

## AVARS IN THE NATURE:

### A network of extensive pedigrees unravels the social practices of the 6th–9th centuries CE in the Carpathian Basin

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*A study published in Nature in April 2024, by a team led by researchers of the Max Planck Institute for Evolutionary Anthropology in Leipzig and the Eötvös Loránd University in Budapest, reveals patterns of social organisation in Avar society (6th–9th centuries CE). More than 400 genetic samples from four fully excavated Avar Period sites from the Great Hungarian Plain have been analysed within the frame of the project, a significant novelty compared to previous archaeogenetic studies was having been aimed at analysing entire communities, i.e. sampling all available human remains. This approach allowed examining biological kinship networks within and between communities.*

Geneticists, archaeologists, biological anthropologists, isotope researchers, cultural anthropologists, and historians worked together as part of a multidisciplinary team in the framework of the [HistoGenes](#) ERC Synergy Grant (No. 856453) funded by the European Research Council to realise the research behind this study. The project, running 2020–2026, explores the population history and patterns of social organisation of the Migration Period in Central Europe in a broad international collaboration.

The population of East Asian and Steppe origin of the Avar Khaganate appeared in the Carpathian Basin in 568 CE. According to the written and archeogenetic sources ([Cell](#)), their leaders fled the steppes of Inner Asia, what is now Mongolia, during the rise of the Turkish Empire, and were joined by other nomadic groups from Eurasia during their migration. They settled in the Carpathian Basin on the remnants of the population of the Gepid and Langobard Kingdoms, which dominated the preceding period. After a few decades of intense warfare with the Byzantine Empire, these steppe groups gradually settled down and adopted a farming lifestyle based on internal resources. The Avars ruled the region until the early 9th century, when Charlemagne's campaigns ended their power.

The population of the four cemeteries (Rákóczifalva, Kunpeszér, Kunszállás-Fülöpjakab, and Hajdúnánás) published in *Nature* belonged to steppe descent groups of the Avar Khaganate. More precisely, genetic, anthropological, and archaeological investigations suggest that the communities in the Danube-Tisza Interfluvium came from Inner Asia, while those settled in the Trans-Tisza Region likely came from the Pontic steppe zone in Eastern Europe. Even if some European elements blended in over time, the genetic make-up of these groups barely changed until the end of the Avar Period. Although they were not homogeneous in origin, they lived in similar kinship organisations, which is consistent with the picture emerging from historical sources and ethnological research on the peoples of the Eurasian steppe zone.

Ancient DNA analyses have identified numerous first-, second-, and third-degree relationships between the buried individuals, which allowed the reconstruction of extensive pedigrees. For example, more than 200 people (women, men, and children) of the mortuary community of the biggest site studied (the cemetery at Rákóczifalva, near Szolnok) could be linked to nine generations of diverse pedigrees. This was the largest reconstructed biological kinship network from an archaeological context in the world at the time of publication.

The communities of the four cemeteries were organised along the same principles: a strict patrilineal genealogy, in which patrilocality and female exogamy were the norm, i.e. men remained in the community

