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Archaeogenetics Beyond Kinship: The Iron Age Intramural Child Burials of Northern Iberia

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Abstract

This chapter addresses the long-lasting custom of placing infant (perinatal and natal) burials inside dwellings in the northern half of Iberia during protohistory. The authors use archaeogenomics and statistical tools to identify consanguineous relationships ("biological kinship") between a sample of analyzed infant individuals from several Early Iron Age villages in the Ebro basin. Genomic results indicate that these individuals had been selected and buried, presumably, for their unusual features, such as trisomies, Down and Edwards syndromes or for being twins. This case study demonstrates how archaeogenetics combined with highly detailed contextual information can provide hypotheses on the reasons for different burial treatments and how genetic data can be used to shed new light on the social groupings attached to residential buildings.

Keywords: *settlement archaeology, perinatal burial, chromosomal trisomy, paleodemography, Early Iron Age.*

In Blanco-González, A. and Alarcón-García, E. (eds.) 2025, *A Social Archaeology of Kinship in Iberia and Beyond. Recent Multistranded Approaches from aDNA to Household Archaeology*. Leiden: Sidestone Press, pp. 159-178.

8.1 Introduction

Recent developments in archaeogenetics have enabled to identify and quantify close biological relationships between people living in the past. In the beginning, studies of ancient DNA (henceforth aDNA) focused on a few individuals from each cemetery, region and period with the aim to grasp the "big picture" of social mobility, migrations and stability (Meller *et al.* 2017; Reich 2018; Krause 2022). The reduction in the analytical costs and the extension of the scope of the questions asked within the newly emerging discipline of archaeogenetics has allowed the genetic characterisation of whole communities buried together, when preservation and resources allow it. This information on purely biological relations –but provided with a spatial, temporal, and material (e.g., grave goods) reference in the archaeological context– has in turn impacted kinship studies, one of the main research fields of social and cultural anthropology. As ethnographic research and theoretical discussions have generated and critically scrutinised an exceptional corpus of information, the meaning of kinship has been extended to a growing array of relations among humans, but also between humans and animals, plants and rocks (Frieman 2023; TallBear 2018). In contrast, the information on biological ascend or descent of individuals provided by the sequencing of ancient genomes, neither rely on perception of ethnographers nor their theoretical perspectives but exclusively depends on the degree of conservation of aDNA. The first-and second-degree relationships between two persons can be reliably determined with statistical tools like READ –when >20,000 genome-wide polymorphisms are preserved (Kuhn *et al.* 2018)– and relations up to the tenth degree are detectable with the identical by descent (IBD) procedure –if >500,000 genome-wide polymorphisms are retrieved (Ringbauer 2024). Before written records existed, such a web of biological relations went far beyond what any human was or is capable of recalling concerning their descent. This fundamental difference in the way that data is generated in anthropology and archaeogenetics and what needs to be stressed with determination in view of some of the discussions maintained in anthropology and, to a lesser extent, archaeology, which has contributed comparatively little to our understanding of kinship in prehistory (Ensor 2013: 272-298).

A recent attempt to bring both research lines closer has shown that differences probably lay more in the part of (past) social reality addressed by each field, than in an underlying epistemological difference between social and natural sciences (Meller *et al.* 2023). The information used by social and cultural anthropology derives from observations and conversations done mostly by western priests, colonial functionaries or academics on others. Most of these observations and conversations cannot be replicated, as recent developments under the capitalist mode of production have changed all societies on the planet or even made them disappear (e.g., Wolf 1982; Davis 2001). Where anthropology has re-visited old field studies and scrutinised previous views on kinship, conclusions reached were often different from the original anthropological studies (e.g., Hutchinson 2000).

Archaeology, on the other hand, tries to replicate this information through the analysis of the material remains left by societies which can no longer be observed nor directly questioned. Inferences concerning kinship are usually based on the size and internal organisation of houses (e.g., Flannery 1973; Kuijt 2002) or on the spatial/stratigraphic arrangements between individuals of different age and sex buried in the same place or monument (e.g., Hager and Boz 2012; Lull *et al.* 2016; Cveček and Schwall 2022). Yet, neither house architecture nor funerary practices are always or only ruled by what anthropology has defined in multiple ways as kinship. This observation allows for

interpretations from many other realms of social organisation, such as interaction with the environment, productive capacity, wealth differences, demography, ideology, etc. It follows that any reading of settlement and funerary records in terms of past kinship relations can only be tentative.

Finally, as already mentioned, genetic studies can only provide information about who was and who was not biologically related among the individuals buried in a cemetery. Unfortunately, an increasing number of studies confirm that many cemeteries only included a fraction of the original community, with the whereabouts of the rest remaining unknown. Physical anthropology has provided abundant examples where the reconstructed demographic profiles are flawed in terms of sex, age or funerary ritual (e.g., Angel 1971; Boz and Hager 2013). The reconstruction of pedigrees has recently started to quantify the proportion of the population inferred to have existed but not identified in a cemetery (Rivolat *et al.* 2023). The discussion on the reasons and criteria applied to grant subsets of the community archaeologically identifiable burials and the others not, has remained largely speculative.

The funerary practice, rather than being fragmented –as often stated– provides insight into performative and ritual practices of social groups of variable size, apparently bound to social conceptions concerning life and death. These rituals are a staged (self)representation of a community in front of the event of death and ancestry. Which persons and objects were interred where, and how, is the result of specific decisions taken in the past, rather than a more or less random result of material preservation and archaeological recovery. While a social or cultural anthropological perspective might be tempted to think that the funerary record is a representative but incomplete image of the whole living society, it is actually an intentional and meaningful selection of individuals, materials, places, and temporalities used to assert, maintain, or transform social, economic, and political relations. Consequently, whoever is buried in a certain way and whoever is not expresses a social selection and the intention to ascertain (or overcome) specific social rules. Whatever bioanthropological, archaeological or genetic results are retrieved from funerary contexts, they are inevitably affected by the decisions made by past societies about who was buried or dealt with where and in which way (Risch *et al.* 2023).

