DNA analysis reveals rapid population shift among Pleistocene cave bears

February 19 2007

Studying DNA obtained from teeth of ancient cave bears, researchers have been able to identify a shift in a particular population of the bears inhabiting a European valley in the late Pleistocene era. The findings illustrate the ability of DNA sequence analysis to reveal aspects of animal population dynamics in the distant past and potentially illuminate the influence of human migrations in animal population changes.

The new work, reported by a collaborative group of researchers including Michael Hofreiter of the Max Planck Institute for Evolutionary Anthropology in Leipzig, Germany, appears in the February 20th issue of the journal *Current Biology*, published by Cell Press.

To investigate the stability of ancient cave bear populations over time, the researchers obtained DNA samples from 29 cave bear teeth from three geographically close caves in the Ach Valley, near the Danube River in modern-day southern Germany. Twenty of the teeth ultimately provided useful mitochondrial DNA sequence (mitochondrial DNA is especially useful for tracking population changes).

The findings indicated that while four sequence types (known as haplotypes) corresponded to bears 28,000 to 38,000 years old, a fifth DNA haplotype was found only in bears that were 28,000 years old or younger. These data suggested that what had been a stable, long-established cave bear population became disrupted around 28,000 years ago and was replaced by a new, genetically distinct cave bear group.

The timing of the disruption appears to roughly coincide with the arrival of modern humans in the Ach Valley, thought to have occurred by 32,000 years ago. The researchers suggest that human influence in the form of hunting and competition for sheltering caves may represent a plausible explanation for the disruption in the cave bear population, creating an opportunity for the infiltration by a neighboring cave bear group. The authors note that though the new bears successfully colonized the Ach Valley for a time, they endured only another 2,000 years before becoming extinct in the region.

Source: Cell Press