LETTER

Inconclusive evidence for patrilocality in Neandertals

Based on genetic evidence collected from multiple individuals at a single site, Lalueza-Fox et al. (1) suggest that Neandertals exhibited patrilocality, a dispersal system in which males stay in their natal groups and females emigrate. Although contemporary human populations often exhibit patrilocality, flexible movement by both sexes is more typical for contemporary human forager populations, making it unclear what pattern we should expect for ancient humans.

The claim of patrilocality rests on the observation that three adult males all have the same mtDNA haplotype, whereas three adult females each carry a different mtDNA lineage. The observation of higher female than male mtDNA diversity within a group is not an indication of patrilocality, however, because males simply carry the mtDNAs of their mothers. If the females in the studied group had each survived and reproduced, their male offspring would have borne three different lineages, and thus appear quite diverse compared with the males in the parental generation or females of their own generation.

Lalueza-Fox et al. (1) also apparently assume that mtDNA haplotype sharing, as is reported for the three adult males, is indicative of a close relationship among individuals. mtDNA diversity in Neandertals appears to be low, however, suggesting that identical sequences may be readily found for individuals who are not close maternal kin. In eastern chimpanzees, a subspecies with a level of mtDNA diversity higher than that of Neandertals and comparable to that found in worldwide samples of modern humans, a recent study demonstrated that mtDNA HVR1 haplotype sharing is nonetheless a poor indicator of maternal sibship among patrilocal chimpanzee males, because fewer than 20% of the males with identical sequences were actually found to be brothers (2). Furthermore, only a very small proportion (<2%) of all possible pairs of adult males in a wild chimpanzee group are maternal sibs (2). This relative scarcity of close relatives is seen in other well-studied wild animal populations (3) and is consistent with theoretical expectations (4). The rarity of adult maternal brothers comes about because females cannot produce very many offspring, half of the offspring are female, and few offspring survive to adulthood. Thus, pairs or trios of adult maternal brothers in Neandertal groups would not be expected to be common.

In sum, the data presented (1) simply do not allow us to conclude whether Neandertals were patrilocal or not. Even if multiple groups were to be examined, use of only mtDNA makes it difficult to assess whether low differentiation among groups is caused by recent gene flow or by more distant common ancestry; thus, researchers aiming to infer sex biases in dispersal typically use comparative analyses of both mtDNA and Y chromosomes from multiple groups at appropriate spatial scales (5). This will be a big challenge using ancient DNA from Neandertal remains, but since these researchers report a molecular sexing analysis using Y-chromosomal DNA sequences (1), this study points to the tantalizing possibility that we may eventually be directly able to infer the residency pattern of Neandertals.

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