Introduction

Defining the extent and patterns of human mobility during the European Bronze Age is a topic that has recently received a lot of attention using genetic and isotopic approaches (e.g., Bailey et al. 2013; Cinnirella et al. 2015; Garcea et al. 2013; Oksanen et al. 2010). Simultaneous in material culture and burial customs across broad geographic regions, such as the Bell Beaker, Corded Ware and Funnel-veil culture, is at minimum, idea we are tracing across extensive social networks. A growing number of isotopic case studies have identified high proportions of non-native individuals in Bronze Age contexts, although how many people moved and who migrated (men, women, children) varies regionally.

In this study, we ask: what extent did human movement (local or long-distance) in Hungary contribute to these emerging Bronze Age patterns of social organization? Past, if mobility is present, can we use isotopic data (87Sr/86Sr, δ13C, δ18O) in conjunction with archaeological, radiocarbon, osteological, and other data to better elucidate the types of mobility used in these contexts?

To address these questions, a large research team has worked to collect multiple lines of complementary data from human inhuman burials from 14 sites across Hungary. These sites span several phases of the BA (see Table below) and a period of 1,000 years. For each phase of the BA we sought to test specific hypotheses about where migrants could have come from and what types of mobility were practiced.

Samples

<table>
<thead>
<tr>
<th>Culture</th>
<th>Geographic Distribution</th>
<th>Date Period</th>
<th>Burial Context</th>
<th>Archaeological Site</th>
<th>Human Bones</th>
<th>Samples Taken</th>
<th>Sexes</th>
<th>Precise Provenance/Collection Details</th>
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Isotopes

- **Carbon**
  - 12C, 13C
  - δ13C: -26.3 to -1.5
  - Isotopic ratios for plants and animals
- **Oxygen**
  - 18O: 0.5 to 1.5
  - Isotopic ratios for water and minerals
- **Strontium**
  - 87Sr/86Sr: 0.707 to 0.709
  - Isotopic ratios for local and non-local resources

Methods

Grain samples from crests, 2°, 3°, and 4° mounds were mechanically cleaned and dried prior to analysis. A high-purity laser (413 nm) was used to ablate the material. The samples were cleaned by washing with a 2% hydrochloric acid solution to remove organic material (1 hour), followed by a 9.5% acetic acid (H3COOH) wash to remove non-carbonate carbonates. The 87Sr/86Sr ratios were measured using an Elan DRC2 plasma source mass spectrometer at the University of California, Los Angeles. The 87Sr/86Sr ratios are expressed relative to the VSMOW standard.

Preliminary Findings

- **Rationale**: DINOSAUR
- **Most individuals fall within expected isotopic ranges for their geographical location, however a cluster group with values above and below local values indicate multi-directional movement.**
- **Isotopic ratios for plants and animals showed significant differences.**
- **Surprisingly, no outliers do not correlate with positive or negative Ο isotopic data.**

Future Directions

- **Building an isoscape for biologically available strontium using modern plant samples with careful consideration of contamination from modern inputs (like fertilizers).**
- **Analyzing of strontium isotopes from cremated human bone from Middle Bronze Age groups.**

References