

Uncommon surnames narrate the family history of those who bear them

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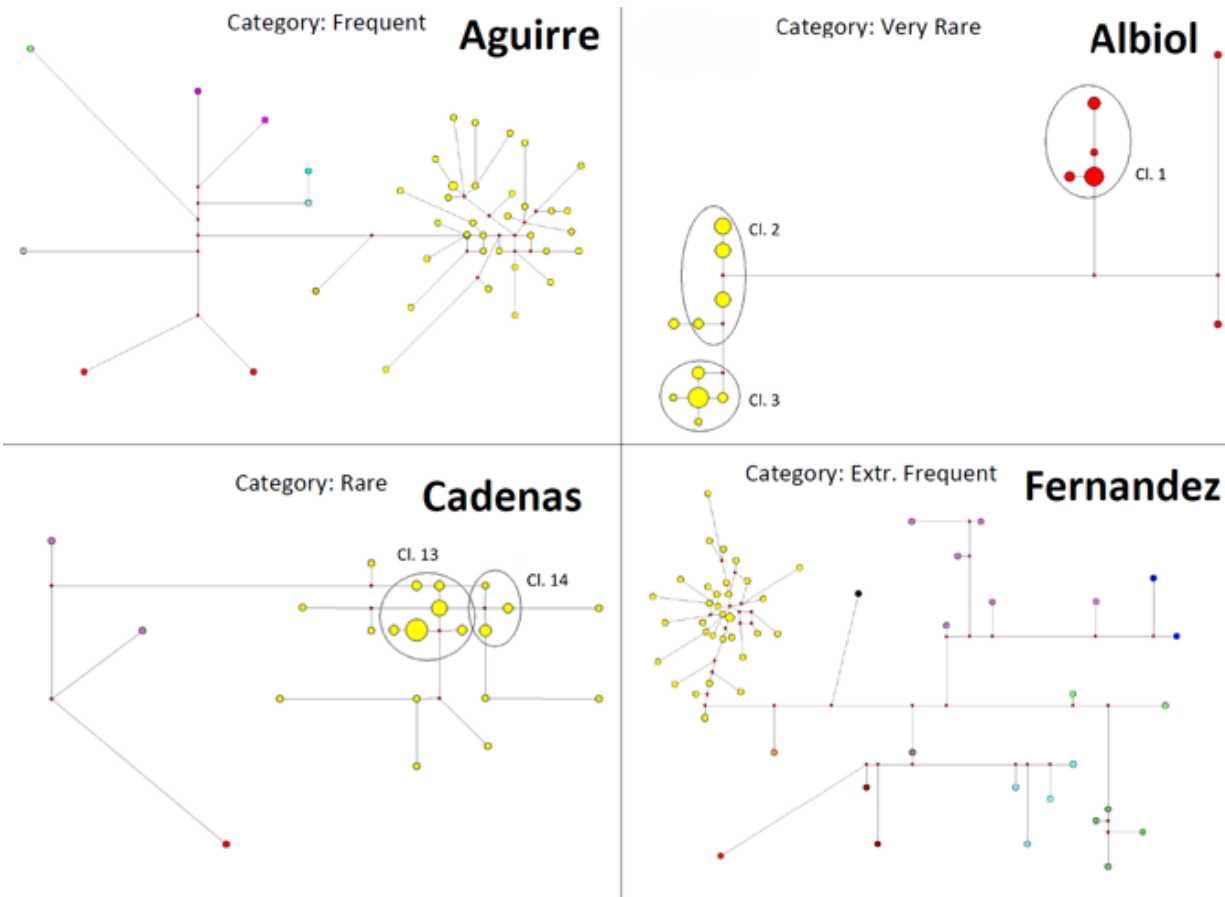
The Bonet Gonzalez family. Credit: Anna

In most societies, surnames are passed on from father to son, just like the Y chromosome. This suggests that men who share the same surnames may have Y chromosomes that are related to one another. A new study analyses this correlation in Spain and reveals that a large number of men

who are bearers of the same unusual surnames are distant relatives.