One archaeological realm where this performative complexity can be captured exceptionally well is intramural burial practices. The close proximity between human remains and the persons living in the dwellings already attaches a special importance to the dead in the ideological, political, economic or other practices of these communities. A selection of corpses is practically inevitable, as the size of houses already sets physical limits on the number of possible interments, if tombs are not reopened and regularly emptied of corpses (Kuijt 2008). When the whole community cannot be entered, special rules need to be established concerning who deserves attention; rules which were definitely anchored in the social relations of the living. Understanding the rules of intramural interment should provide us direct insight into the social relations of the persons living, working or simply having access to these social spaces. While bioarchaeology has been crucial to identifying rules of interment in terms of sex, age, pathologies, and nutrition, and while archaeological observations have retrieved spatial and structural regularities, archaeogenetics allows us to establish if the buried individuals where biologically related or not. Whichever array of relations existed in the past, sexual relations leading to descendants definitely formed part of them and merit special attention given their crucial importance for the physical as

well as political reproduction of the community. Consequently, archaeogenetics can provide information to understand our prehistoric past, which goes beyond the realm of the relation between biological relations, sex and kinship (Risch *et al.* 2023).

Resorting to recent aDNA results obtained from intramural Iron Age inhumations of the North of the Iberian Peninsula (Papac *et al.* 2023), the present study aims to highlight the heuristic gains achieved by this type of studies. This case shows how archaeogenetics can provide, for the first time, a hypothesis on the reasons followed by a community to separate their deceased into different groups. But we also want to highlight how genetic data can be used to understand the social group attached to architectonic buildings, conventionally interpreted in archaeology as houses and settlements, and the temporal duration of these relations.

8.2 Intramural burials in Iron Age Iberia

While cremation became a widespread funerary practice in large parts of Europe and the Mediterranean by the end of the Bronze Age, communities in northern Iberia and along the Mediterranean coast –from Languedoc to Murcia– reserved intramural burial for a selected number of children, most of which died at perinatal age (Fig. 8.1). Absolute dates and stratigraphic observation indicate that infants started to be interred in settlements in this large territory around 1000 BCE and continued to be practiced under Roman rule (Moya *et al.* 2005: 44).

So far, around 770 intramural burials of young children have been identified in nearly 90 Final Bronze Age and Iron Age settlements, mostly in the north-eastern part of the Iberian Peninsula (Fig. 8.1). Although numbers differ notably between sites, over half of the known settlements have only produced evidence of one or two intramural burials. According to the available funerary evidence, the rest of the population was cremated and buried in cemeteries outside the settlements. The discourse surrounding the meaning of this very restricted intramural burial rite has developed over a long time in Iberian archaeology. Sacrificial rituals have been suggested for a long time (Gusi 1970), but these are not supported by available anthropological evidence. Alternative explanations have related the burials to offerings during the construction or remodelling of buildings (Guérin and Martínez 1987-1988; Dedet and Schwaller 1990). Intramural interments have also been considered as a selection of children who died of natural causes (Armendáriz and de Miguel 2006: 41; Lorrio *et al.* 2010). Age was clearly a selection criterion as most of skeletons that have been studied anthropologically died around 40 weeks of intrauterine life, probably during or shortly after birth (Risch and Carbonell 1986; Guérin and Martínez 1987-1988; Gómez and Oliver 1989; Gracia *et al.* 1989; Maluquer de Motes *et al.* 1990; Agustí *et al* 2000; Armendáriz and de Miguel 2006; de Miguel 2009; Lorrio *et al.* 2010; Carnicero-Cáceres and Torres-Martínez 2021). Double and triple burials, which are well-documented in a dozen settlements, have been interpreted by some authors as twins or triplets, who died more or less simultaneously at a perinatal age (Agustí *et al.* 2000; Armendáriz and de Miguel 2006; de Miguel 2009; Lorrio *et al.* 2010; Subirà and Molist 2016; Blasco and Montón 2019). No specific burial patterns can be recognised in terms of the spatial distribution of the skeletons within the settlements. Neither the number of burials nor the rooms and buildings where they are placed in seem to follow any obvious rule.

The apparent randomness concerning the number of tombs, the number of inhumations per tomb, and their location inside the settlements suggests that the events or circumstances leading to intramural burial practices were unforeseeable or erratic, as well as selective in view of the limited number of skeletons found in living spaces.