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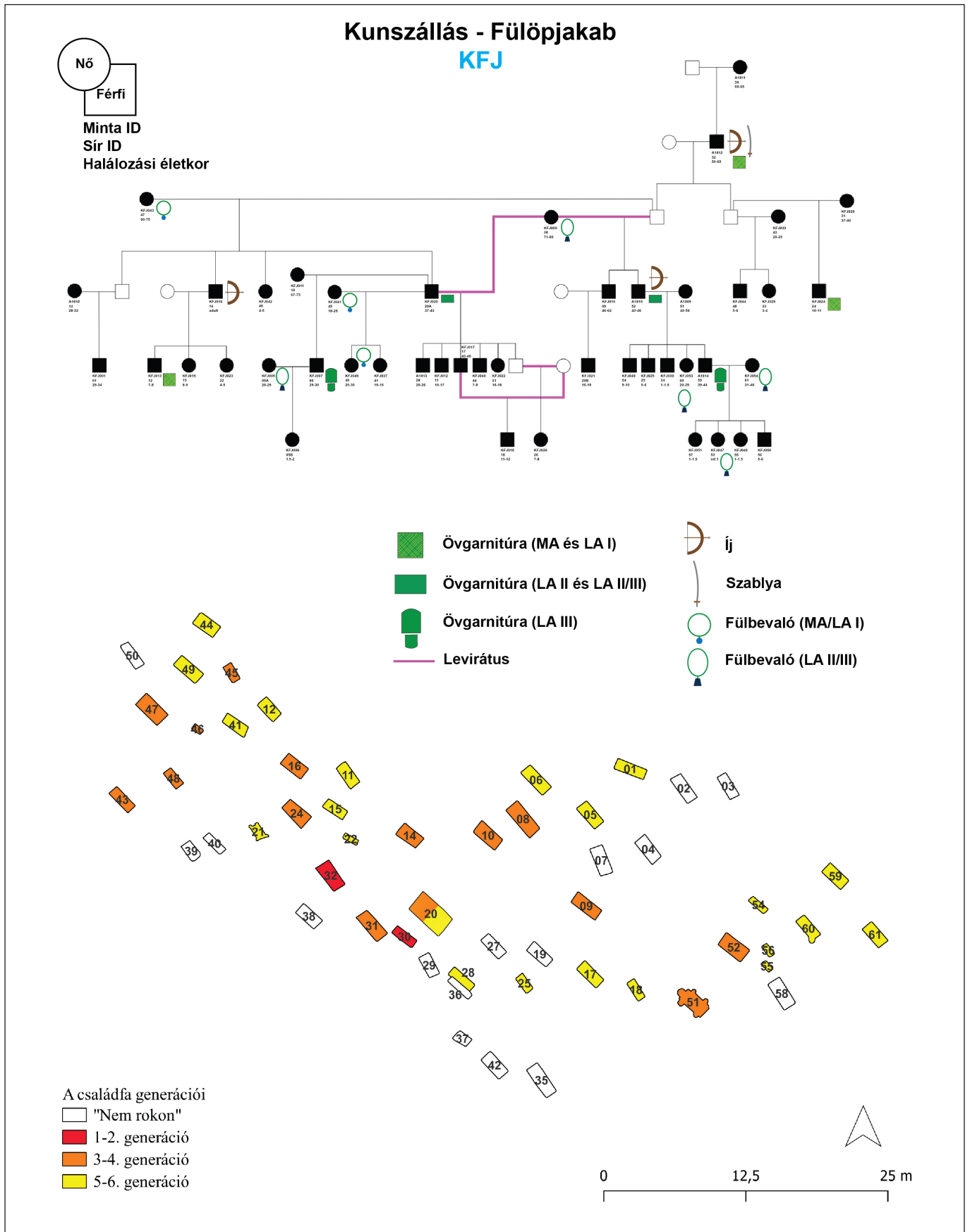


Fig. 1. Reconstructed pedigree and cemetery map of the Avar site at Kunszállás-Fülöpkab, with markings of the graves of men buried with belts and weapons, women wearing earrings, and generations (graphics by Levente Samu and Balázs Takács after GNECCHI-RUSCONE et al. 2024)

after marriage, while women always came from other places. The communities were organised around a single main paternal descent line. Archaeological evidence suggests that the role of the founders of the communities and their direct male descendants was particularly important. They were typically laid to rest in graves with an attire with ornate belts and provided with horse harnesses and sometimes complete horses for the afterlife. The heads of families and communities were likely to be selected from among them. In contrast, inter-community kinship networks were primarily established through women, as shown by a fine-scale method mapping distant biological kinship (identity-by-descent/IBD). IBD analyses also revealed that a denser kinship network was established within the Danube-Tisza and Trans-Tisza regions than between them. Another important finding in this respect is that the elderly ‘Khagan’ in the Kunbábony grave, who is considered to have held an exceptionally high social position based on the prestigious items and status symbols in his grave, had the highest number of between-site IBD connections among all the published Avar Period individuals.