The relationship between [surnames](#) and Y chromosomes -both paternally inherited- has previously been a subject of research in Great Britain and Ireland. For the first time, a study has now explored the correlation between surnames and chromosomes in Spain using samples from over 2,000 volunteers, resulting in an inverse correlation between the frequency of the family name and the prevalence of the Y chromosome.

"There is a strong relationship between the surname and the Y chromosome in Spain. The majority of men who share relatively unusual family names -those carried by less than 6,000 people in all of Spanish national territory- also tend to share an identical or very similar Y chromosome, thus demonstrating that these surname carriers descended from the same original bearers of those paternal surnames," explains Conrado Martínez-Cadenas, a researcher from the Department of Medicine at Jaume I University in Castellón and from the Human Evolutionary Genetics Group at the University of Oxford, as well as the main author of the article published in the journal *European Journal of Human Genetics*.



Relationship networks among men with the same surname for four Spanish surnames with different frequencies. Credit: University Jaume I

Nonetheless, the analysis shows that as a surname becomes more common, the correlation with the Y chromosome gradually disappears. The data indicate that common family names do not represent men from the same family line given that all of them have different [Y chromosomes](#).

Surname frequency - a key element in the correlation

For the study, in which the Forensic Science Institute at the University

of Santiago de Compostela also participated, 37 Spanish surnames were selected with the aim of providing wide geographic coverage in addition to representing a broad spectrum of frequency. Next, the surnames were classified into five groups: very common, surnames with over 150,000 bearers nationwide -Fernández, Martínez-; common, surnames with between 15,000 and 150,000 bearers nationwide -Aguirre, Díez-; uncommon, surnames with between 5,000 and 15,000 individuals -Tirado, Ibarra-; rare, surnames with between 3,000 and 5,000 bearers -Bengoechea, Cadenas-; and very rare, with between 100 and 3,000 individuals nationwide -Nortes, Albiol-.

A total of 1,766 samples of DNA were collected from unrelated male volunteers representing each of the 37 surnames, and another 355 control samples were obtained.

"The data show that the correlation or coancestry between the surname and the Y chromosome does not at all depend on the geographical origin (Castilian, Catalan or Basque) nor the type of surname (derived from the father's name, a place name, a profession, a nickname, a physical trait) -explains Martínez-Cadenas-. It only depends on the frequency of the surname".

According to the study, the origins of the Spanish surnames date back to an estimated 536 years ago on average. However, some surnames are older than others: their ages vary between 200 and 800 years old.

"This age is calculated by determining the most recent common ancestor of study participants with a particular surname. This is not the true age of the surname, however, but rather the point in time when study participants of the same surname had the most recent common ancestor in the direct male line," specifies the researcher.

The Irish - a different case

Prior to this study on Spanish surnames, the only detailed research conducted had analysed the relationship between surnames and the Y chromosome in Great Britain and Ireland.

The researchers decided to compare these analyses in order to find similarities and differences among these three populations. They discovered that the correlation patterns between surnames and the Y chromosome in Spain were similar to those of the British study, but different from those of the Irish study.

"The analyses indicate that the Irish surnames are much older than those from Spain and the United Kingdom, in addition to presenting a correlation that does not depend on surname frequency" affirms Martínez-Cadenas.

"In Ireland, some very common surnames present a strong correlation between surname and the Y chromosome -something that is not observed in Spain or the United Kingdom-, while others do not," sums up the researcher.

According to the study, despite the fact that Spain is a population with a historical, demographic and genetic background different from that of the British Isles, similarities with the development of British surnames suggest that the inverse correlation between the frequency of family names and the prevalence of the Y chromosome could be a general process.

The development of Irish surnames, appearing in clans in which even unrelated individuals share the same surname, would be the result of more unusual, specific circumstances.

More information: Conrado Martinez-Cadenas et al. The relationship between surname frequency and Y chromosome variation in Spain,

European Journal of Human Genetics (2015). [DOI: 10.1038/ejhg.2015.75](https://doi.org/10.1038/ejhg.2015.75)

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