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Isotopic evidence for dietary diversity at the mediaeval Islamic necropolis of Can Fonoll (10th to 13th centuries CE), Ibiza, Spain

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ABSTRACT

The diet of the population interred at the Islamic necropolis of Can Fonoll, Ibiza, Spain, which was in use between the 10th and 13th centuries AD, is reconstructed from the carbon ($\delta^{13}C$) and nitrogen ($\delta^{15}N$) stable isotope ratios of bone collagen from 112 individuals. The mean ± sd (1σ) $\delta^{13}C$ (−19.0 ± 1.3‰) and $\delta^{15}N$ (10.3 ± 0.8‰) values of the Can Fonoll population indicate a diet based largely on terrestrial C_3 resources. However, the wide range of both $\delta^{13}C$ (−20.6‰ to −8.6‰) and $\delta^{15}N$ (7.0‰ to 12.1‰) values attested at Can Fonoll indicate significant variation in individual diet. The elevated $\delta^{13}C$ values of a small proportion of the individuals buried at Can Fonoll are consistent with the consumption of a large proportion of, or dependence on, C_4 resources, such as millet. Comparison of the $\delta^{13}C$ and $\delta^{15}N$ values of the Can Fonoll population with those of other mediaeval populations from the Balearic Islands and mainland Spain highlights a wide range of stable isotope values, which reflects not only significant differences in diet but also points to widespread mobility within the Mediterranean Basin.

1. Introduction

The Spanish island of Ibiza, part of the Balearic Islands in the Western Mediterranean has seen an influx of peoples from the eastern and central Mediterranean (in particular North Africa) since at least the mid-7th century BCE (McMillan and Boone, 1999; O'Connor, 2003). In the 8th century CE the Iberian Peninsula came under Moorish influence, which resulted in linguistic, social, economic, technological, cultural and religious change (McMillan and Boone, 1999). There is evidence that Islamic influence in Ibiza started at least in the 8th or 9th centuries and the island was under Islamic control certainly from the 10th century until 1235 CE with the Christian conquest by the Crown of Aragon (Davies, 2014; Gurrea Barricarte and Martín Parrilla, 2016).

Fuller et al. (2010) investigated the impact of cultural change on diet, one aspect of cultural behaviour through which identity may be expressed. Diet was reconstructed through carbon ($\delta^{13}C$) and nitrogen ($\delta^{15}N$) stable isotope analysis of human bone collagen of archaeological Ibizan populations. This study suggested that there was a significant shift in diet associated with Moorish expansion into Ibiza. The Islamic population from the early mediaeval necropolis of Es Soto, in Ibiza town, which was in use from the 10th to the 13th centuries, exhibited a greater reliance on C_4 resources than earlier populations on Ibiza (Fuller et al., 2010; Nehlich et al., 2012). However, Ibiza town was an important centre for trade and the diet of the Es Soto population may not be representative of populations elsewhere on the island.

Here, we present the results of carbon ($\delta^{13}C$) and nitrogen ($\delta^{15}N$) stable isotope analyses of a contemporaneous Islamic population from a necropolis located at Can Fonoll in the southwestern region of Ibiza (Figs. 1 and 2). Those interred in the cemetery (*maqbara*) may have been involved in agricultural production on the island (Castro, 2009) and likely represent a more residentially stable community than that of Ibiza town. The Can Fonoll assemblage represents one of the largest mediaeval Islamic populations from Ibiza to be studied to date (Kyriakou et al., 2012). Comparison with the urban population at Es Soto (Fuller et al., 2010) and other mediaeval populations from the Iberian Peninsula offers a broader understanding of dietary variability within the Balearic Islands and beyond.

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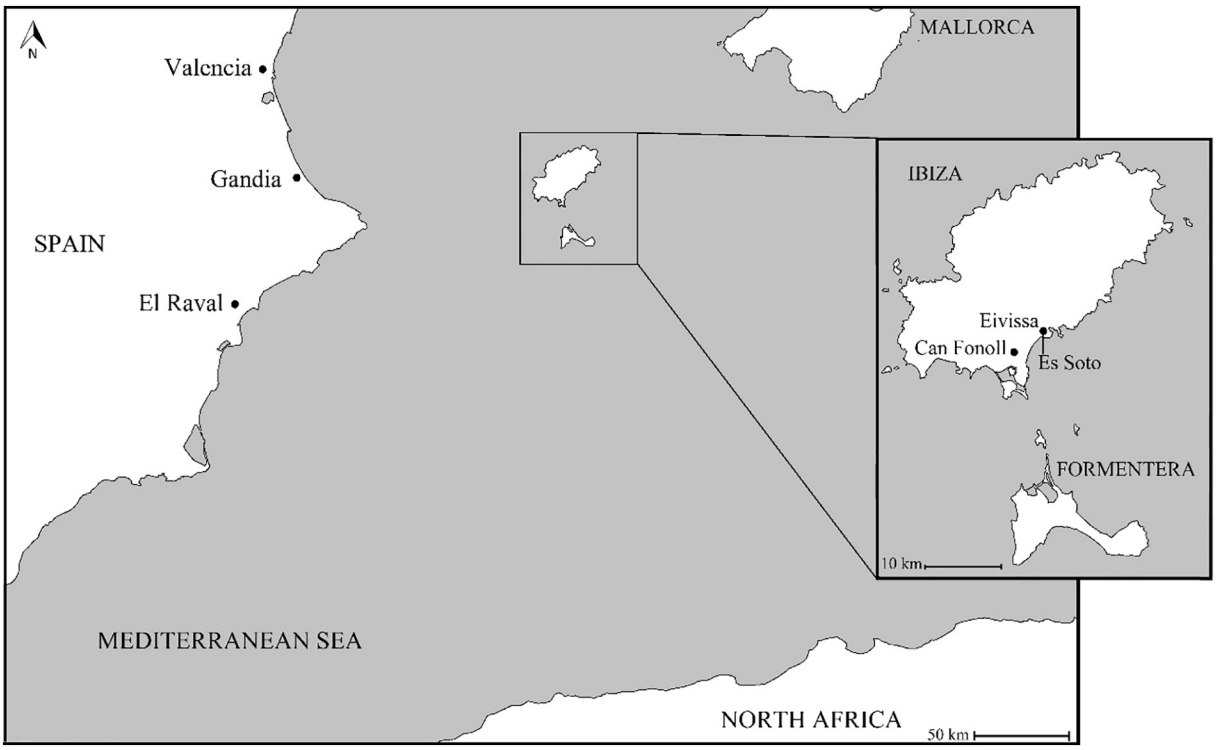

Fig. 1. Location of Can Fonoll, Ibiza, Spain.

2. Reconstructing diet

The Balearic Islands witnessed a population influx from mainland Al Andalus following the establishment of Islamic control in the early 10th century (Kirchner, 2009a). Thirteenth-century records detailing land rents in rural areas of Ibiza indicate small groups of settlements and associated farmland, with names of Arabic-Berber derivation (Kirchner, 2009b). Watermills, constructed to irrigate small allotments on valley floors, were also used to grind cereals into flour (Kirchner, 2009b). While it is known that intense agriculture and irrigation took place, direct evidence for the diets of mediaeval populations from Ibiza is limited.

Fig. 2. Photograph of excavated graves at Can Fonoll necropolis.
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