Stable isotopic evidence for diet and nutritional stress in a potentially cannibalized human skeletal sample from Ana Manuku, Mangaia, Cook Islands

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Introduction

Ana Manuku, a prehistoric (1390-1470 AD) rockshelter on Mangaia, has been interpreted as a ritualistic site that potentially shows evidence for cannibalistic practices (Steadman et al., 2000). Mangaia is the southern most island of the Cook Islands.

Two excavated earthen ovens at the site contained over 1800 NISP of human bone representing 26% of the faunal assemblage (Steadman et al., 2000). Of these, 39 NISP yielded cutmarks (Antón et al., 2007).

Materials and Methods

Here we significantly enlarged the isotopic datasets from the zooarchaeological assemblage and increased the human skeletal sample to include subadult and additional adults. For diet modeling, we compiled isotopic data of modern/archaeological Cook Islands fauna & flora (similar to methods of Valentín et al. 2006; Jones and Quinn, 2009) however, unlike previous studies, we limited isotopic data to faunal and flora from the Cook Islands (Allen and Craig, 2009; this study). We corrected each category to represent an individual ingesting 100% of diet (5% δ13C values (Lee-Thorp et al., 1989) + 4‰ δ15N (Ambrose and DeNiro, 1986) and modeled diet with IsoSource and a concentration dependent isotopic model (IsoConc). Since animal flesh rather than bone collagen is consumed we corrected for archaeological bone δ13C by -3.7‰ (Keegan & DeNiro, 1988).

We compared our human dietary isotopic values to those of all published samples from prehistoric/historic Pacific Islands ranging from 3000-150 BP. Data were taken from Ambrose et al., 1997; Valentín et al., 2006; Field et al., 2009; Jones and Quinn, 2009; Allen and Craig, 2009; Kinaston, 2013, 2014a,b, 2015; Stants et al., 2015a,b.

Results

The elevated δ15N values and low δ13C can be the result of several factors, not necessarily cannibalism. Elevated δ15N values may be a consequence of nutritional stress (catabolism) and/or macronutrient scavenging (review in Reitsma, 2013). Concentration dependent (IsoConc) models (Phillips & Koch, 2002) indicate feasible dietary contributions from C3 plants, marine resources (pelagic fishes, reef fishes, sea turtle), terrestrial endemic species, and terrestrial domestic species.

Given the context of the Ana Manuku human skeletal sample (Steadman et al., 2000), ethnohistoric evidence (Hiroa, 1934), and dietary isotopic values (this study), cannibalism (ritualistic or nutritive) cannot be completely discredited as a plausible dietary practice. Terrestrial endemic/domestic dietary resources, nutritional stress and cannibalism may have acted in concert to produce the dietary isotopic results.

Discussion

An IsoConc model using only Cook Island C3 plants, marine resources and terrestrial endemics as dietary endmembers encompasses almost all of the individual isotopic values from Ana Manuku. Both of these non-cannibalistic models correspond well with the faunal evidence.

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