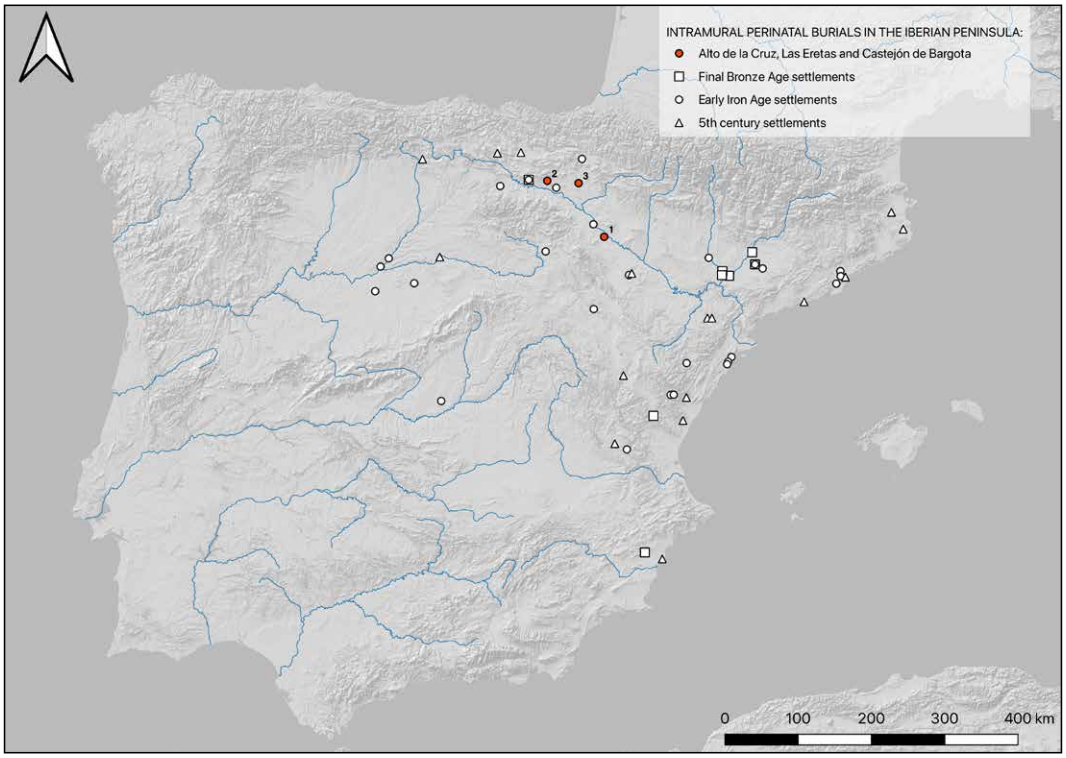

Figure. 8.1. Map of Late Bronze Age and Early Iron Age settlements with intramural perinatal burials in the Iberian Peninsula: 1. Alto de la Cruz; 2. Las Eretas; 3. Castejón de Bargota.

8.3 The analysed burials and their archaeological context

So far, the genomes of 37 intramurally buried children have been studied, found in three Early Iron Age (henceforth EIA) settlements of Navarra (Spain), dated between *ca.* 800-450 BCE. They include 29 individuals from the well-known fortified settlement of Alto de la Cruz, excavated extensively during the second half of the twentieth century (Fig. 8.2). Another six individuals come from a very similar, though smaller, settlement of Las Eretas, and two more individuals were found at El Castejón, all excavated in the last decades (Armendáriz and de Miguel 2006; Castiella *et al.* 2009). The three sites are fortified villages with blocks of rectangular houses typical of a new occupation pattern emerging in the northeast of the Iberian Peninsula during the last stage of the Late Bronze Age (Maluquer de Motes 1958; García *et al.* 1994). While Alto de la Cruz and Las Eretas are good examples of lowland villages located at the bottom of valleys next to the Ebro and Arga rivers, respectively, El Castejón de Bargota is a fortified hilltop settlement that occupies one of the heights in the southern foothills of the Cantabrian mountains.

8.4 Insight into funerary ritual and social organisation provided by genetics

From the 37 EIA children of the three settlements, the petrous part of the temporal bone was sampled and analysed for aDNA. Enough data was produced from 35 children (>40,000 1,240k single nucleotide polymorphisms, henceforth SNPs) for downstream autosomal,

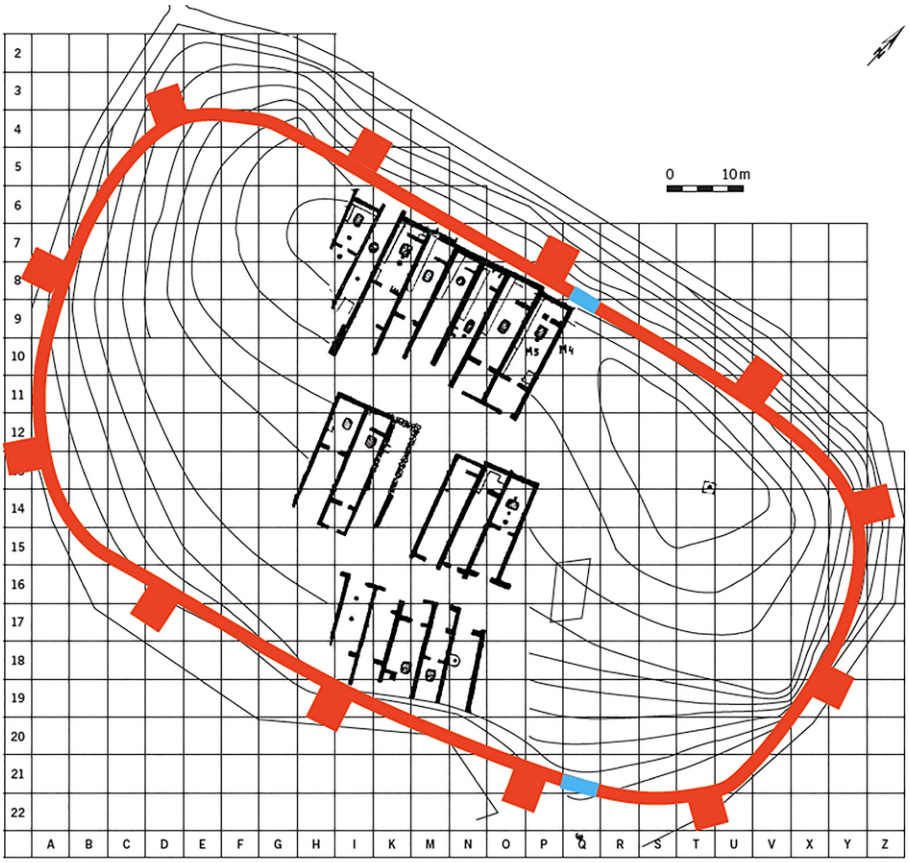

Figure. 8.2. General plan of Alto de la Cruz (village PIIb) with the authors' proposal for the reconstruction of its fortification; in blue, documented parts of the wall; in red, proposed layout (modified after Maluquer de Motes 1954: pl. 1).

