DNA preservation in late Pleistocene materials from China

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During past few years, most of ancient DNA (aDNA) studies in China mainly focused on ancient human remians with ages ranging from several hundreds years to 6 Ka BP. Abundant Late Pleistocene mammalian materials distributing in vast areas in China with great potential significance for molecular evolution.

Biogeographically, taking the Qinling Moutains as the boundary, China can be divided into South China and North China regions during the Late Pleistocene.

South China is characterized by the giant panda– stegodon fauna. Because the humid and warm climate, the quality of aDNA preservation is very poor. Many DNA extraction experiments are performaced on giant panda, stegodon materials collected from Hunan, Hubei, Guangxi, Sichuan and Yunnan Provinces in this region. But so far, no authenic DNA has been obtained from these materials. The study of aspartic acid racemization and bone or teeth histology on these fauna also indicates poor DNA preservation in these areas.

On the other hand, North China is marked by the mammoth- coelodonta fauna under dry and cold climate. The DNA preservation of a few sites in North China permits reliable ancient DNA sequences. So far, aDNA of mammoth collected from Inner Mogolia (Yang et Lai, 2003), bison from Harbin (Shapiro et al., 2004) have been reported. aDNA have been successfully extracted from horse, coelodonta, and mammoth from Harbin, Heilongjiang Province in Northeastern China.

DNA preservation in North China is better than South China. In addition to climate, pH value may also be a main factor influencing the ancient DNA preservation in these two areas.

References

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The Miocene Clarkia deposit of Idaho: New uses for old molecules

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The investigation of ancient biomolecules is traditionally dominated by the search for biomarkers in petroleum geochemistry and in the investigation of the evolution of early life in Archaean and Proterozoic rocks. But research on the biochemistry of identifiable fossil remains also has an important role.

In situ biomolecules can provide chemosystematic and phylogenetic data and yield environmental indicators. Coupled with molecular isotope information (compound specific carbon and hydrogen isotope signatures) molecular analysis provides a powerful tool for investigating ancient CO_2 concentrations, temperature and precipitation patterns, and ancient physiological adaptations. *In situ* biomolecules are also an important resource for the calibration of degradation, and organic maturity and diagenetic processes, particularly where original composition can be inferred by comparison with equivalent living material.

Research on the biochemistry of individual fossils in Tertiary deposits was initiated largely on the Miocene Clarkia deposit in response to the spectacular preservation of the biota, not least the leaves. While the plant fossils from Clarkia are some of the best known in terms of their organic chemistry, they and other elements of the Clarkia assemblage provide a focus for investigating a range of other issues, particularly in comparison with other Tertiary biotas. These include: diagenetic alteration of macromolecules; the molecular context of the preservation of labile molecules; the influence of lithology, anoxia, hydrolysis, and other degradation agents on organic preservation and the fidelity of molecular and isotopic signatures; and contrasts in the preservation of plant molecules and those of insects and fishes.