FROM THE NEW YORK CITY
OFFICE OF CHIEF MEDICAL EXAMINER**

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Abstract

Stable isotopic analyses have recently begun to be used in forensic biological profiles to help guide investigations of unidentified human remains. Residential histories are commonly inferred with $\delta^{18}\text{O}$ and $^{87}\text{Sr}/^{86}\text{Sr}$ values of enamel and bone bioapatite when matched to water and lithology of geographic origins. Dietary isotopes ($\delta^{13}\text{C}$ and $\delta^{15}\text{N}$) have also been employed to indicate geographic locations of unidentified human remains. However, culturally influenced food traditions pose interpretative complications especially in multicultural metropolitan regions such as New York City (NYC). This study gauges the variation in $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ values of human bone collagen from 47 forensic cases of unknown identities spanning the past 30 years in the custody of the New York City Office of Chief Medical Examiner (NYC OCME).

Results are framed with previous analyses of enamel and bone carbonate $\delta^{18}\text{O}$ and $\delta^{13}\text{C}$ values conducted by IsoForensics and within various food traditions and diet trends practiced by NYC residents as surmised by brief interviews and general knowledge. Unlike established geographic maps based on dietary isotopes that group NYC with geographic areas as big as the entire United States, I find that NYC residents have relatively lower $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ values on average, indicating diets comprised of less animal protein and less corn or sugarcane than regional averages. Isotopic values of the unidentified human remains on average have significantly higher $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ values than NYC residents but show an equally high range of variation. Several possibilities for explaining these results are discussed including the influence of geographic origins and food traditions on isotopic values. This research illustrates the potential for integrative isotopic analyses of unidentified human remains as well as the importance of a holistic anthropological approach to interpretation of forensic casework in multicultural contexts.