Y-chromosomal, and mitochondrial analyses. READ (Kuhn *et al.* 2018) was used in the first place to identify close biological relatedness. Recently, IBD (i.e. identity by descendent) analyses have been performed on those individuals with >500.000 SNPs recovered. This information allows us to identify relations which can reach up to the tenth degree. The patterns of consanguinity and effective sizes of the population from which individuals are sampled were determined by runs of homozygosity (henceforth ROH) in genomes of various haplotype lengths using HapROH (Ringbauer *et al.* 2021). Finally, the individuals studied here were also subject to a recent screening project involving 9,855 ancient samples with genetic data for chromosomal trisomies (Rohrlach *et al.* 2024). This combination of genetic and statistical approaches has allowed us to provide insight into the biological conditions of the children and the social relations that might have led to their burial within the settlements.

8.4.1 What was different or "special" about the few children buried inside the houses?

Taking into account that child mortality in late prehistory probably affected between one quarter and one third of the population (Alesan *et al.* 1999; Séguy and Buchet 2013; McFadden *et al.* 2022), the few intramural burials recovered in the Iron Age settlements of northern Iberia must have fulfilled certain criteria to be spared from cremation and

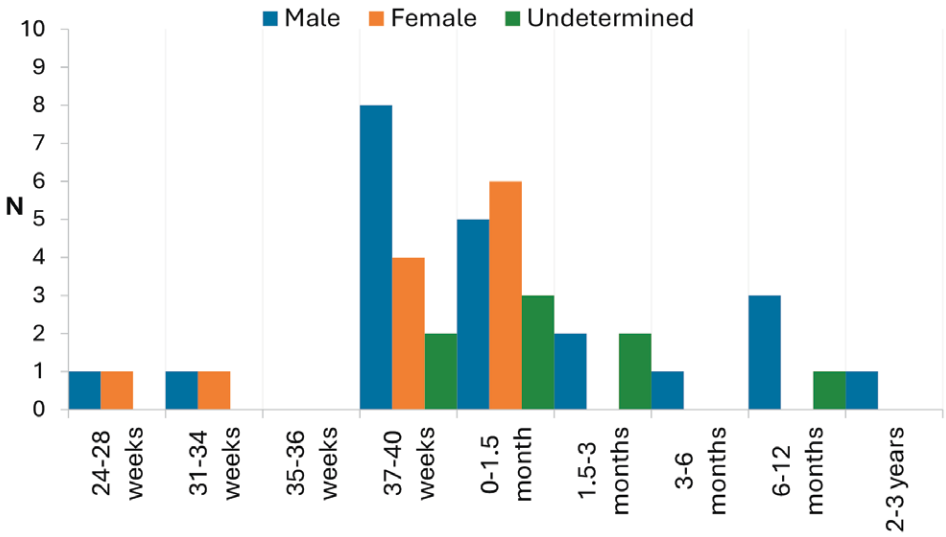

Figure 8.3. Age and sex of the anthropologically and genetically studied buried children from Alto de la Cruz, Las Eretas and El Castejón (Navarra, Spain).

kept inside the architectonically circumscribed spaces where part of the social practices of these communities took place.

Age of death clearly seems to have been one of these criteria (Fig. 8.3). Two thirds of the buried children had died at the end of gestation (37-40 weeks), possibly because of birth complications, or immediately afterwards. During the first month of extra-uterine life, deaths are frequently related to the after-effects of a complicated birth, infectious disease, often of respiratory and digestive type, and to genetic and congenital alterations that limit the development of the babies, leading to their death. Very few of the buried children (~10%) had not reached the age of foetal maturation (37 weeks). This distribution of age and sex offers a demographic profile which, despite possible limitations, may be representative of child mortality in EIA populations. More difficult to explain are the children over six months of age, some of whom featured clear asymmetry between dental and bone development.

The results of genetic sex determination reject the possibility that children were selected according to their biological sex (Fig. 8.3). Despite more male than female intramural child inhumations being recovered, the ratio does not deviate statistically significantly from 1:1 ($p=0.24$, binomial test). A clear disproportion is only observed among the children buried above three months of extrauterine life, all of which could be identified as male when genetic analysis was successful (7 of 10 individuals). It is unclear if this mirrors the higher male than female mortality commonly observed among children (Drevenstedt *et al.* 2008; Pongou 2012).

More significant is the exceptionally high number of identical twins identified through READ among the 35 sequenced children. The first case was identified in Las Eretas and the second in El Castejón. In both cases, twins were buried together under the respective house floors, suggesting they died simultaneously at a perinatal age (Fig. 8.4). It is noteworthy that the two individuals originating from another possible double burial were not related in a first or second degree, implying that not all multiple EIA infant burials need to be seen as twins, siblings or half-siblings. However, this conclusion needs to be taken with caution, as no information on the context of both skeletons, found in 1949, has been published.

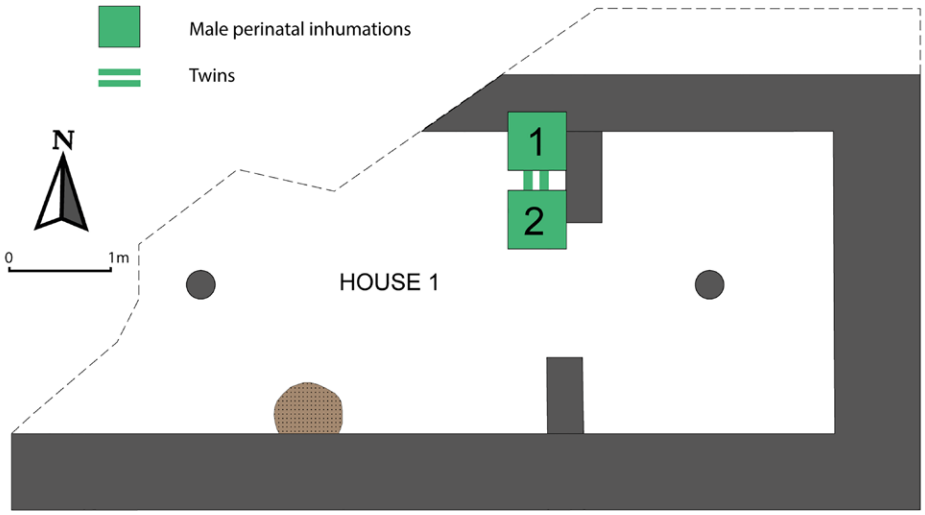

Figure 8.4. Location of a grave with identical twins inside House 1 of El Castejón.

