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Supplement B from Tung and Knudson, "Social Identities and Geographical Origins of Wari Trophy Heads from Conchopata, Peru" (Current Anthropology, vol. 49, no. 5, p. 915)

Field and Laboratory Methodology: Sampling and Strontium Isotope Analysis

Strontium isotope ratios were calculated for six guinea pigs from the local Ayacucho market. The sellers stated that the guinea pigs were raised on alfalfa from nearby fields. However, because imported fertilizers could have been used on those alfalfa fields or the guinea pigs could have consumed kitchen scraps of imported foods (although the sellers stated that this was not the case), we also collected samples from six human skeletons buried in Conchopata tombs to further confirm local Ayacucho Basin strontium isotope values.

All tooth and bone samples were initially prepared in the Laboratory for Archaeological Chemistry at the University of Wisconsin–Madison. Modern fauna samples were ashed at 800°C for 10 hours. Archaeological enamel samples were mechanically cleaned by abrasion to remove the outermost layers of enamel, which are most susceptible to diagenetic contamination (Budd et al. 2000; Montgomery et al. 1999; Waldron 1981, 1983; Waldron et al. 1979). Archaeological bone samples were mechanically and chemically cleaned in a series of weak acetic acid washes in order to remove any diagenetic contamination and then ashed (Nielsen-Marsh and Hedges 2000; Price et al. 1992, 1994; Sillen 1989). Strontium isotope ratios were obtained at the Isotope Geochemistry Laboratory in the Department of Geological Sciences at the University of North Carolina, Chapel Hill. After separation of the strontium from the sample matrix with EiChrom SrSpec resin, strontium isotope ratios were measured on a VG Sector 54 thermal ionization mass spectrometer in quintuple-collector dynamic mode; the internal ratio $^{86}Sr/^{88}Sr = 0.1194$ was used to correct for mass fractionation. Recent analyses of strontium carbonate standard SRM 987 yielded $^{87}Sr/^{86}Sr = 0.710245 \pm 0.000018$ (2σ). Internal precision for strontium carbonate runs is typically 0.0006%–0.0009% standard error, based on 100 dynamic cycles of data collection. Additional details of both sample preparation and sample analysis are given by Knudson and Tung (2007). We also note that the application of strontium isotope analysis to identify local and nonlocal individuals is well established in residential-mobility studies (e.g., Bentley et al. 2002, 2007; Cox and Sealy 1997; Knudson et al. 2004; Knudson and Price 2007; Montgomery, Budd, and Evans 2000; Muller et al. 2003; Price et al. 1994).

Although bone is often diagenetically contaminated by groundwater and soil from the burial environment (Lee-Thorp 2002; Price et al. 1992), the trophy-head samples retained some biogenic strontium. If they had been contaminated by the local burial environment, the samples would have exhibited bone strontium isotope ratios closer to the average local value. Instead, three of the four trophy-head bone fragments showed strontium isotope ratios much higher than the local value.

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