In many cases, a man or woman had children with more than one partner: two, three, or even four. This may have involved remarriage due to the early death of a spouse or polygamy; particular cases may be interpreted in the light of the age at death and archaeological finds. An interesting pattern emerged among women: in the case of multiple reproductive partners, the fathers were usually close male relatives, which suggests that the custom of levirate marriage (i.e. close male kin of the deceased husband marrying the widow) were practised on a wider scale. After the early death of the husband, his brother, half-brother, nephew, or a son by another wife became the new partner. This institution served to stabilise the family’s social and economic situation after the death of one of its male members. Despite extensive biological kinship, inbreeding was not at all common in these communities. This means that descent was strictly tracked for generations and intermarriage between blood relatives was considered a taboo.

The spatial distribution of graves within a cemetery may also be indicative of social relations. In the case of the Avar communities, cemetery orders prove that biological kinship was of major importance for social relations, too. Close relatives, even adults, were usually buried near each other in the same part of the cemetery. Girls and young women up to 16–19 years were buried in the family circle but disappeared after that, moving to their new homes. Based on the collected data on age, the youngest mothers were 18–22 years old at death.

Due to comprehensive sampling, a partial replacement of the population could be confirmed in the mortuary community of Rákóczfalva. The cemetery was started by small kinship groups at the end of the 6th century CE; later, in the second half of the 7th century CE, new families led by male siblings arrived there, and most of the original inhabitants moved out. No signs of violence were found on the skeletons. The population change was also reflected in burial practice and diet. The earlier inhabitants stuck more strongly to steppe traditions (e.g., burials with sheepskin and archaic hand-formed pottery) and consumed more millet, while those arriving later differed less from the general culture of the second half of the Avar Period. In terms of genetic ancestry, however, the earlier and the arriving populations were essentially identical, with only the Y-haplogroups being different. Neither the archaeological data nor the isotopic (strontium) analyses suggested that the new group came from outside the Carpathian Basin. It is likely that internal power realignment of the Avar Khaganate and the growing population’s need for land and pasture drove them to the favourable area along the Tisza, transforming the local relations. It was at this time, in the second half of the 7th century CE, that the Kunszállás and Hajdúnánás cemeteries examined in this study were founded, thus providing further evidence of the transformations taking place within the Avar Khaganate.

One of the most important lessons learned from the reconstructed social structures is that the communities of eastern origin preserved their steppe-type social structure despite the radical changes taking place in their way of life and economy upon arriving in the Carpathian Basin. Not only the institution of the Khaganate, i.e. the organisation of the highest political elite, was based on steppe traditions until the end of the Avar rule but the kinship organisation of lower social strata also firmly preserved them.

The HistoGenes (856453 ERC-2019-SyG) project is led by Walter Pohl (ÖAW, Vienna), Patrick J. Geary (IAS, Princeton), Johannes Krause (MPI EVA, Leipzig), and Tivadar Vida (ELTE, Budapest). The human

skeletal material is kept in the Hungarian Natural History Museum and the Department of Biological Anthropology at the University of Szeged. The archaeological and anthropological analyses were carried out at the Institute of Archaeology and at the Department of Anthropology of the Eötvös Loránd University. The preparation of genetic samples was carried out by the staff of the Institute of Archaeogenomics, HUN-REN RCH. Genetic analyses were carried out in the Max Planck Institute for Evolutionary Anthropology in Leipzig. Isotopic analyses were carried out at the University of Cape Town and in the CEZA laboratory in Mannheim.

For further details, see a [presentation](#) held on the topic on the Researchers' Night in 2024 and a [summary](#) of the HistoGenes project.