We also identified two cases of first-degree relatives, and the fact that all four individuals are newborns and share mitochondrial and Y-chromosome haplogroups implies they must be siblings. Five cases of second-degree relatives were also found. It follows that some couples and some biologically related groups buried more than one of their children inside the settlements, while others did not. This excludes, for example, that an exclusive intramural burial right was followed when the first child of a couple was born dead.

More unexpected has been the identification of four cases of children with chromosomal trisomy, three from Alto de Cruz and one form Las Eretas. The screening of 9,855 ancient genomes generated at the Max-Planck Institute for Evolutionary Anthropology only revealed two more prehistoric cases, which were also buried inside settlements (Rohrlach *et al.* 2024). Only two more cases of trisomy in prehistory have been published so far (Cassidy *et al.* 2020; Anastasiadou *et al.* 2024). All of them have been identified as having Down syndrome (trisomy 21), whereas one child from Alto de la Cruz is the first and, so far, the only case of Edwards syndrome (trisomy 18) known from prehistory. The high frequency of children with trisomy in Alto de la Cruz and Las Eretas suggests that these children were perceived as "special" and worthy of keeping near the living.

In sum, the exceptionally high number of twins (4/35) and cases of chromosomal trisomies (4/35) identified through genetics provide a first hint concerning the funerary criteria applied to a small number of children. In this sense, the intramural burial right appears as an expression of a certain perception of illness and way to approach it.

8.4.2 How large were the communities related to EIA settlements?

The observed patterns of ROH imply that the dwellings of the Iron Age maintained relations with a population of several thousand, which in general allowed them to maintain low levels of consanguinity. The cases of trismy 18 and 21 identified through statistical screening of ancient genomes offered a new way to approach paleodemography. As these genetic disorders seem to have occurred at the same rates in past human populations as they do today, their appearance in a community implies a specific number of births (Rohrlach

et al. 2024). Today, the rates of prevalence of Down and Edwards are 1:705 and 1:3,226, respectively, when considering live births, stillborn and terminated pregnancies. These mean values were used to simulate the total population required to produce the cases of trisomy observed for Alto de la Cruz and Las Eretas. This simulation took into account: a) that neither settlement was completely excavated, nor all samples yielded aDNA; b) that the corrected life expectancy at birth (e^0) in the EIA could have been 22.9±1.37 years; and c) considered the size and duration of the settlement (see Papac *et al.* 2023 for details). According to the results of five million simulations, the cases of trisomy 21 expected to have been buried in Alto de la Cruz would have required between 9,249-16,947 births over the course of 400 years of EIA occupation. Running the same calculations with trisomy 18, a similar range of births was reached (11,643-21,334). In the case of Las Eretas, with an occupation of 250 years, between 6,085-10,929 births would have been required to result in the number of children with trisomy 21 expected to have been buried in the settlement.

If this cumulative census population size (D) over the settlement's lifetime is transformed into actual population numbers, using the well-known paleodemographic formula proposed by Acsádi and Neneskéri (1970), and adding the maximum and minimum figures derived from the trisomy 18 and 21 cases, the population burying these children in Alto de la Cruz (P) would need to reach between 530-1,221 persons. The population placing their dead trisomy 21 children in Las Eretas can be simulated between 557-1,001 persons. Though not quantifiable in the same way, these large population sizes are also supported by the high numbers of identified twins.

8.4.3 How large were the communities performing intramural burials?

Genetic analysis of intramural burials, especially in the case of children, can also inform about the social composition of the persons who had access to these spaces. We consciously avoid using the term "living" as such actualism of household organisation might not be as universal as Western ways of dwelling might suggest. The EIA communities of Navarra might have organised build spaces in a very different way, as we will see.

Few of the archaeological labels of the anthropological remains recovered between 1948 and 1957 provide sufficient information to relate them, at least tentatively, to some of the individuals mentioned in the excavation reports (Taracena and Gil 1951; Gil 1953; Maluquer de Motes 1958). But in at least two of the more recently excavated spaces of Alto de la Cruz and one from Las Eretas we were able to sequence groups of children buried under the same floor level and to define their degree of biological relatedness. The most complete bioarchaeological record has been provided by Building 87/8 of settlement phase IIa, where all five children could be sequenced (Fig. 8.5). Two brothers (CRU026-CRU027) were buried at a certain distance from each other in the northwestern part of the *ca.* 90 m^2 space. A set of sisters (CRU022-CRU023) was placed more to the southwest, again at a certain distance from each other. These sisters are among the five highly consanguineous individuals identified by the ROH pattern (Papac *et al.* 2023: fig. 18). Their long stretches of ROH (≥ 33 cM) totalling ≥ 62 cM in length, suggest that they are the offspring of parents who were related to one another at approximately the third-degree (possibly first-cousins). A third female infant (CRU025) was placed between both pairs, but no first- or second-degree relation with both pair of siblings could be identified (Fig. 8.5). It is of interest that the three children

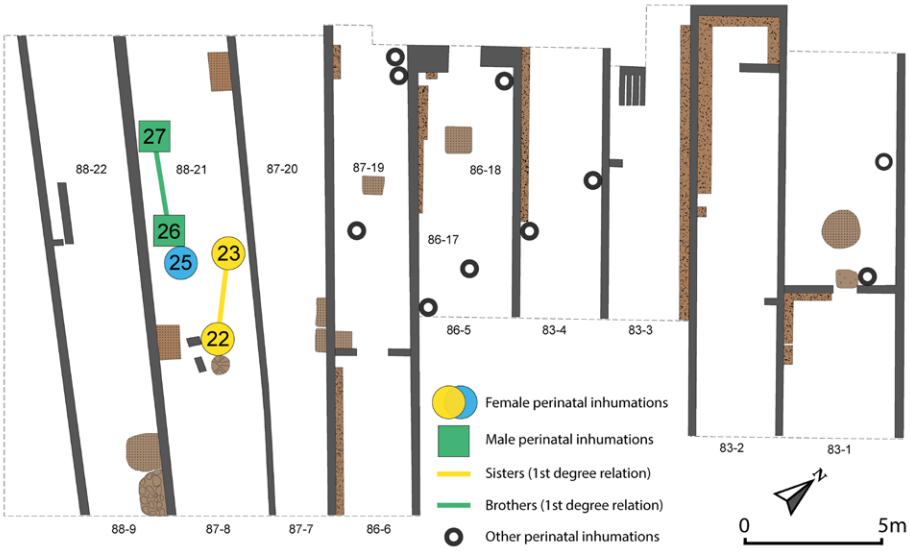

Figure 8.5. Alto de la Cruz settlement phase IIa and first-degree relationships between perinatal inhumations identified in building H87/8.

buried closely together in the central part of the room had no close biological relations between them, while the siblings of two of them are located at a certain distance from this central group (Fig. 8.5). The newly generated IBD data confirm that the two brothers and the two sisters belong to nearly mutually exclusive pedigrees. Both siblings are related in a third or more distant degree to other children of the settlement, but neither of these groups show relations between them.

A similar situation is observed in the building immediately below 87/8, which was destroyed by intense fire at the end of settlement Phase IIIb. Two of the three perinatal burials excavated in the central part of Room 88/21 could be analysed with READ (CRU028, CRU029), showing that a first- and second-degree relation can be excluded (Papac *et al.* 2023: fig. 18). The new IBD data confirm that both individuals also belong to mutually exclusive pedigrees. The boy CRU029 is related (>20cM) to at least five more children, including the two brothers CRU026-CRU027 and the girl CRU025, buried in the successive building of settlement phase IIa, but none of these individuals has a similarly close relation to the young boy CRU028, who instead was distantly related (>12cM) to CRU024, a case of trisomy 21 also dated to phase IIIb, and to the twins ERE001-ERE002 found in Las Eretas. The pedigrees of CRU028 and CRU029 can only be related through CRU024, which is related (several stretches >20cM) to CRU006, which in turn is more distantly linked to CRU029 (only one stretch >20cM).

The same situation is also observed in Las Eretas, where three of the four children buried in Building 2 were successfully sequenced (Fig. 8.6). Meanwhile, ERE004, a boy with Down syndrome and the individual with the highest ROH values in the whole sample (Papac *et al.* 2023: fig. 18), and the girl ERE005 had a second-degree relation, probably implying they were half-siblings rather than "uncle/aunt-nice/nephew". As they share the same mt haplogroup (Papac *et al.* 2023: tab. 6), the first scenario would imply that both were children from the same mother, but of different fathers. The second would

Figure 8.6. Buildings and infant burials of Las Eretas. Besides the twins ERE001 and ERE002, only inhumations ERE005 and ERE006 revealed a second-degree relationship.

suggest a matrilineal line of descent. Both individuals were distantly related to twins ERE001-ERE002 of the neighbouring building (Fig. 8.6). In any case, the biological relations between the two pairs were neither through a paternal nor through a maternal line, as mitochondrial and Y-chromosome haplogroups are different. On the other side, boy ERE003, which was not buried at a large distance from the two previous closely related individuals, shows no match with any individual from Las Eretas or Alto de la Cruz.

In sum, in all rectangular buildings where we could sequence two or more individuals excluding twins, the present results do not support the identification of individual dwellings with nuclear families, as conventional archaeological models tend to assume (e.g., Maluquer de Motes 1958). Rather, the EIA buildings seem to have been managed by extended groups formed by several couples and their offspring. In all three analysed buildings, the offspring implied markedly different pedigrees, both in ascending and descending lines. These pedigrees were only remotely related, as in fact were most inhabitants in both settlements. The spatial closeness of the children's burials does not necessarily preclude biological closeness, except in the case of twins which were always buried together. In Building 87-8 of Alto de la Cruz, three different couples even had the right to bury (some of) their children in the same space and in close proximity to each other.

Given the short duration of each settlement phase, it is unlikely that these genetic and spatial patterns are the result of successive occupation of the buildings by different groups. Such a scenario, with extended groups attached to the buildings, also finds support in the archaeological record of the successive and exceptionally well-preserved Rooms H88/21 and H87/8. Unfortunately, very few remains were found in the interior of Building 2 of Las Eretas, which was neither destroyed by fire nor suddenly abandoned. However, the contents

	Surface	Hearths	Kilns	Grinding Slabs	Pottery	Burials
Alto de la Cruz, Building 87/8 (level IIa)	93 m^2	2	-	2	9	5
Alto de la Cruz, Building 88/21 (level IIIb)	Unknown, but probably *ca*. 90 m^2	1	1	3	17	3
Las Eretas, Building 2	71.5 m^2	1	0	1	3	4
Las Eretas, Building 4	99.5 m^2	2	2	3	12	not excavated

Table 8.1. Food processing structures, grinding tools and small-sized pottery (collared cups and bowls) found in buildings with multiple intramural burials from Alto de la Cruz and in well-preserved buildings from Las Eretas.

of Room 4 provides a better glimpse of what could have been the common inventory of an EIA house at Las Eretas (Tab. 8.1). The number of hearths, grinding stones, and pottery vessels have been used in archaeology as indicators of the number of persons involved in the productive and consumptive activities of a social space. Particularly tight is the relation observed in different ethnographical contexts between grinding stones and adult women, given the physical constraints of cereal grinding, which usually is carried out daily for several hours by each woman (e.g., Hayden 1987; Horsfal 1987; Gronenborn 1994, also based on our own fieldwork in rural northern Ghana and Mali). Quern stones are usually a lifetime possession of women. Only where markedly different types of cereals –such as wheat and millet– are ground in similar quantities, can a women use two different grinding slabs (Nixon-Darkus *et al.* 2024), a situation which is not supported by the botanical record of Alto de la Cruz (Cubero Corpas 1990). Demographic inferences based on grinding tools must also take into account that in Navarra only the stationary grinding slabs seem to have been made of stone (Maluquer *et al.* 1990), while the grinders are missing in the lithic record and, probably, were made of wood, as confirmed experimentally and through use wear analysis in other parts of Iberia (Delgado-Raack and Risch 2016). In relation to pottery, only small vessels have been considered, as they were probably related to the individual consumptions of food or beverages.

According to these parameters, the food processing structures, tools and pottery recovered in the buildings of Alto de la Cruz and Las Eretas conform better to a pattern produced by extended groups than by nuclear families (Tab. 8.1). Large buildings had at least two grinding slabs, two firing structures, and a large number of small pottery vessels. The presence of two identical hearths placed in different parts of the square room is particularly revealing in Building 87/2 of Alto de la Cruz and in Building 4 of Las Eretas. Instead, in other rooms, cooking hearths were clearly shared by the extended groups, suggesting a high degree of cooperation. The large amount of pottery of different sizes and shapes present in the buildings also supports the occupation by a large number of individuals rather than of a nuclear family. If the small vessels and bowls are considered to be representative of the number of (juvenile and adult) individuals consuming in a certain space, the larger houses can be expected to have provided food to more than nine persons (Tab. 8.1). All 12 vessels from Building 4 of Las Eretas come from the back of the room. According to their find context, they seem to have been stored in a pantry

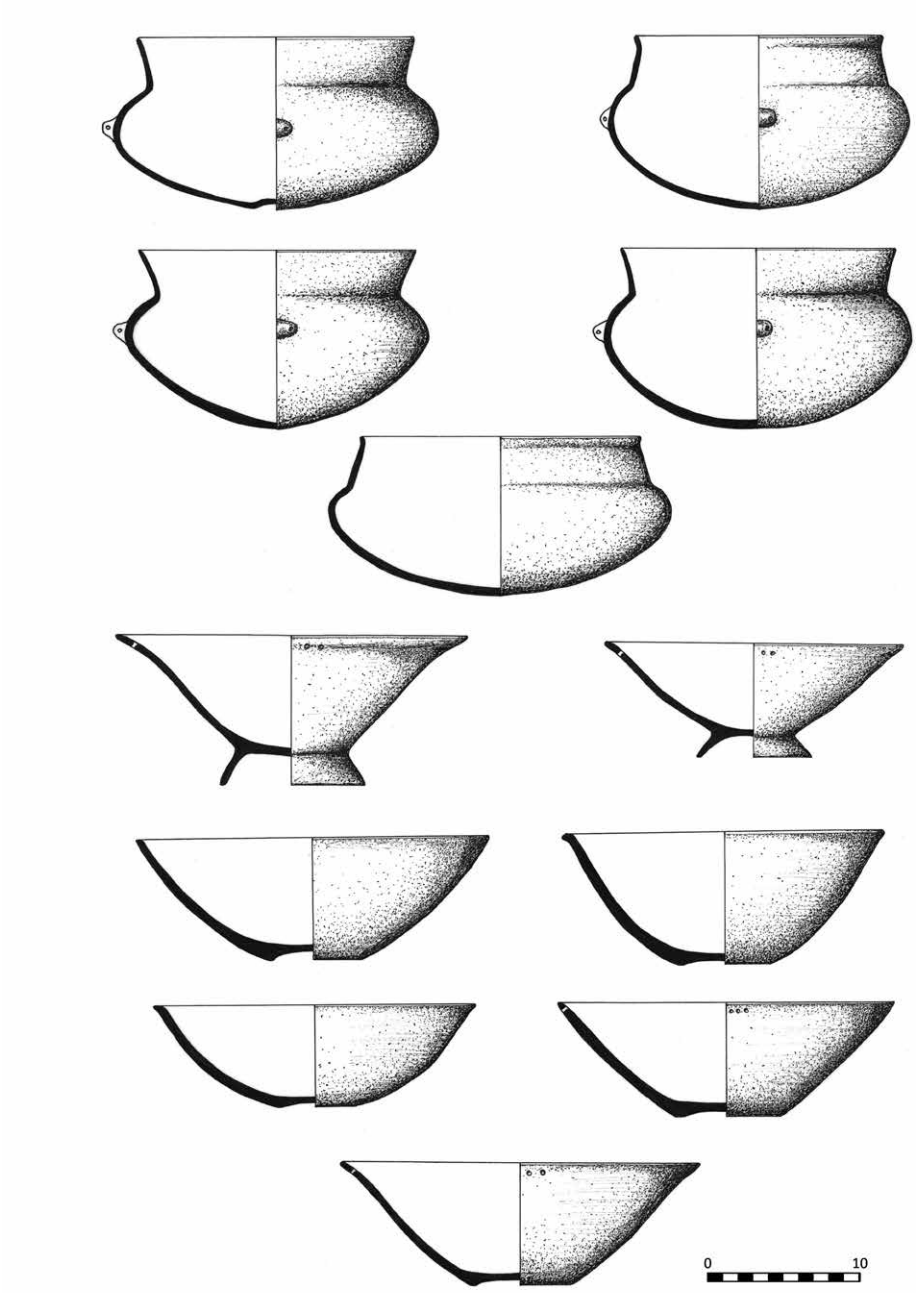

Figure 8.7. Small collared cups and bowls found in the rear of Building 4 of Las Eretas, probably stored in a pantry.

or cupboard, rather than used in daily activities (Fig. 8.7). Five vessels are simple bowls while another five classify as collared cups. They would have allowed serving different types of foods and beverages to five additional persons, who were always not present in the building (Fig. 8.7). A special standfood and another two bowls have exceptionally fine walls and might have been used for special purposes. Only Building 3 of Las Eretas seems to have relied on one hearth, one grinding slab and a few pots; but its size is significantly

smaller. It must also be mentioned that at least in Las Eretas, modern excavations could show that grinding slabs were also placed and used in open spaces outside the buildings. In any case, the larger and better-preserved constructions have provided an exceptional variety and quantity of daily means of production and consumption, making the engagement of an extended group more likely than a nuclear family.

8.4.4 Did the EIA communities of northern Iberia follow patri-, matrilineal or ambilineal descent?

Another interesting result of IBD is the observation that pairs of individuals having second- to fourth-degree relations (nine or more shared sequences of >20cM) often share the same mt haplogroups (7 out of 11). Three more pairs of individuals sharing only one to six sequences of >20cM also have the same mt haplogroup. Such a pattern suggests that some of the children were related through the maternal line, while others –slightly less– were through the paternal line. This is even more likely, taking into account that the buried children could not have had descendents, and that some second-fourth-degree related pairs belong to different settlement phases and/or were found in different buildings, making it unlikely that they were the children of the same woman. Apparently, rules of matrilocality and "male exogamy" were followed by these EIA communities, although patrilineality and patrilocality also seem to have existed, as the related cases with different mtDNA support.

8.5 Conclusions

The substantial progress in our understanding of prehistoric societies achieved through the close collaboration between genetics and archaeology becomes manifest recalling, for example, the conclusions reached by the excavator of Alto de la Cruz concerning family life in the settlement's houses. It was published over 60 years ago, but echoes the views held in relation to many regions and periods in prehistory: "The type of house and the subsequent tradition throughout the Ebro basin and in most of the Peninsula suggests that we are dealing with a monogamous society. The houses present such a unity that it is difficult to combine the coexistence under the same roof of several women with their respective children" (Maluquer de Motes 1958: 142, translated by the authors).

The first genetic results provided by intramural and mostly perinatal burials of EIA Northern Iberia oblige us to reconsider such assumptions perpetuated as conventional wisdom in dominant narratives. In the first place, we have confirmed that the funerary ritual devoted to a small group of children observed strict criteria concerning age, but not sex. Sacrificial rituals can be excluded given the lack of paleopathological evidence of violent actions but is also contradicted by the observation that several of the buried children, including one case of Down syndrome (CRU024), had not reached the age of foetal maturation and could not have survived childbirth or were stillbirths anyway, making sacrifice impossible. Our current hypothesis, which will need to be confirmed in other settlements, is that the perinatal children buried under the living floors of the living were selected for their unusual traits or were born under special circumstances perceived by the community at their birth. Twins and children with trisomies are clearly overrepresented, considering that our sample only included 35 individuals. Clearly, this

group of children was socially valued as being different enough to remain close to the spaces of everyday life, instead of being cremated and buried in urnfield cemeteries outside the settlements. The aspect of health or the specific circumstances in which a child was born and –shortly afterwards– died have not been imagined as possible motivations behind these ritual practices and might modify recent reflections of social anthropology on the meaning of intramural child burials in other prehistoric contexts (e.g., Kuijt 2008; Cveček and Schwall 2022).

The archaeogenetic study of Alto de la Cruz and Las Eretas has also provided new strategies to address crucial aspects of social organisation such as community size and continuity. The number of persons involved in this special child burial rite, in the settlements as well as in the individual buildings, was substantially larger than thought in all previous models, which were ultimately derived from ethnological observations. It can be expected that this ideologically connected community was also responsible for the economic and political organisation of the settlements. The size of the populations attached to 0.5-0.75 ha large settlements, such as Alto de la Cruz and Las Eretas, could have reached up to 1,000 people, making it likely that they settled beyond the fortified areas. The sharing of buildings by biologically unrelated groups, otherwise residing in a wider area, suggests a complex economic and political use of the walled space, which challenges the usual household-based models envisaged by archaeology.

A further challenge to current views is the fact that the very regularly built square houses –which is a recurrent trait of Iron Age architecture in Iberia– seems to have been used by two or more groups of mutually exclusive descent lines. The regularity observed in the material inventories of the houses has often been used as evidence for the lack of social inequality and economic exploitation in the EIA settlements (Ruiz Zapatero and Fernández Martínez 1985; Armendáriz 2008: 175-181). This co-habitation, co-working, and co-worshiping of their children, involving a considerable number of people who shared the same spaces, fireplaces, raw materials, and tools, might have been a successful mechanism to avoid social asymmetries.

Although further archaeogenetic studies are necessary to support this result, the high number of second- to fourth-degree relations sharing the same mt haplogroup suggests that settlement continuity, also after moments of destruction, was assured mostly –though not exclusively– through the different maternal lines of each community. Also in this respect, the EIA of northern Iberia seems different to the Bronze Age communities, as well as to the traditional model of Western societies.

Acknowledgements

This project has received funding from the European Research Council (ERC) under the European Union's Horizon 2020 research and innovation programme (grant agreement 851511). It has also been supported by the Spanish Ministry for Science and Innovation (PID2020-112909GB-100) and by the research project "Convergence and interaction between complex Bronze Age societies" from the Academia program of the *Institució Catalana de Recerca i Estudis Avançats* (ICREA) of the Catalan Government. One of the authors, Marcello Peres is the beneficiary of a Margarita Salas Grant from the Spanish Ministry of Universities, under the framework of the European Union "NextGenerationEU" program.

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